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PREFACE

Here we have the Proceedings book from the International scientific conference 11th - 12th December 2008 devoted to *theoretical, methodology and methodical aspects of physical education*. In organization of the Faculty of sport and physical education of Belgrade University, and in collaboration with the Olympic committee of the Republic of Serbia, the Ministry of education and the Ministry of science and technology of the Republic of Serbia, another significant meeting for physical culture was successfully organized and completed.

Since 1990, The Faculty of sport and physical education, on the occasion of the Faculty Day, has traditionally organized scientific conferences. Since then there has been an evident growth of the number of participants and reported papers. At first, the authors mostly from the home faculty attended conferences, but later, the authors from the other faculties in Serbia also started attending them. Gradually, the conference developed into a scientific meeting with international participation.

The papers from the scientific meeting in 2008 *("Theoretical, methodology and methodical aspects of physical education")* were published in the Proceedings book 2009, for the first time in the bilingual form (the papers were completely presented both in Serbian and English language). Altogether, 104 papers were registered: 2 invited speakers' lectures, 89 papers, 10 poster presentations and three topics in the form of a workshop. Going toward the meeting, the Proceedings book of abstracts of all registered papers was published in English and Serbian language. In compilance with the prososition, published before the Conference and the final reviaew by the members of Scientific Board, the Conference Proceedings include **57** papers in extenso. The authors from 12 European countries: Great Britain, Slovenia, Switzerland, Italy, Hungary, Bulgaria, Slovak Republic, Czech Republic, Croatia, Bosnia and Herzegovina, Montenegro, and Serbia, attended the conference.

The papers at the Conference were presented in four sessions and within a special poster presentation. According to order of presentations at the Conference, two separate publications were prepared: The Procedings book (in Serbian language, both in Cyrillic and Latin letters, in order as the papers were received), and the Proceedings book in English language.

The scientific board is satisfied with the participation of home authors and even more with the participation of foreign authors, older and younger ones, including students at master and doctoral studies. Though there were the authors who individually presented their papers, some papers were results of collective cooperation. Altogether, 152 authors (95 home and 57 foreign authors) took part at the Conference. On the basis of all this, it could be concluded that this was one of the conferences with the largest number of participants until now, the largest number of registered papers and of published papers, too. Special gratitude for translations of the papers from English into Serbian language deserves Gordana Vekarić, a lecturer of English language. The Proceedings book in Serbian language will enable all our experts to introduce the results of this international meeting. For the first time the papers are available to the world expert and scientific public in English language, and they will, besides The Proceedings book in the written form, also be presented in the electronic form at the faculty site (www.dif.bg.ac.rs).

Width of different theoretical, methodological and empiric approaches can be noticed in the structure of the presented papers at the scientific conference. As expected, the papers from different scientific fields were presented at the conference; they explained theoretic-philosophic, methodological, methodic, psychological, pedagogic, sociological, historical, biological-medical and legal aspects of physical education. Besides these ones, a number of authors presented the papers that treat the possibility of implementation of sport (identification of talents) and recreation, into regular and outdoor classes of physical education. Generally looking, physical education, as an entity of physical culture, gets a significant Procedings book that will enable a new stimulus in development of this scientific field.

Synthetically evaluating the results of this International scientific conference, we can be satisfied with the participation of a large number of scientists, research workers, teachers and students of physical education, home and foreign ones. Theoretic, scientific and methodological approaches presented at this conference confirm that expert and scientific idea in/about physical education widens and develops more and more. Multidisciplinary, theoretic and scientific base, methodological correctness and empiric testability are some of main characteristics of directions of scientific development in physical education demonstrated by the research workers at this international conference. The inductive method of concluding is still dominant in most papers, but ideas of hypothetic-deductive concluding are making their way, and together with the inductive way of concluding they contribute to the holistic view of the reality of physical education. It is one of the evidences that physical education in Serbia, as an expert and scientific discipline, on its way of scientific ripening, is on a good way of theoretic-methodological, multidisciplinary and holistic tendencies of development.

We thank all participants for their contribution in activities at this International scientific conference. We give the Procedings book to the expert and scientific public for critical analysis, use and growth of scientific knowledge in physical culture.

President of scientific board,
Prof. Božo Bokan PhD

PLENARY SESSION
(Invited Speakers)

SELECTED ISSUES, CHALLENGES AND RESOLUTIONS IN PHYSICAL EDUCATION

Ken Hardman

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Introduction

Worldwide, physical education is characterised by diversity with elements of congruence in provision and practice. The congruence is seen in advocacy of physical education as a 'cradle to grave' process contributing to an individual's development associated with the notion of the 'physically educated person'. Such advocacy has brought an expanded role for physical education particularly in recent years. As a school subject, it is granted a 'broad brush' scope and potential and thus, it is in a relatively unique position with responsibility for addressing someway and somehow many contemporary issues through its perceived distinctive features within the educational process with characteristics not offered by any other learning or school experience. This responsibility is well summed up in the November 2007 European Parliament's *Resolution on the Role of Sport in Education* (2007/2086NI). The preamble to the *Resolution* alludes to physical education as "the only school subject, which seeks to prepare children for a healthy lifestyle and focuses on their overall physical and mental development, as well as imparting important social values such as fairness, self-discipline, solidarity, team spirit, tolerance and fair play…" and together with sport is deemed to be "among the most important tools of social integration". The preamble also recognises a decrease in "the number of PE lessons… in the past decade" across Europe in both primary and secondary schools, that there are divergences and inadequacies in provision of facilities and equipment between the Member States and that physical education teacher training programmes differ widely with "an increasingly widespread practice whereby PE is taught in school by teachers with inadequate specialist training". There is also recognition that "there is no appropriate co-ordination aimed at reconciling school and out-of-school sporting activities, and at making better use of existing establishments, and that the link between them varies from one Member State to another". My own research (Hardman, 2007) bears testimony to these inadequacies and to others: quality and relevance of physical education curricula, subject and physical education teacher status, financial deficiencies and inclusion matters (gender and disability). Ironically, whilst physical education is now clearly on the European (indeed worldwide) political agenda with hitherto unprecedented articulation of policy principles seeking to encourage physical activity engagement and active lifestyles, and combat rising levels of obesity and sedentary lifestyle illnesses, this political ascendancy is occurring when physical education in schools is facing a number of challenges and there are issues, which need to be addressed.

Aims

In a European context, this paper focuses on issues related to the physical education curriculum, specifically its presence in schools and time allocation as well as its aims and content and teacher preparation and concomitantly makes some suggestions to meet with the challenges arising from the issues. Additionally, in recognition that a number of claims, often unsubstantiated, have been made on the broad educational impact of physical education upon young people and that there is a prevailing belief that engagement in physical education is, somehow a 'good thing', the issue of robust research evidence is addressed. The intentions are to: (i) provide a 'reality check' on selected physical education-related issues; (ii) challenge some orthodoxies, in order to provoke thought; and (iii) suggest some directions to sustain a secure future for physical education in schools as a lifestyle-enhancing enterprise.

Presence of Physical Education in Schools

Within the European region, all countries either have legal requirements for physical education in schools or it is generally practised. Required physical education provision during compulsory schooling years varies across countries according to age or year stage of attendance. Overall the average number of years during which physical education is taught in schools is 12 (range 8-14) with a 73% cluster of 11 and 12 years. The start-end years' continuum and associated access to physical education are significant for individual development and sustained participation in physical activity. The early years are important in developing fundamental

motor skills and providing opportunities for optimal development of physical capacities during the crucial years of growth and maturation. The significance of school finishing age centres on tracking physical activity engagement from adolescence to adulthood. When access to physical education programmes ends at an earlier age, pupils are vulnerable to disengaging from physical activity with a consequence that they do not continue with it in later life and there may be insufficient time to embed either the skills or the habits for regular engagement in physical activity throughout the full lifespan.

Despite official commitment to entitlement of access to physical education in schools either through state legislation or as a matter of general practice, such provision is far from being assured, particularly in contexts of localised implementation of the curriculum:

- **Finland**: "Legal status is the same, but in practice not. The freedom of curriculum planning at schools has led to situations where implementation of physical education is not done according to the regulations concerning the weekly lessons' (University Professor)
- **Ireland**: "… Many primary schools do not offer the required time for PE (and the) level implementation is not uniform. (A) majority of senior students in secondary schools receive little or no PE" (Senior Inspector of PE)

The 'gap' between official policy and regulations and actual practice is geographically widespread and pervasive factors contributing to it are seen in devolvement of responsibilities for curriculum implementation, loss of time allocation in some cases because time is taken up by other competing prioritised subjects, lower importance of school physical education in general, lack of official assessment, financial constraints, diversion of resources elsewhere, inadequate material resources, deficiencies in numbers of properly qualified personnel and attitudes of significant individuals such as head teachers. Additionally, exemption from physical education classes, granted on presentation of a medical certificate from compulsory physical education classes, is only acknowledged by a few countries. Such exemption practice on medical grounds is recognisably widespread throughout the region thus, perhaps undermining its status within the curriculum. An issue here is that exemption is rarely sought, if ever, from other curricular subjects except, perhaps, for religious education classes in some countries. Moreover, survey evidence suggests that physical education lessons are more likely to be cancelled than other curriculum subjects.

Physical Education Curriculum Time Allocation

Reductions in school physical education curriculum time allocation in the 20th century were evident in many countries across the world and are well illustrated in the European region, where there was gradual erosion throughout the century. Weekly timetable allocation for physical education across Europe is **109 minutes** (range of 30-240 minutes) with clusters around 60 and 90 minutes in primary/basic schools and **101 minutes** (range 45-240 minutes) with a cluster around 90 minutes in secondary and high schools. Mirroring the global situation, there is a gradual 'tailing off' in upper secondary (high) schools (post 16+ years) in several countries and optional courses become more evident. Notably, figures in 2000 were higher with an average of **121 minutes** in primary schools and **117 minutes** in secondary schools, thus representing a perceived reduction in curriculum time allocation in the period 2000-2007 (Hardman & Marshall, 2008).

Surveys' findings reveal variations between the prescribed or expected amounts of time or lessons allocated to physical education and those actually delivered. The situation is exacerbated by time allocated to other subjects and in some countries is deteriorating where recent educational reforms have resulted in physical education teaching time decreases as observed in geographically distanced countries in different socio-cultural and economic settings:

Austria

School autonomy prescribed by national Law 283/2003 produces variations and PE can give way to other subjects; the allocation of 3-4 lessons in secondary schools has been effectively reduced to 2 in lower secondary and 1 in upper secondary levels (Grössing, Recla & Recla, 2005; and Dallermassl & Stadler, 2008)

Germany

In most Länder, time allocation for school PE is between two and three lessons per week. There is a wide gap between policy and practice. In the secondary general schools 33% of lessons are cancelled (Balz & Neumann, 2005)

Ireland

Despite a recommended 60 minutes per week, PE is not provided in all primary schools and research shows the average amount of time ranges from 12 to 60 minutes and 75% classes have less than 30 minutes; at post-primary level 120 minutes are recommended (90 minutes is seen as a minimum but many schools offer less), however, there is a progressive reduction from 75 minutes (Year 1) to 57 minutes (Year 6) minutes (Halbert & MacPhail, 2005)

Notably, in the European Parliament's *Resolution*, is the call on Member States to make physical education compulsory in primary and secondary schools with a guaranteed principle of at least three physical education lessons per week. The European Physical Education Association (EUPEA) recommends daily physical education in the early years of schooling (elementary grades, up to 11 or 12 years of age and 3 hours (180 minutes) per week in post-elementary (secondary/high schools) grades. In the United States, the National Association for Sport and Physical Education (NASPE) recommends a minimum of 150 minutes per week for physical education in elementary schools and 225 minutes per week for middle and high school students. *Recommendations* by the Council of Europe Committee of Ministers on 30 April 2003 included a significant reference to physical education time allocation: an agreement to "move towards a compulsory legal minimum of 180 minutes weekly, in three periods, with schools endeavouring to go beyond this minimum where this is possible" (Council of Europe, Committee of Ministers, 2003) and a call for one hour of daily physical activity in or out of school settings (Hardman, 2008). Curriculum time allocation is an important issue in the provision of quality physical education and European countries should heed the recommendations of inter-governmental and international non-governmental agencies.

The Physical Education Curriculum

1. Aims

Some physical education curricular changes are now occurring in some parts of Europe and shifts are evident in aims, themes and contents with signs that purpose and function are being redefined to accommodate broader life-long educational outcomes including healthy well-being, active lifestyle and personal and social development. Also evident, is increasing attention devoted to quality physical education concepts and programmes. From examination of the thematic aims of physical education curricula in the region, a number of patterns and issues emerge. The trend to inclusion of broader lifelong educational outcomes is evident in the importance of physical education in developing health-related fitness (15% of primary and secondary schools' curricula) as well as promoting active lifestyles (12% and 14% of primary and secondary schools respectively). Substantial recognition is also apparent in physical education's contribution to promoting a pupil's personal and social development (22% and 24% of primary and secondary schools' curricula respectively but less so of moral development (9% and 3% of primary and secondary schools' physical education curricula respectively). Nevertheless, despite such developments, there is evidence to suggest that there is a continuing pre-disposition towards aims that are primarily concerned with development of motor skills and refinement of sport-specific skills (32% in primary schools and 35% in secondary schools respectively). It is a tendency, which is encapsulated in an English PE teacher's comment that there is "…Too much focus on acquiring and developing skills".

2. Physical Education Curriculum Activity Areas

Official policy statements indicate some commitment to a "broad and balanced" range of curricular activities' opportunities for pupils. At one level, this would appear to be reflected in practice with the range of different activities taught within most physical education programmes. In descending order team and individual games (collectively) are most commonly taught and are followed by track and field athletics, gymnastics, dance, swimming, outdoor adventure activities and 'others'. However, several surveys' data challenge the extent to which breadth and balance are provided. Examination of activity areas time allocation across Europe reveals how, in practice, competitive sport activities dominate the physical activity experiences of pupils in both primary and secondary schools, where there is a predominantly Games (team and individual) orientation followed by Track and Field Athletics and Gymnastics. These three activity areas account for 72% of physical education curriculum content in both primary and secondary schools (see table 1). As table 1 also demonstrates, collectively, swimming, dance and outdoor adventure activities are accorded only 19% of activity time allocation at primary level and only 18% at secondary level. Such orientation runs counter to societal trends outside of school and raises issues surrounding meaning and relevance to young people's lifestyles as well as quality issues of programmes provided and delivered.

Table 1. Activity Area Curriculum Time Allocation in Primary and Secondary Schools (%)

Activity Area	Primary Schools %	Secondary Schools %
Games	41	42
Gymnastics	17	13
Track & Field Athletics	14	17
Swimming	7	6
Dance	8	5
Outdoor Adventure Activities	4	7
Other	9	10

3. Quality and Relevance Issues

A major issue is that of the quality and relevance of physical education curricula. In an increasing number of countries, the traditional content of school physical education and/or sports activity pays little regard to the outside-school world and pupils' lifestyle contexts. The scenario of a discrepancy between what the school offers and what the pupils are looking for regarding sports-related activities is not untypical in many countries. Such a situation is underpinned by repeated teachers' and officials' references to young students no longer seeing the relevance or significance of physical education as a school subject. This is epitomised in a teacher's observation that there is an "inappropriate curriculum for PE in elementary and secondary school. Curriculum is not realistic and in many parts has nothing together with practice"; and in a government officials observation that "children prefer other activities to PE/sport ones".

The overall situation is not only seen in content of curricula but also in structures related to extra-curricular activity and emphasis on school sport. In some countries, these structures, like curriculum activity orientation, may be counter to, or not aligned with, the lifestyle needs and demands, trends and tendencies of young people in out-of-school settings. Collectively, the experiences acquired from unwilling engagement in competitive sport-related physical education are a 'turn-off'. The widespread practice in physical education curricula to provide experiences, which merely serve to reinforce achievement-orientated competition performance sport, is a narrow and unjustifiable conception of the role of physical education. For many boys and girls, such programmes do not provide personally meaningful and socially relevant experiences and they limit participatory options rather than expand horizons. Competitive sports may be where exercise becomes "fun" for children who are good at it, but for those who are less talented, it is where exercise becomes not only physically demanding but also emotionally painful and socially humiliating" (Alderman, 2008, p.5). In this context, it is unsurprising that pupil interest in physical education declines throughout the school years and youngsters become less active in later school years. It would seem that this goes beyond those who have traditionally been either put off by, or not enjoyed, physical education. In some instances, there appears to be a much deeper rejection of physical education as a legitimate school activity, epitomised perhaps in one government official's comment that there is "inadequate level of social consciousness among pupils concerning advantages of physical education".

If physical education is to play a valued useful role in the promotion of active lifestyles, it must move beyond interpretations of activity based upon performance criteria: its current frame of reference should be widened. The preservation of physical education in its old state is not the way to proceed; it is time to move into the 21st century! Engagement needs to be relevant and meaningful to sustain regular and habitual participation in, and out of and beyond school. In the light of available scientific evidence, individual needs and societal trends, inactivity levels and sedentary lifestyles patterns and circumstantially associated rising levels of obesity, consideration of the re-conceptualisation and reconstruction of physical education is essential. If children are to be moved from 'play stations' to play-grounds' (Balkenende, 2005), any re-conceptualisation of physical education, which contributes to the creation of the 'physically educated' or 'physically literate' person, does need to be accompanied by improvements to raise the quality of teaching and learning processes as well as that of associated teacher educational preparation or training. Recent pedagogical and didactical developments have consequences for physical education teacher education both at initial and in-service/ continuing professional development training levels. Wherever appropriate, physical education delivery can benefit from re-orientation towards placing more responsibility on students for their learning with the managerial responsibility of the teacher progressively transferred to pupils and so enhance pupil involvement. Reflective practitioners will translate into reflective students! Re-conceptualisation needs to be seen in the context of life-long participation in physical activity and should include inter-related strategies to embrace the formulation of quality programmes, which provide meaningful experiences and, which attract young people to the joy and pleasure of physical activity and so foster an 'active life-style' philosophy with a focus on

relevance and understanding. The nature and quality of delivery of the school physical education curriculum is fundamental to the future not only of the subject in schools but also to the future of active life-styles over the full life-span for the two are inextricably entwined. Initial and in-service training/further professional development should properly address pedagogical and didactical developments and social and cultural shifts and so help to enhance the physical education experience of children. This is particularly important in primary/elementary schools, preparation for which is often 'generalist' rather than specialist. Any reshaping, however, may well need to recognise local and cultural diversities, traditions as well as different social and economic conditions.

Advocates have to ensure that physical education can justifiably claim a higher status, be worthy of improved time allocations and appropriate personnel, financial and material resources. If physical educators want to make an impact on enhancing activity levels in order to improve health, then some current practices should be abandoned because they do not appear to work for many children. Instead, if physical educators are serious about physical activity for health promotion, then nutrition and physical literacy should be central strategies and they should work closely with families, wider school, education and health, (sport) communities. Additionally, radical changes to pedagogy would be required, especially when trying to meet challenges embedded in the rhetoric of meeting the individual needs of each child but all "need to acquire knowledge, understanding and behavioural skills to ensure physical activity becomes a regular part of their daily life" (Fairclough & Stratton, 2005). The challenges should not ignore relevant scholarly research, which, in recent years has made significant progress in unravelling some of the 'mysteries' of learning and socialisation processes in different and various cultural and cross-cultural contexts.

Teaching Personnel

There are persistent concerns regarding inadequacies of teaching personnel for physical education classes. Across the region, the quality of teacher preparation for physical education is variable and there are examples, which suggest lack of commitment to teaching as well as pedagogical and didactical inadequacies in some countries. A common scenario (94% of countries) is qualified 'specialist' PE teachers at secondary level, (though some German Länder and Hungary indicate that, in practice, some generalists are also employed to deliver physical education) and 'generalist' teachers at primary/elementary level (85%); some countries (67%) do have specialist physical educators in elementary (primary) schools, but the variation is wide and there are marked intra-regional differences. In some countries, the generalist teacher in primary schools is often inadequately or inappropriately prepared to teach physical education, especially as minimal hours may be allocated for physical education teaching initial training (in some institutions, this can be as low as 8-10 contact hours). The former point is well illustrated in Germany by the Sprint Study (DSB, 2006): in order to teach PE in schools, the successful completion of a PETE programme and the associated qualified teacher status (according to the specific type of school) are pre-requisites for all teachers; the reality in schools reveals a different picture because, whilst 80% of all state qualified teachers who teach physical education lessons have a physical education subject degree qualification, 20% of such teachers has no formal qualification in the subject; with regard to different school types, the problem is more salient in primary schools (*Grundschule*), where 49% of the teachers delivering the physical education curriculum have no specific education in physical education subject matter; in the different branches of the secondary school, the figures of formally unqualified teachers decrease considerably - *Hauptschule* (secondary general schools) 30%, *Realschule* (secondary modern schools) 11%, and *Gymnasium* (Grammar schools) 2-3% (DSB, 2006).

In 63% of European Union (EU) countries, there are opportunities for in-service training (INSET)/ continuing professional development (CPD) but there are substantial variations in frequency of provision, which ranges from free choice through nothing specifically designated, every year, every two years, every three years to every five years. Duration of INSET/CPD also reveals differences in practice between countries: those with annual training range from 12 to 50 hours, from 3 to 25 days; biennial and triennial training courses of 4 weeks; and five years range from 15 days to 3 weeks or 100 hours over the five year period. Annual INSET/ CPD is indicated in 50% of countries, every 2 years in 15% of countries and greater than two years in 35% of countries. In some countries, inadequate promotional infrastructure and finance can inhibit participation in INSET/CPD; a Swedish physical educator reports "…Often I have to find in-service training myself and I have also often to pay for it with my own money".

Professional development should not cease on completion of initial teacher training; it needs to be a continuous process throughout a teacher's professional career. CPD has a key role raising and/or enhancing educational practices and standards. CPD is not only essential but it also needs to be delivered with appropriate expertise and with up-to-date content that is relevant to practice. For each designated category level of teacher

(from specialist physical education teacher to generalist teacher), regular (and obligatory) participation in CPD is advocated. Such a requirement recognises the need for keeping up with subject and its delivery-related developments and/or career specialisation for which further qualification(s) may be required.

A physical education professional development programme should be part of a national strategy, which seeks to ensure that teachers have the tools and expertise needed to engage pupils. A principle relevant to CPD strategy is evaluation by schools of the quality of existing physical education/school sport provision, selection of relevant CPD training, implementation and measurement of outcomes. In order to convert this principle into practice, a range of opportunities, which meet diverse needs and are well supported, should be available.

Evidence (Hardman & Marshall, 2006) from countries where CPD programmes have been successful in improving teaching and learning processes and outcomes in physical education suggests that it is important to have a properly constituted government or national professional association level agency with responsibility for provision of a CPD framework, which embraces the range of career development routes, for designing and implementing a strategy for the quality assurance (with developed quality bench-mark standards) of professional development provision for teachers of physical education classes. Such an agency could have a significant role in providing leadership for physical education and its practitioners; it could contribute to improving and safeguarding standards and develop accreditation systems to ensure appropriate preparation, experience and qualification as well as promote safe and ethical delivery and share examples of 'best practice'.

Physical Education Orthodoxy and Research

The European Parliament 2007 *Resolution* represents a significant step forward in policy guidance in the domain of physical education. The *Resolution*, in accord with accepted (though scientifically unproven) orthodoxy, implies that physical education has the propensity to make significant and distinctive contributions to children, schools and wider society: respect for the body, integrated development of mind and body, understanding of physical activity in health promotion (general well-being, diet, nutrition and reduction in health care costs), psycho-social development (self-esteem and self-confidence), social and cognitive development and academic achievement, socialisation and social (tolerance and respect for others, co-operation and cohesion, leadership, team spirit, antidote to anti-social behaviour) skills and aesthetic, spiritual, emotional and moral (fair play, character building and codes of behaviour) development, a panacea for resolution of the obesity epidemic, inactivity crisis and sedentary lifestyles, a medium for inclusion and integration as well as for informing pupils about the physical and psychological dangers inherent to the use of doping substances , enhancement of quality of life etc. Two fundamental questions arise here.

1. Should physical education be held accountable for any or all of educational outcomes or benefits it claims or is claimed on its behalf?
2. How can physical education deliver all that is claimed in its name?!

Relevant to both questions is a list of associated questions. For example: how is it possible to impact on children's obesity with minimal timetable allocations of only one or two 30-minute physical education lessons a week?; how can we develop a broad range of movement skills in large class sizes of 30 or more students, who the physical educator may see for less than 36 hours a year?; is even an hour of daily physical education enough?; and with the knowledge that the intensity, duration, and frequency of physical activity do more than anything to immediately impact on student health, how can we successfully help students experience the joy of movement in physical education classes while urging them to meet target heart rates? Maybe it is an issue of 'changing minds' and, thereby, 'winning bodies'! If so, the legacy we will leave with our students may indeed change the lifestyle habits that lie at the foundation of today's obesity crisis. We need to juxtapose advocacy rhetoric with scientific evidence.

Generally accepted is physical education's distinctive contribution to physical development. This physical focus has shifted over time from health-related rationale through performance-related considerations, to health impact of sedentary behaviours with physical activity as a public health issue and in the political limelight with lifelong engagement in physical activity as a goal widely accepted, even though evidence of significant benefits from physical activity is either limited or not scientifically proven. Evidence of physical education experiences as a foundation for lifelong activity is scarce.

It is claimed that a value of physical education lies in acquisition of personal, social and socio-moral skills to produce a form of 'social capital' to enable young people to function successfully (and acceptably) in a

broad range of social situations (Bailey, 2005). The claim is grounded in a belief that physical activity is a suitable vehicle for personal and social responsibility and pro-social skills. But research evidence is inconclusive and impacts come heavily qualified; longitudinal studies and evaluations are thin on the ground. There is a need for greater understanding of mechanisms that lead to improved social behaviour, i.e. of the process of change.

With specific reference to socialisation, research concerned with attitudes and their relation to behaviour in a range of sport-related contexts has proven inconclusive. The challenge remains to determine why people do not engage in sporting activities, even though its health and general well being enhancement effects are widely accepted. Whilst there are many who have provided supportive evidence for the benefits to be derived from engagement in physical activity and socialising effects on positive behavioural outcomes, there are others, whose research points to disbenefits and negative outcomes (Hardman, 1997). Many of the underlying assumptions on the influence of sporting activity (and by implication, physical education) as a socialising agency, facilitating social accomplishments, promoting social status and mobility, transmitting dominant modes of behaviour and developing positive character traits have been challenged and have remained unsubstantiated and unproven; there is even some evidence to suggest that sport can be divisive and can militate against integrative values.

The affective domain comprises emotions, preference, choice and feeling, beliefs, aspirations, attitudes and appreciations, i.e. psychological wellbeing including self-esteem (there is strong evidence for this), self-perception, and personality development but again empirical evidence is scarce and other variables may be contributory factors. The individual's experience (intrinsic factors are more important than extrinsic factors) in physical education/sport can determine whether participation is viewed as positive or negative (personal achievement and task mastery are more important than competition in determining positive perceptions): "joyless experiences" (McNab, 1999) may be one significant causal factor in high teen-age drop out rates from sporting activity, especially where and when participants suffer excessive pressure to win, have low perceived ability and feel unattached, features which lead to an increase in disaffection. Physical activity can be associated with affective development but again mechanisms are unclear as is the relationship between them – is it causal or casual?! Also what is not clear is whether different forms of physical activity are more beneficial than others.

A number of claims, often unsubstantiated, have been made on the broad educational impact of physical education upon young people. There is a prevailing belief that engagement in physical education is, somehow a 'good thing'. Robust evidence to test the claims of physical education benefits is needed but accumulation of evidence does suggest physical education can have some/many benefits for some/many young people given the right social, contextual and pedagogical circumstances. Research (different/better) is needed to focus on contexts and processes that are most likely to exploit the potential, if any, of the physical education learning environment for young people's educational benefit.

Conclusions

Since the 1999 Berlin first Physical Education Summit, there has been an array of advocacy and initiatives by a numerous international and national agencies and institutions, epitomised in *Communiqués, Recommendations and Resolutions, Position*, *Declaration* and *Commitment Statements* as well as the dedicated 2004 *European Year of Sport through Education* and 2005 United Nations' *Year of Sport and Physical Education*, Conferences and Seminars. Collectively, they are demonstrative of broad-spread political will and indicative of an international consensus that issues surrounding physical education in schools deserve serious consideration in problem resolution. A result has been implementation of positive programmes and good practices in physical education in several European countries with a number of measures to optimise the quality of physical education provision and so enhance the experiences of children in schools. There is evidence to suggest that national and, where relevant, regional governments have committed themselves through legislation to making provision for physical education but some have been either slow or reticent in translating this into action through actual implementation and assurance of quality of delivery. Generally, the 2005-2008 Worldwide (Hardman & Marshall, 2008) and European Parliament (Hardman, 2007) Surveys' "reality checks" revealed several areas of continuing concern. Thus, positive developments and policy rhetoric are juxtaposed with adverse practice shortcomings. The overall scenario is one of 'mixed messages'. Almost nine years on from the Berlin PE World Summit, the situation now in Europe is typified by little change in some countries and regions and by positive developments, stabilisation and relative decline in others. As Maude de Boer-Buqiccio (2002) (the then Council of Europe Deputy Secretary General) observed at the *Informal Meeting of Ministers with responsibility for Sport* in Warsaw, "the crux of the issue is that there is too much of a gap between the promise and the reality" (p.2); policy and practice do not always add up! It is clear that children are being denied the opportunities that will transform their lives in too many schools in too many

countries. Such denial of opportunities is inconsistent with the policy principles of the 1978 UNESCO *Charter for Sport and Physical Education* and 1975 (revised in 2001) revised Council of Europe *Sport for All* Charter as well as the well-intentioned interest-vested groups' *Declaration* and *Commitment* Statements.

The attention devoted to increasing levels of obesity and the association with physical inactivity might appear to bode well for physical education but this association may prove to be a mixed blessing because arguably there is a risk of ignoring many of the most beneficial outcomes of quality physical education if the subject matter is reduced to simply being a means to countering the obesity problem. It is tempting for physical educators to see their subject matter as the solution to children's obesity. After all, if children do nothing else, most of them at least get some regular physical activity during some 10-12 years of required school physical education. However, while some physical activity may be better than none, the physical education profession alone cannot solve the obesity crisis. This is not to suggest that physical educators should not try to stimulate young people's activity engagement, and help them to understand the value of physical activity and healthy eating. Inactive lifestyles and unhealthy diets, left ignored by families, communities, media, and some kind of legislation, mean that the best efforts of the physical education profession to turn the tide of obesity will not succeed.

If persuasion of 'significant others' (e.g. policy-makers, decision-takers, administrators and practitioners) of an essential presence of physical education in schools' curricula is to be pursued, commitment to re-conceptualisation, reconstruction and delivery of a relevant quality curriculum by appropriately qualified teaching personnel will in themselves be insufficient. Sustained application of political skills and argument of the case at local, through national, to international levels are required. The value of communication to ALL components of society, teachers, parents, and government officials cannot be over-estimated. The growing body of medical and other scientific research evidence and positive statements support a potentially compelling case for physical education in providing life-long benefits directly related to preventing disease and to maintaining an enhanced quality of life, but further and more robust research is required. The existing accumulated evidence needs to be presented clearly and concisely and in a language that can be understood to convince all 'enterprise' partners and significant others that physical education is, indeed, an authentic and indispensable sphere of activity. To this end, as both inter-governmental and non-governmental organisations have recognised, goals will be better served by effective partnerships with shared responsibilities of all vested interested agencies and institutions involved in policies and their implementation. The principle of partnerships embracing multi-sectoral policies is an essential feature of the policy framework of the World Health Organisation's (2004) *Global strategy on diet, physical activity and health* as well as the European Parliament's 2007 *Resolution*.

A school's role extends to encouraging young people to continue participation in physical activity, through the provision of links and co-ordinated opportunities for all young people at all levels and by developing partnerships with the wider community to extend and improve the opportunities available for them to remain physically active. Hence, there is a need for wider community-based partnerships. With only two hours per week time allocation (in many countries, it is frequently less), physical education cannot itself satisfy physical activity needs of young people or address activity shortfalls let alone achieve other significant outcomes. Bridges do need to be built, especially to stimulate young people to participate in physical activity during their leisure time. Many children are not made aware of, and how to negotiate, the multifarious pathways to out-of-school and beyond school opportunities. As one French teacher put it there is "not enough co-operation between schools and sport organisations", an observation underlined by almost two-thirds of European countries indicating lack of links between school physical education and the wider community.

Physical Education Teacher Education programmes should address these facilitation and intermediary roles of the physical education teacher. Thus, at the very least, their professional preparation should embrace familiarisation with pathways for participation in wider community multi-sector provision and the achievement of personal excellence. Support is fundamental to the realisation of such ideals. It can be achieved through the collaborative, co-operative partnership approach involving other professionals and committed, dedicated and properly mentored volunteer individual and group enthusiasts. Personnel functioning in partner institutions should have appropriate skills and competences, which might be acquired through some special training.

Despite mixed research findings messages and/or insufficient empirically-based longitudinal evidence, it is widely acknowledged that physical education can positively influence physical and psycho-social health and hence, is important at <u>all</u> stages in the life-cycle from childhood to old age. Therefore, it seems logical to suggest that socialisation into, and through physical activity, should occur from 'womb' to 'tomb', i.e. physical

education over the full life span. If physical education is to sustain its presence both in formal and informal educational and socio-cultural settings, and continue to have a positive role as an instrument of socialisation, then issues have to be confronted. With the knowledge that educational experiences have a propensity to facilitate and help enhancement of life-span welfare and well-being, physical educators should respond to the needs of optimally developing individuals' capabilities and provide opportunities for personal fulfilment and social interactions, essential in human co-existence. Protagonists argue that physical education is an essential element of education and has an indispensable role in the upbringing and education of people. It is worth remembering, however, that it is not the activity, but the reason for taking part that sustains participation. I would add that its role embraces the often over-looked intrinsic value of the 'sheer joy of participation in physical/sporting activity' and should receive greater priority attention.

The European Parliament's *Resolution* very clearly establishes physical education on the political agenda. It is an agenda, which UNESCO is also actively pursuing as it attempts to formulate quality physical education policy principles, which can be suitably adapted by Member States to 'local' circumstances and conditions. With such inter-governmental commitments to policy principles and action advocacy, a secure and sustainable future for physical education appears to be realisable.

Maintenance of monitoring of developments in physical education across the world is an imperative. The Council of Europe's 2003 *Recommendations,* the UNESCO 'Round Table' *Communiqué* and the WHO *Global Strategy* have advocated regular reviews of the situation of physical education in each country. The Council of Europe referred to the introduction of provision for a pan-European survey on physical education policies and practices every five years as a priority! (Bureau of the Committee for the Development of Sport, 2002a; 2002b; Council of Europe, Committee of Ministers, 2004). With such reviews in mind, UNESCO has initiated a 5-year pilot phase with the University of Worcester, UK as a *Monitoring Advisory Centre* to assist in monitoring developments in school physical education and sports programmes of Member States. To this end, the University of Worcester's Physical Education Monitoring Centre, acting as a kind of 'Clearing House', is developing a worldwide institutional network of national Centres, which will provide annual update reports on developments and undertake regular monitoring surveys. This 'watching brief' mechanism will gauge whether "promises" are being converted into "reality" and so contribute to countering potential threats and securing a safe future for physical education in schools. Otherwise with the Council of Europe Deputy Secretary General's intimation of a gap between "promise" and "reality", there is a real danger that intergovernmental agencies' *Recommendations* and *Resolutions* will remain more "promise" than "reality" in too many countries across the world and compliance with international and national Charters will continue to remain compromised (Hardman & Marshall, 2005) just as responses to the various *Declaration* and *Commitment Statements* will remain as conceptual ideals (Hardman & Marshall, 2008).

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LONGITUDINAL COMPARISON OF DEVELOPMENT OF CERTAIN PHYSICAL CHARACTERISTICS AND MOTOR ABILITIES OF TWO GENERATIONS OF CHILDREN AND YOUTH, AGED 7 TO 18, IN SLOVENIAN PRIMARY AND SECONDARY SCHOOLS IN THE PERIOD 1990-2001 AND 1997-2008

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INTRODUCTION

Media and information technology provide easy and fast contentment of people's needs for entertainment in physically undemanding way – mostly through activities that involve sitting. This is why experts come up with the term sedentary way of life to enforce the problem on international level (Brettschneider & Naul, 2004; 2007; Corbin, 2002; Rychtecky, 2007; Strel et al., 2005).

Studies of the international and Slovenian youth's physical fitness are focused on one of the key problems of the modern society – the increase of body weight and subcutaneous fat tissue (Avbelj et al., 2005; Bučar Pajek, Strel, & Kovač, 2004; Lobstein, Baur, & Uauy, 2004; Planinšec, 2006; Raudsepp, & Jurimae, 1998; Stergar, Scagnetti, & Pucelj, 2006; Strel, 2007; Strel, Kovač, & Jurak, 2007; Strel et al., 2003; Strel et al., 2005).

Data on physical fitness have been collected in various countries around the globe with various testing systems. For measurement of motor abilities of the American youth, the Americans most often use the Youth Fitness test and Fitnessgram in Physical Best Package, while some of European use the *Eurofit* test battery (Jürimäe & Jürimäe, 2000). Since 1987, Slovenia systematically collects data on several physical characteristics and motor abilities of pupils and youth (*Slofit* system) as a part of a research project »Informational system for determining, supervising and evaluating physical fitness of pupils in Slovenia« (Strel et al., 1996). *Slofit* system is regulated by school legislation. Teachers of physical education measure pupils every year in April; data is afterwards processed and feedback information about physical fitness of pupils is sent back to schools before the end of the school year. Annual analyses show that the database includes over 90% of all primary school pupils and slightly over 80% of all secondary school students (Strel, Kovač, & Rogelj, 2006).

The *Slofit* system database has several purposes (Strel, Starc, & Kovač, 2007):

- Findings of the measuring analysis allow the PE teachers to properly plan and implement the education process (accommodating classes to individuals with appropriate differentiation and individualization), to advise pupils when they want to attend various free-time sports activities, advise parents if their children have problems in physical or motor development; directing individual pupils who show greater talent for sport towards additional sports training.
- On the basis of their information primary and secondary school pupils can, with some help of experts, design their programs of exercise and get some useful advice when starting to attend different sports activities. In that way they are qualifying for individual evaluation of changes of their physical fitness, choosing suitable programs and determining length and intensity of their sports exercise.
- The development information of every child is reported to parents, who can observe the physical and motor development of their child for the time of his or her entire education process (longitudinal observation). The parents can compare their child's results with standardized results of his or her contemporaries (transversal observation). Their child's physical and motor development can be discussed with a PE teacher, physician or a coach.
- Rapid development of youth, deteriorated motor abilities, various health issues (obesity, disturbances in nutrition, type II diabetes, asthmatic affections …) and sometimes intrusive offer of doubtable civilization values can cause big problem in child's and adolescent's growth (Armstrong & Welsman, 1997; Brettschneider & Naul, 2004, 2007; James, 2004; Jurak, 2006; Strel, Kovač, & Jurak, 2004; Strel, Kovač, & Starc, 2008). Following the trends of change and comparison with other European countries (Kovač et al., 2007; Brettschneider & Naul, 2007) makes appropriate reactions of professionals on a national level in the field of public education (in kindergartens and schools with regular physical education classes and additional sport activities in this area), out of school sport activities (offers of various sport associations, national sport leagues, institutions on local and national level, sport-oriented individuals) and health care (programs that stimulate and trigger exercise and consuming healthy food) possible.

Several years of research work (Jurak et al, 2003; Kondrič, 2000; Kovač, 1999; Strel, Kovač & Jurak, 2004; Strel, Kovač, & Rogelj, 2006; Strel, Starc, & Kovač, 2007; Šturm & Strel, 1985) show significant changes in physical fitness of Slovenian pupils.

METHODS

Sample of measured subjects

The sample of measured subjects includes two generations of Slovenian pupils, first measured from 1990 to 2001, second from 1997 to 2008. All pupils have been measured within the framework of *Slofit* system (Strel et al., 1996). Only healthy pupils who were not excused from physical education for health reasons and whose parents gave their written positive consent to participate in the measurements were tested. Pupils with missing data for any of the eleven tests in any of the years were excluded from the analysis. The sample of each measured generation ($N_{1990–2001}$=24.571, $N_{1997–2008}$=21.244) represents approximately 85% of all pupils attending primary and secondary schools in Slovenia. The number of measured subjects at the age of 18 is about 10% smaller than the other age groups because pupils from the vocational schools already finish their schooling before they turn 18.

Sample of measured variables

Data from *Slofit* system were used in the analysis. After fifteen years of preparation (Šturm & Strel, 1985) measurements of the Slovenian pupils have been systematically carried out every year since 1986 by physical education teachers (Strel, 1996). *Slofit* system includes three anthropometrical measurements and eight motor tests (Table 1); all tests have suitable measuring characteristics. Our analysis included three anthropometrical tests (body height, body weight and upper-arm skin fold) and four motor tests (bent arm hang, forward bench fold, 600-metre run and 60-second sit-ups).

Table 1: Sample of variables

Test	Abbr.	Measured capacity	Measuring unit
Body height	ABH	Longitudinal dimension of the body	mm
Body weight	ABW	Volume of the body	kg
Upper-arm skin fold	AST	Amount of subcutaneous fat tissue	mm
Arm plate tapping – 20 seconds	TAP20	Speed of alternate movement	no. of repetitions
Standing broad jump	SBJ	Power of legs	cm
Obstacle course backwards	OCB	Co-ordination of the whole body movement	second
60-second sit-ups	60SITUP	Muscular endurance of the torso	no. of repetitions
Forward bench fold	FBF	Flexibility	cm
Bent arm hang	BAH	Muscular endurance of shoulder girdle and arms	seconds
60-metre run	R60	Sprint speed	seconds
600-metre run	R600	General endurance	seconds

Data analysis

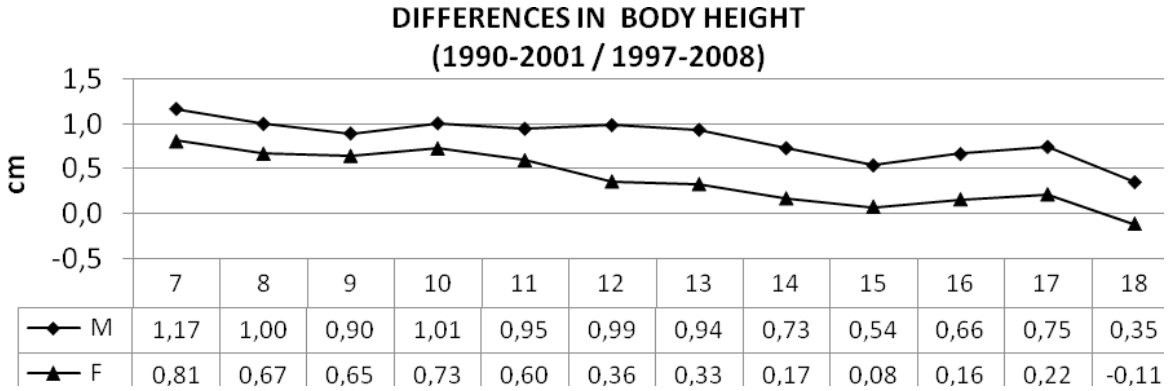
The data of the pupils who have started their primary school in the school year 1990–1991 and have participated in the measurements every year in the period 1990–2001 were used for starting point in the comparison. They have been compared to generation of pupils measured every year in the period 1997–2008. The data were analyzed by the statistical package SPSS 15.0. Basic statistical parameters (mean, standard deviation) between all age groups and index of changes were calculated to evaluate the developmental trends in both generations. Finally average indexes of changes in all included motor abilities (XT) between the two generations were calculated.

RESULTS

Physical characteristics

The comparison of two generations shows a linear trend of changes of results in both sexes. The largest differences in body height are observable at the start of the primary school and the smallest at the end of the secondary school. Seven years old pupils measured from 1997–2008 were approximately 1 cm taller in comparison to their peers measured from 1990–2001. At the end of secondary school boys measured from 1997–2008 are slightly taller than those measured from 1990–2001, while the girls are slightly shorter (Figure 1).

Figure 1: Differences in body height between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19



	7	8	9	10	11	12	13	14	15	16	17	18
M	1,17	1,00	0,90	1,01	0,95	0,99	0,94	0,73	0,54	0,66	0,75	0,35
F	0,81	0,67	0,65	0,73	0,60	0,36	0,33	0,17	0,08	0,16	0,22	-0,11

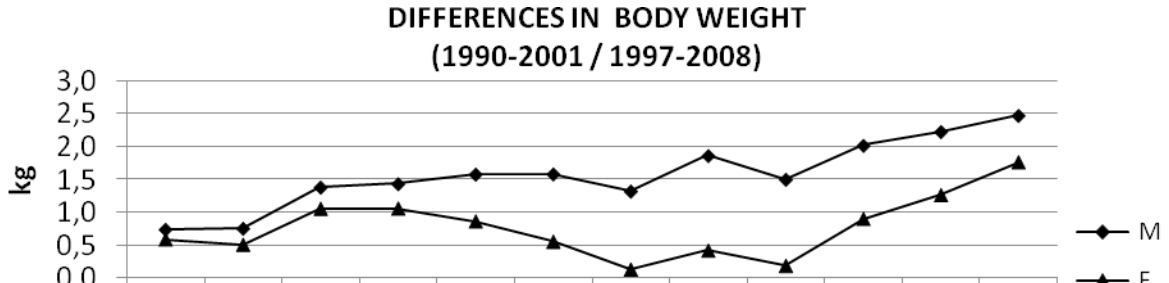
* 0.0 on the axes y represents average results of pupils measured from 1990-2001

The comparison of two generations in body weight (Figure 2) shows that pupils measured from 1997–2008 remained heavier through whole primary and secondary school. On average they have been almost 1 kg heavier than those measured from 1990–2001.

Girls measured from 1997–2008 have been heavier until age nine (1 kg) in comparison to girls measured from 1990–2001 , but afterwards the body weight of both generations has gradually leveled. At age 13 both generations had approximately the same average body weight. The girls of the younger generation started gaining weight in secondary school and have become approximately 1.5 kg heavier to the compared older generation pears at age 18. Differences between boys of the two generations prove to be even bigger; the 1997-2008 generation has been approximately 1 kg heavier than the 1990–2001 generation from age seven onwards and the difference between them and their older generation peers has been growing steadily all the time. At age 18, the 1997–2008 generation of boys became approximately 2.5 kg heavier than the boys of the 1990–2001 generation.

There are many reasons for changes: changes in lifestyle, differences in nutritional habits and less spontaneous physical activity of pupils (Andersen, Froberg, Kristensen, & Møller, 2007; Brettschneider & Naul, 2007; James, 2004; Strel, Kovač, & Jurak, 2007). Kovač and Starc (2007) report that – although the Slovenian pupils are more active in their free time than their peers ten years ago – the increased planned physical activity cannot compensate for the negative influences of the modern everyday life in which the spontaneous physical activity and effort are diminishing.

Figure 2: Differences in body weight between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19



	7	8	9	10	11	12	13	14	15	16	17	18
M	0,74	0,76	1,38	1,44	1,58	1,58	1,32	1,86	1,50	2,02	2,23	2,47
F	0,59	0,51	1,06	1,06	0,87	0,56	0,13	0,42	0,19	0,90	1,27	1,77

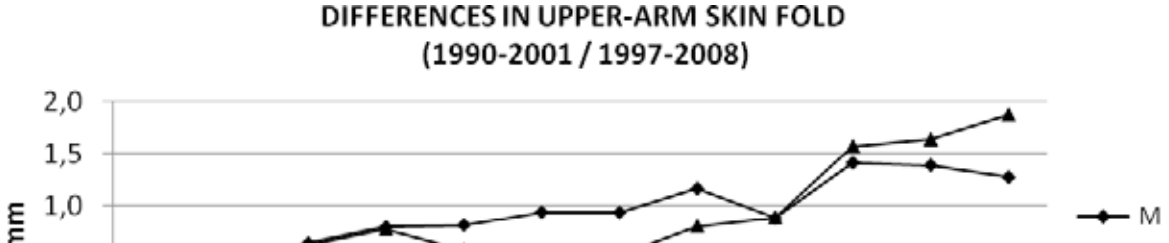
* 0.0 on the axes y represents average results of pupils measured from 1990-2001

Since the data of body weight don't provide sufficient information to assess the composition of the body, usualy some other anthropometric measurements is used. For the use in schools, a simple measurement procedure is needed and that is why a measurement of one or more skin folds with caliper is used (Wilmore & Costill, 1994). In the *Slofit* system the upper-arm skin fold is measured.

The comparison of upper arm skin fold between the two generations (Figure 3) indicates that the younger generation shows 6% higher amount of body fat tissue than their older generation peers. Subcutaneous fat tissue of 1997–2008 generation was higher than the subcutaneous fat tissue of their older generation peers already at the beginning of primary school (3.7% or 0.5 cm). Afterwards the difference has linearly grown bigger to the age of 16 when it was approximately 11% (1.5 mm); larger differences have been observed among boys. Both, body weight and subcutaneous fat tissue of the younger generation have increased (Figure 2 and 3); we can therefore conclude that the increase of body weight is a direct consequence of the increase of subcutaneous fat tissue and not of the increase of muscle weight.

Bučar, Strel, & Kovač (2004) ascertained that the number of overweight pupils in Slovenia has risen for more than 20% from 1983 to 2003 (the research included a sample of 10.186 male and female students); especially large is also a number of obese youth. Since the increased amount of subcutaneous fat tissue also means the increased number of fat cells, the consequences for the physique are far-reaching, since the today's overweight youth will have to find more effective ways to fight the excessive body weight in their adult age (Kovač & Starc, 2007).

Figure 3: Differences in upper-arm skinfold between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19



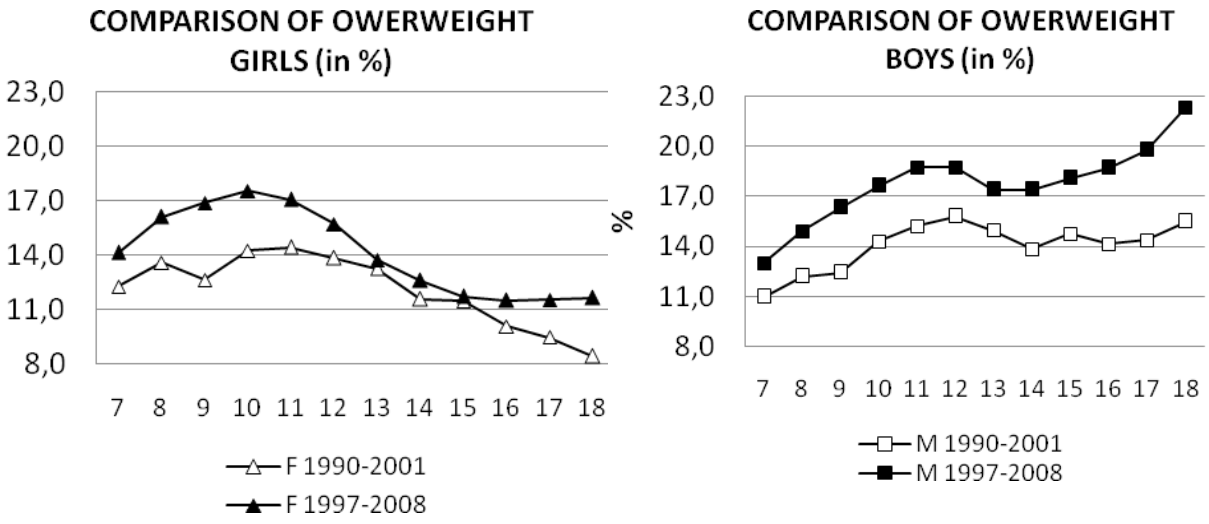
	7	8	9	10	11	12	13	14	15	16	17	18
M	0,35	0,49	0,63	0,79	0,81	0,93	0,93	1,16	0,88	1,41	1,38	1,27
F	0,41	0,42	0,61	0,77	0,57	0,50	0,51	0,80	0,88	1,57	1,63	1,87

* 0.0 on the axes y represents average results of pupils measured from 1990 - 2001

The prevalence of excessive weight (excluding obesity) and obesity were determined according to the IOTF cut-off points (Cole et al., 2000). Percentage of overweight and obese pupils (BMI regarding IOTF) was

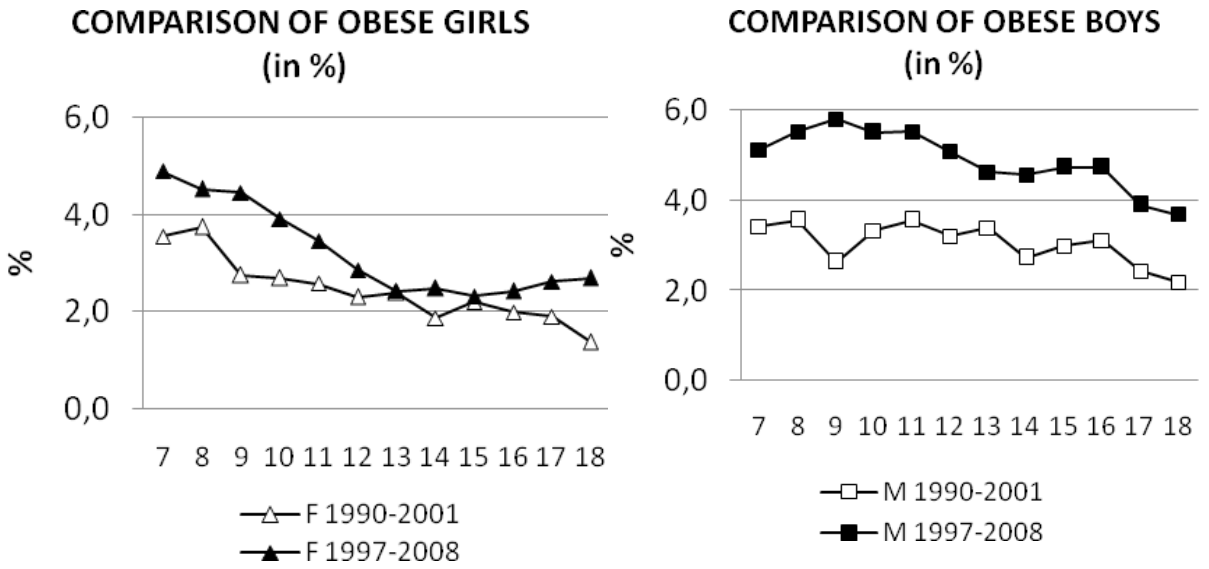
calculated. In comparison of the two generations the number of overweight pupils has increased for an average of 26.3% in 7 years. The increased number of overweight girls (17.5%) is much smaller. The largest differences (Figure 4 and 5) in increase of overweight girls have been occurring until puberty (approximately 31.5%). The largest differences in the number of overweight boys are found at age 18 (approximately 41%).
The highest percentage of overweight pupils consists of overweight boys of 1997–2008 generation at the age of 18 (22.3%) (Figure 4). The highest percentage of overweight girls in the same generation has occurred at age 10 (17.5%).

Figure 4 & 5: Proportion of overweight boys and girls at different ages in Slovenia – comparison of two generations (1990/2001 and 1997/2008)



In the observed time period the average number of obese pupils rose even faster than the number of owerveight pupils (increase of obesity among boys was 62.4% in comparison to the 35% increase of obesity among girls). The most negative increase has been occuring in the first four years of primary school, when physical education classes are thought by classroom teachers.

Figure 6 & 7: Proportion of obese boys and girls at different ages in Slovenia – comparison of two generations (1990/2001 and 1997/2008)



Overweight and obesity are reaching epidemic proportions in the developed world (James, 2004). Excessive weight is becoming one of the most common diseases of children, according to experts of the World Health Organisation. In 2003, the WHO reported more than 1 billion overweight people globally, with at least

300 million of them being obese (WHO, Obesity and Overweight, 2003). Over the last decade the prevalence of obesity in Western and Westernising countries has more than doubled (James, 2004). It is estimated that 400,000 extra children are becoming overweight or obese each year in the population of the new European Community. In Canada, Australia and parts of Europe 1% of all children are becoming overweight each year; 25% of children in the USA are overweight and 11% are obese (Lobstein, Baur, & Uauy, 2004). The WHO data for Europe for 2004 show that in the 13- to 15-year old population 12% of boys and 7% of girls were overweight and 2% of boys and 1% of girls were obese (Andersen, Froberg, Kristensen, & Møller, 2007).
Among children obesity is an increasingly important predictor of adult obesity regardless of whether one's parents are obese (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). There are several consequences of obesity. Along with increased mortality, obesity is a risk factor for a range of chronic diseases such as Type 2 (adult-onset) diabetes, coronary heart disease, some types of cancer, osteo-arthritis and back pain (Andersen, Froberg, Kristensen, & Møller, 2007). Some consequences of obesity like– hyperinsulinaemia, poor glucose tolerance and a raised risk of Type 2 diabetes, hypertension, sleep apnea, social exclusion and depression are observable already in childhood, while other obesity epidemic diseases emerge in adulthood (Lobstein, Baur, & Uauy, 2004).

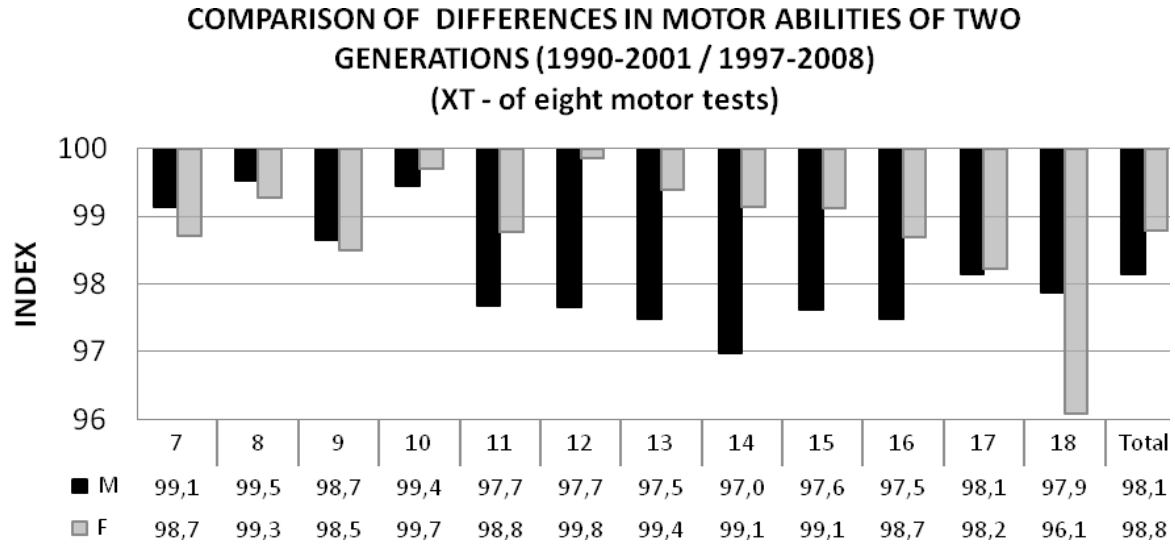
Clearly the prevalence of overweight and obesity is also taking on epidemic proportions in Slovenia (Bučar Pajek, Strel, Kovač, & Pajek, 2004; Strel, Kovač, & Jurak, 2007). The percentage of overweight and obese boys and girls in Slovenia has been rising almost constantly every year from 1991. Obesity is growing at higher rates than overweight, as it has more than doubled in just 15 years (Kovač, Leskošek, & Strel, 2007). Nevertheless, the proportion of overweight and obese boys is twice as high as the proportion of overweight girls (Strel, Kovač, & Jurak, 2004).

Motor abilities

When comparing generations according to age (Figure 8), all average results of 1997–2008 generation are worse then the results of the 1990–2008 generation. As a measurement of motor efficiency an average value of eight motor tests (XT) was calculated. The negative changes are bigger among boys than among girls; the influences of sedentary way of life are evidently stronger on motor efficiency of boys. The differences in the compared generations between the sexes increase in puberty.

On average, the results of boys deteriorate for 1.9% and of girls for 1.2%. The differences in the motor efficiency are the largest in the group of boys aged 14 (3%) and in the group of girls aged 18 (3.9%) and can be a consequence of a high increase of body weight (Figure 2 and 3).

Figure 8: The differences in the motor efficiency at different ages in Slovenian boys and girls – comparison of two generations (1990/2001 and 1997/2008)



	7	8	9	10	11	12	13	14	15	16	17	18	Total
M	99,1	99,5	98,7	99,4	97,7	97,7	97,5	97,0	97,6	97,5	98,1	97,9	98,1
F	98,7	99,3	98,5	99,7	98,8	99,8	99,4	99,1	99,1	98,7	98,2	96,1	98,8

* 100 on the axes y represent an average of results from 1990-2001

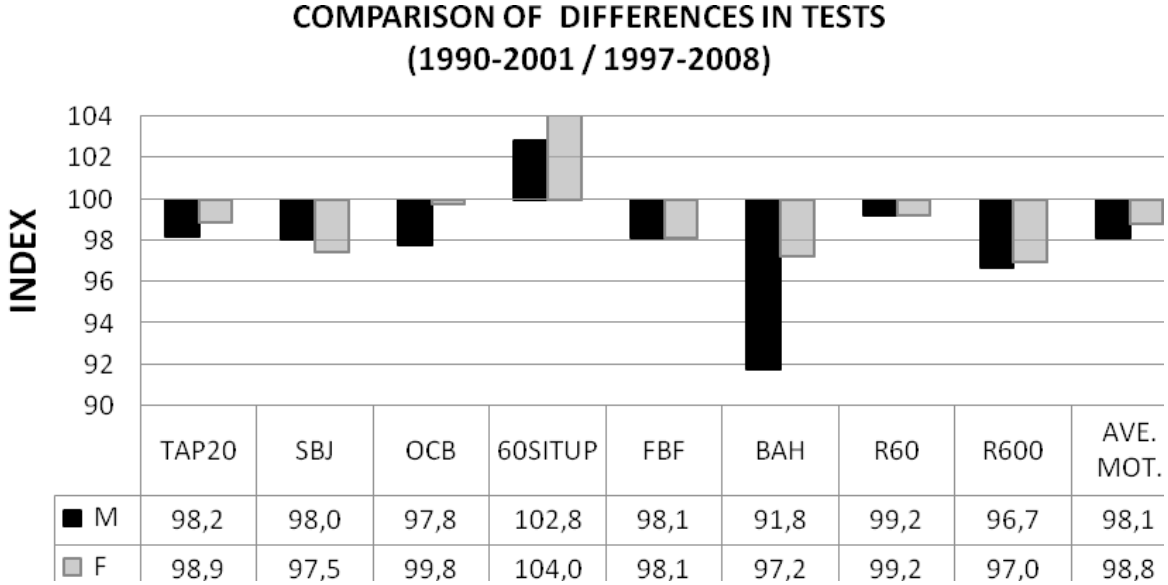
The indexes of motor tests prove to be mostly negative (Figure 9). Leskošek, Strel and Kovač (2007) report that the performance in almost all fitness tests measured in the Slofit system are substantially hindered (or at least is in negative correlation) with obesity – regardless of age or sex of children. The highest influence

of obesity was found in tests requiring the moving of the whole body (*standing broad jump*, *obstacle course backwards*, *60-* and *600-metre run*) or holding the whole body in a position (*bent arm hang*). Smaller influence was found in test *60-second sit-ups*, which requires moving only of the upper body. In a test measuring flexibility, *forward bench fold*, differences between weight categories are also small except among older boys and girls, where normal and overweight children perform substantially better then their obese pears.

The research of Rychtecky (in Brettschner & Naul, 2004) show similar changes at Czech, Slovak and Polish pupils. He reports deterioration of results in strength of arms and shoulder girdle and general endurance.

Overall the differences are the most positive in tests that measure muscular endurance of the torso and most negative in those that measured endurance of shoulder girdle and arms and general endurance. After two decades of constant improvement of results in tests that measure flexibility (Kovač & Starc, 2007; Strel, 2007; Strel et al., 2005), a slight deterioration in flexibility has been detected between the two generations.

Figure 9: Index of changes in results of motor tests in Slovenian boys and girls – comparison of two generations (1990/2001 and 1997/2008)



	TAP20	SBJ	OCB	60SITUP	FBF	BAH	R60	R600	AVE. MOT.
M	98,2	98,0	97,8	102,8	98,1	91,8	99,2	96,7	98,1
F	98,9	97,5	99,8	104,0	98,1	97,2	99,2	97,0	98,8

* 100 on the axes y represent an average of the results from generation measured 1990-2001

Endurance of shoulder girdle and arms test (Bent arm hang)

The comparison between the two generation (Figure 10) shows that the results in the test *bent arm hang* are still deteriorating. These results are in agreement with other studies (Brettschner & Naul, 2004; Strel et al., 2005; Rychtecky, 2007). Differences are larger among boys than among girls (Figure 11). The biggest differences are in the group of boys in puberty, when the results of the 1997–2008 generation are approximately 10% worse than results of their peers measured from the 1990–2001 generation. A negative deterioration in results of the 1997-2008 generation of girls in secondary school (Figure 11), is probably a consequence of increased body weight (see Figure 2 and 3).

The other reasons for this condition could be also the absence of gymnastics elements in schools (Bučar Pajek, 2003; Štemberger, 2003; Turšič, 2007). Activities which require great self-restraint and at times even overcoming some muscular pains are not appreciated in today's society and are in the eyes of parents and public opinion considered as an overload. Very low level of muscular endurance of shoulder girdle and arms is also a consequence of acceleration processes in body development (body weight and especially the increase of subcutaneous fat tissue) (Figure 3). The results of different studies show that both factors have a negative influence on muscular endurance (Strel, 2007).

Figure 10: Comparison in the results of the test bent arm hang between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19

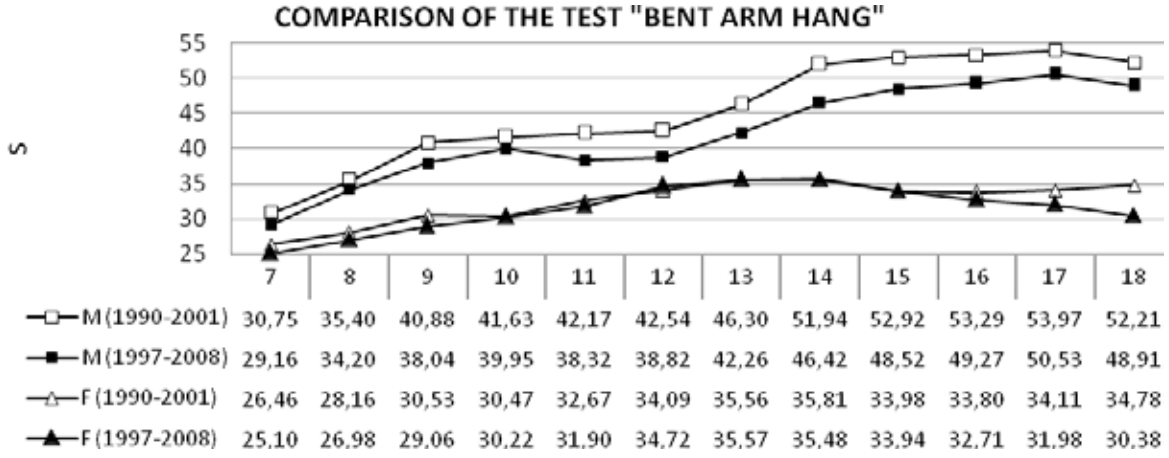
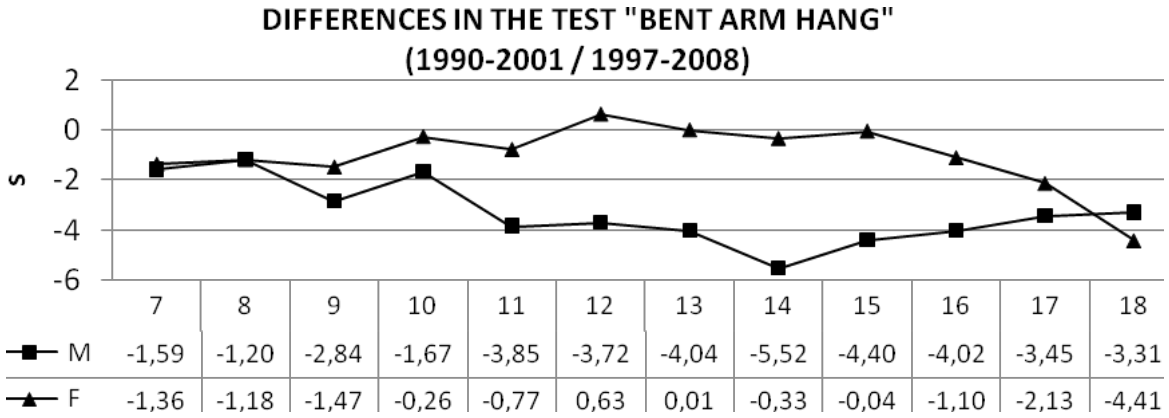


Figure 11: Differences in the test bent arm hang between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19



* 0.0 on the axes y represents average results of pupils measured from 1990-2001

General endurance test (600 m run)

In the *Slofit* system the test 600-m run is used as an indicator of general endurance (Strel et al., 1996). The comparison of the two generations in general endurance shows that the results of the younger generation are worse than those of their peers measured from the 1990–2001 generation (Figure 12). Pupils of the 1997–2008 generation enter primary school with lower level of general endurance in comparison to the 1990–2001 generation, but their results afterwards level with the results of older generation. There are no significant differences in this test among sexes (Figure 13).

Even though the difference in results of both generations is negative, the differences are smaller than in the past (Strel, 2007; Strel et al. 2005). Regarding the fact that body weight has a negative influence on the results in 600-m run (Kropej, Škof, & Milić, 2002; Strel, 2006; Strel, 2007) we can claim that general endurance of the 1997–2008 generation of pupils hasn't deteriorated despite worse results in the 600-m run test.

Attitude towards sports like running, Nordic walking, biking and cross-country skiing is gradually changing. It is possible that media have been playing an influential role in this process (articles and special weekly supplements with sport contents to daily papers). Its influence on children, youth and parents, who have been exposed to positive effect of endurance training through the media, is an encouragement for sports activity at home and for participation on many recreational events in schools, on local and on national level. The increased interest to overcome distances with rollerblades or bicycles is very common by families today and has a positive effect on endurance (Jurak et al., 2003; Strel et al., 1993; Strel et al., 2004).

Figure 12: Comparison in the results of the test 600-meter run between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19

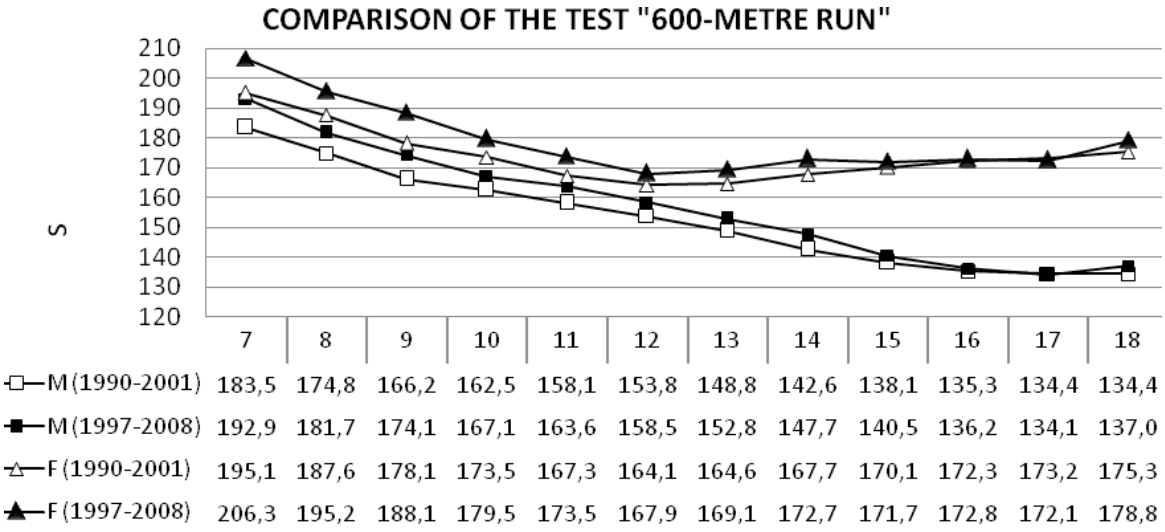
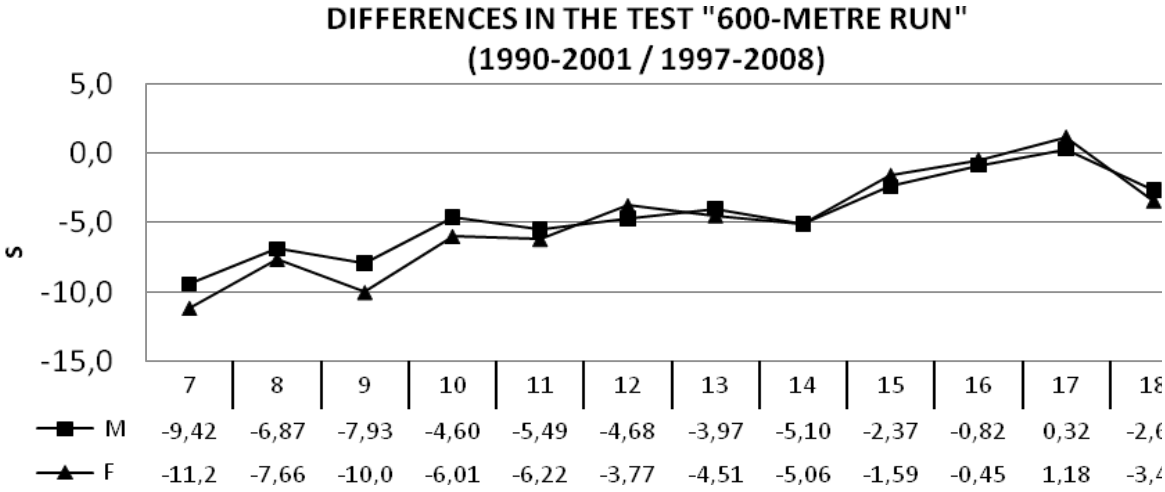


Figure 13: Differences in the test 600-meter run between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19



* 0.0 on the axes y represents average results of pupils measured from 1990-2001

Muscular endurance of the torso test (60-seconds sit-ups)

Parallel to other studies a positive trend of development of muscular endurance of the torso between the two generations has been established in results of both sexes (Figure 14). On average, the boys of the younger generation have increased their results for 2.8% and girls for 4.0% (Figure 15). Different authors found especially large positive changes among 15 to 18 year old girls, up to 25% in different age groups (Strel et al., 2003, Brettschneider & Naul, 2007; Rychtecky, 2007). In this study the largest differences are in the period of puberty.

One of the strongest factors, which has influenced the changes in the last ten years is most certainly the cult of a beautiful and muscular torso, which is promoted through the media (Cesar, 2007). Sport industry has seized its moment and has produced new sport equipment for its shaping. That is how children and youth gain an opportunity to practice on the machines at home (together with their parents, especially mothers); modern forms of training enables such workout also in schools and in fitness centers (Kovač & Starc, 2007).

Figure 14: Comparison in the results of the test 60-seconds sit-ups between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19

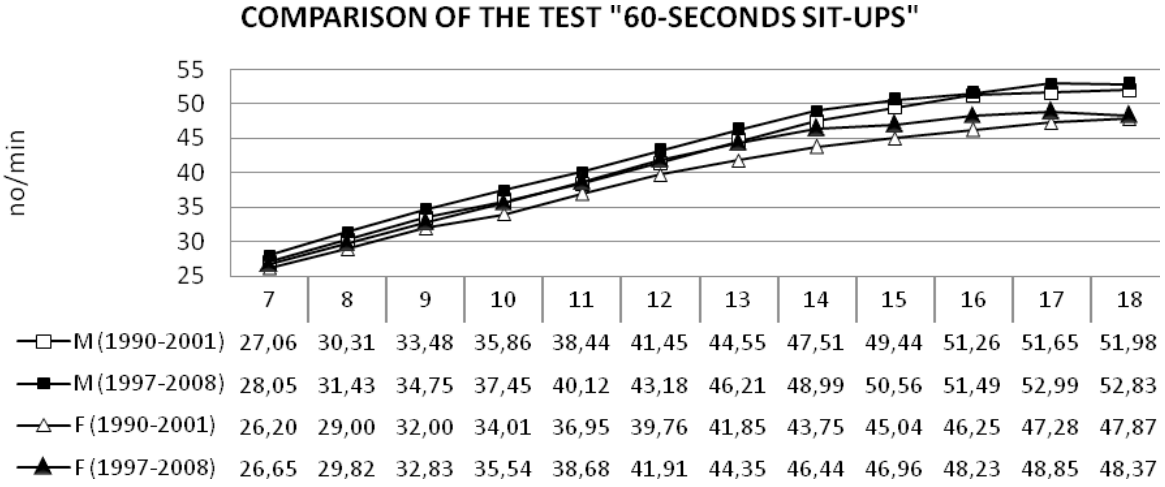
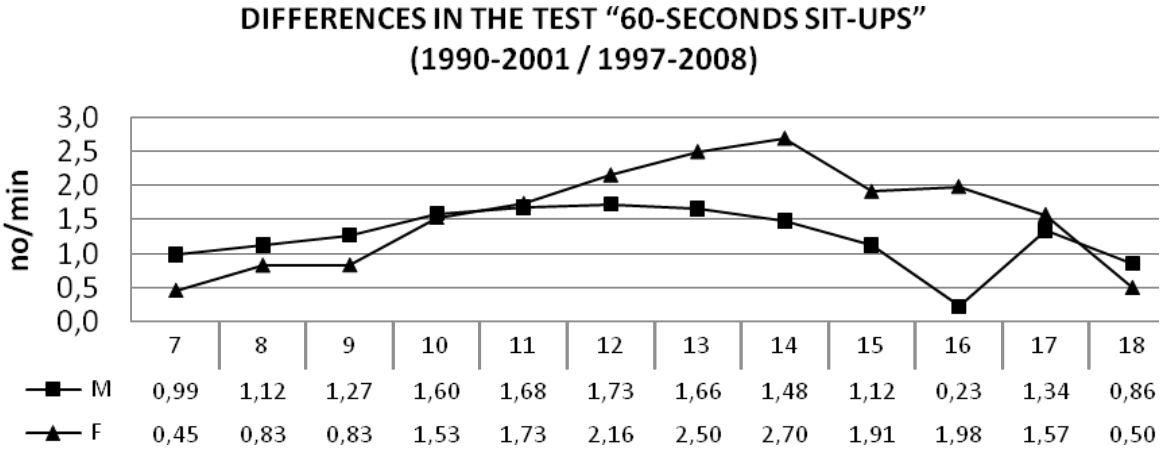


Figure 15: Differences in the test 60-seconds sit-ups between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19



* 0.0 on the axes y represents average results of pupils measured from 1990-2001

Flexibility test (Forward bench fold)

The results show that girls of both generations like in other studies (Kondrič, 2000; Kovač, 1999) have better results than boys (Figure 16). The comparison of data of the two generations shows a growing gap between the generations. At age 7, when the pupils of both generations started school, the pupils –of the younger generation started with slightly better flexibility which has constantly worsened until their age of 18 (Figure 17).

We assume that the decrease of flexibility is also a consequence of less gymnastics elements (Bučar Pajek, 2003; Štemberger, 2003; Turšič, 2007) and stronger orientation to strength training (Figure 15).

Figure 16: Differences in the test forward bench fold between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19

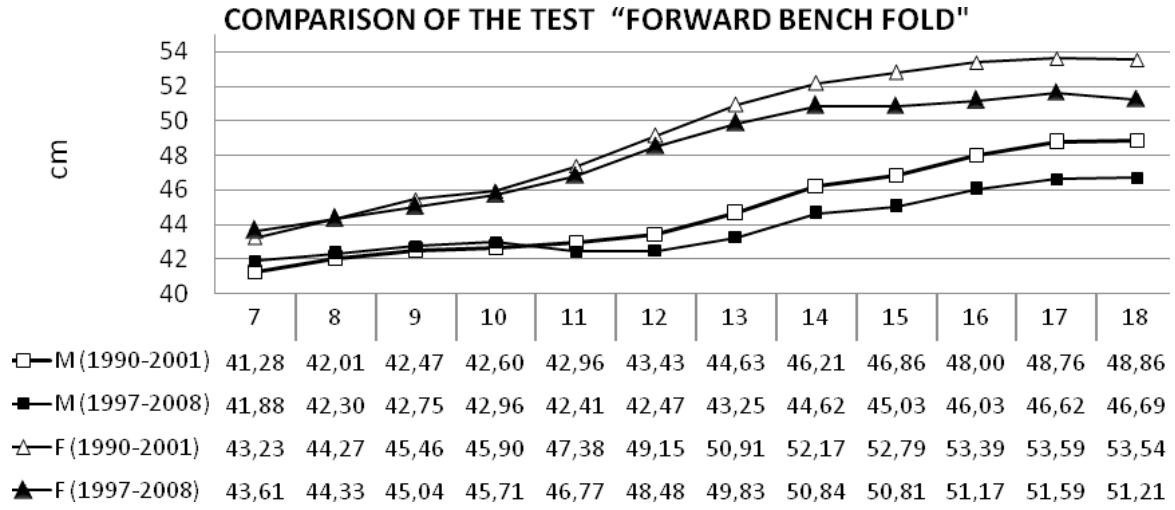
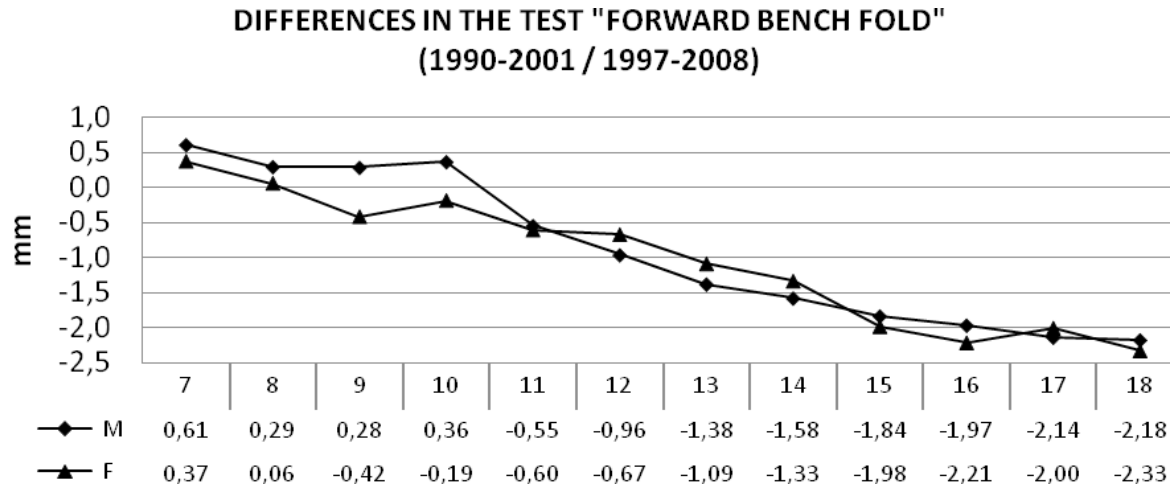


Figure 17: Comparison in the results of the test forward bench fold between two generations (1990/2001 and 1997/2008) of Slovenian pupils, aged 7-19



* 0.0 on the axes y represents average results of pupils measured from 1990 - 2001

CONCLUSION

The lifestyle of young people nowadays usually consists of passive and unvarying mental activities and unhealthy habits which, among others, alarmingly include a sedentary life and poor eating habits. Unsuitable eating habits and lack of movement result in overweight and obesity that are reaching epidemic proportions in the developed world (James, 2004).

The size and direction of changes in some physical characteristics and motor abilities of two generations of Slovenian primary and secondary school pupils of generation 1990–2001 and 1997–2008 have been compared in seven years period. Body weight of pupils has increased up to 4%, amount of subcutaneous fat tissue up to 13%; negative changes have been detected in motor efficiency. In muscular endurance of shoulder girdle and arms results have deteriorated up to 15% and in flexibility up to 5%. In accordance with results of other international studies (Brettschneider & Naul, 2004; 2007; Rychtecky, 2007) positive trend in muscular endurance of the torso has been detected also in Slovenian pupils (6%).

Changes in physical fitness are a consequence of different factors. There is a need promote active way of life, increase physical activity outside schools and promote healthy eating habits on a national level. In Slovenia conditions for physical education in schools is quite good (enough competent teachers and coaches for out of school sports activities, good working conditions, quality sport halls and sport equipment and average less than 20 pupils in physical education classes).

Despite the positive factors the proportion of overweight and obese pupils in Slovenia is increasing like it does in other developed countries (Andersen, Froberg, Kristensen, & Møller, 2007; Lobstein, Baur, & Uauy, 2004).

It is possible to conclude that the recommendations in which one hour of physical activity per day is recommended is going to need a correction to two hours of physical activity per day. The form of physical activity should be carefully chosen for appropriate level of energy expenditure and it should be individually adjusted to different needs of children. That is how extremely fast growth of negative effects on physical fitness of pupils could be stopped.

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SESSION 1

THE RELATION BETWEEN MOTOR EFFECTIVENESS AND MOTOR CREATIVITY IN PRESCHOOL PERIOD

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INTRODUCTION

Motor creativity is a phenomenon which has been studied on a small scale, in spite of the fact that motor development with children is in the function of general development, furthermore, children express themselves through movement better than any other modality.

It is widely accepted that all children are creative by nature, and that the manifestation of creativity depends on the environment and the inner motivation of the child. Also, in an attempt to explain the nature of creative behavior of the child, it must be taken into consideration that childhood has its own markings and characteristics that separate it from other periods of an adult life.

Creativity is one of the most appreciated human abilities. Most often, two elements are named as characteristics of creativity: 1. - a creative individual observes, sees, lives through, combines things in a new, unusual way; 2. - a creative individual creates new, unusual, different ideas and acts (Cudina-Obradovic, 1990, pg. 51). In attempts to solve and perceive the term of creativity, there is also a division of creativity into those with ”big C” and “small c” (Winner, 2000). Creative children with a “small c” are those who mainly discover rules and skills of a certain field and invent unusual strategies for solving problems within the same field on their own. In cases of creativity with ”big C” children change and transform a certain field, which requires a base of knowledge and experience. It is thought that children cannot be (or that they are very rarely) creative in this way. According to age, Taylor (1978) classifies creativity into five levels: creativity of spontaneous activity (1-6 years of age); creativity of directed activity (6-10 years of age); creativity of inventiveness (11-15 years of age), creativity of innovation (16-17) and creativity of creation (over 18 years of age). It is noticed that the first four levels can be linked to creativity with “small c” and only the last one with creativity with “big C”.

According to the investing theory of creativity by Sternberg and Lubart (1993), creativity requires the acquisition of six different components: abilities, knowledge, cognitive style, personality traits, motivation and environment. They believe that experience (knowledge) and skills (practical abilities) are needed for the realization of an idea in creative act. According to Renzulli (2006), highly productive individuals (even children) are characterized by three groups of abilities which overlap: above average ability in a certain domain (doesn’t necessarily have to be superior), motivation (dedication to the task) and creativity. The author sees that it is necessary to provide the experience of studying in order to promote the interaction among all components of creativity and to provide opportunities, resources and a support for development and application of gifted behavior. Wyric (1968) defines motor creativity as a capability of producing many original motor answers to a certain stimulus. Most of the well-known concepts are based on the Gilford’s theory and factor of divergent production. Subfactors of divergent production - fluency, originality, flexibility and elaboration represent the main components of creativity. Fluency is in a correlation with originality, while original ideas come after a long series of stereotypical ones.

According to modern theories of creativity, knowledge has an important role in forming a critical line under which creativity is not possible. Parnes considers that creativity is a function of knowledge, imagination and evaluation. The biggest part of knowledge or experience in creative studying is organized in a way that it is possible to combine ideas and to achieve different accomplishments. The use of knowledge in an imaginative way is the essence of creative productivity. Knowledge and logic open the doors of unexplored, unknown (“I know what I don’t know”), even beyond definite reality. By using knowledge, more and more is realized about distant things, those beyond immediate reach of senses and means. Connecting logical relations in one domain of reality by principle of analogy alleviates and shortens the process of finding relations in the realm of unknown (Sefer, 2000).

Djordjevic (2005, pg. 43) quotes that creativity is "people's ability to find a new solution, deal with a problem from a different angle and create new ideas…". Taylor (1978) considers that lack of adequate skills and knowledge, use of inefficient methods of learning, lack of motivation, trouble in realizing the relations, fear from failure and critics, disturb individuals in creative solving of problems. In considering ratio of knowledge and creativity Taylor doesn't exclude the importance of reaching certain knowledge but he also thinks that process needed to reach knowledge is equally important. Knowledge reached through small number of examples and only in one way, is not adaptable for new situations. It can limit the creative process. On the other hand, knowledge reached through few different processes can be a good condition for creativity.

Knowledge can not be equalized with creativity. This implies that one can not learn to be creative but only to practice it. For example, in sports more practice brings better results. But looking at this from the opposite angle we may conclude that most individuals don't solve problems by thinking but using already reached knowledge. Since it is not possible to have knowledge for all hypothetic situations, the importance of stereotype use of knowledge is obvious.

Participation and success in physical education ask for development of many complex movements. Most of these movements have natural (fundamental) ways of moving as their base, which is necessary for certain number of special skills which a child has to learn. Gajic (1985) thinks that a child's success in motor field depends from situations in which basic movements start, the existence of conditions for expressing a variety of movements and existence of problem situations for solving motor tasks. Some years ago it was thought that fundamental movements were a result of child's age and that children would develop them until they are seven provided that they have necessary conditions.

Today we know that quality of this movement depends from learning and practicing with planned and organized influence for making a good surrounding for all kinds of movement and developing of motor potential (Gallahue: 1987, Malina: 2004). Abilities and fundamental development must follow each other. If they don't have a chance to integrate and appreciate conceptual knowledge which is the base of many different disciplines, children won't be able to learn different kind of expertise which is necessary for optimization and total realization of their abilities. If we just focus on abilities it can lead to cumulative deficit since children will never got a chance to learn and appreciate the concept which is basic for them. Bloom (1985), Feldman and Pirito (1992) also think that success in motor activities depends on education based on concepts and knowledge that can prepare them for later, more sophisticated challenges within some discipline.

Unfortunately, children today are not living in the best surrounding and do not have the best education for physical activities. Within the talents study, Abbott, Collins, Sowerby and Martindale (2007) marked that teachers believe that children will not be "literate" in moving without proper conditions for development. Teachers in kindergarten also think that children are not physically active enough which affects their motor development (Sturza-Milic: 2007). Increased physical activity in this period of life has negative effects on quality of living, health, relationship between a child and family (Matejak and Planinsec: 2008, Rajtmajer: 2008). Roncenvalles (2006, Bala and Popovic: 2006) finds that children in kindergarten don't reach appropriate level of motor models expected for that period of life. They have poor results in adequate locomotor skills and abilities to control the objects. Motorically more successful children compared with the rest have more sense for coherency, they can bare the stress easier and are more immune to everyday stress that modern life brings (Sturza-Milic: 2008). In a study of motor creativity between boys and girls Serbetar (2003) finds that certain motor knowledge (especially for girls) was too low and this has a negative effect on performing of motor creativity.

According to the previous knowledge of different authors and the results of previous reasearch there as a connection between motor effectiveness and motor creativity in motor domain of preschool children, but it is still not sufficiently explained. Therefore, **the basic aim of the paper** is the relation between motor effectiveness and motor creativity (fluency and originality) in preschool children. In addition, it should examine whether there are differences between the components of motor creativity of preschool boys and preschool girls.

METHOD

The sample

The paper compares the results obtained from motor testing of a sample of 57 preschool girls and 54 preschool boys aged 6 to 7 from Vrsac.

The sample of variables

Motor effectiveness has been estimated by means of 7 mobile tasks:

1. Standing long jump (SLO);
2. Sit-ups (SIU);
3. Obstacle cource backwards (OCB);
4. Going through hoops carrying an object (GHO)
5. Running 20 m (R20);
6. Deep foward bend while seated straddled (DSS);
7. Tapping rate (TAP);

Motor tasks have been suitable for the children's age and have shown optimal metric characteristics so far (Sturza: 1999, Bala and Popovic: 2006).

Motor creativity was evaluated by Torens test *Thinking Creatively in Action and Movement* (TCAM), which is standard in testing children in pre-school period. The chosen problem was „In how many different ways can you carry the ball?" but it was modified in some way compared to original Torens TCAM (in original TCAM test the second problem was „In how many different ways can you throw the ball at the basket?". The other problems in TCAM are like: „In how many different ways can you move?", „What can you do with a plastic glass?" etc. TCAM produces three results (for fluency, originality and flexibility). I didn't consider flexibility because of specific period and age of children. The testing has been done individually due to the specific age of the polled population, while the performance of each child has been recorded in order to be able to undertake further analyses and assessments. At the same time, a retesting has also been undertaken to check the reliability of the used test "How many different ways are there you can carry a ball" (fluency – CFLU and originality – CORI). According to the obtained statistically significant coefficient of correlation (for CFLU r = 0.71; p = 0,01 and for CORI r = 0.77; p = 0,01), as well as the value of Alfa reliability coefficient under the classical sum model (for CFLU Alfa = 0.8977; for CORI Alfa = 0.9122) it can be concluded that the used test is of optimal reliability.

Statistical data processing

The data processing of motor testing and the testing of motor creativity implied the calculation of basic statistics for the used variables and the application of Pearson's linear correlation and T-test for small independent samples.

RESULTS AND DISCUSSION

The Tables 1 and 2 show the basic descriptive indicator and the indicator of deviation of normal distribution for motor variables and the variables of motor creativity:

Table 1. Basic descriptive indicator and the indicator of deviation of normal distribution for motor variables

Variable	N	Min	Max	Mean	Std	Sk	Ku
SLO	111	63.00	132.00	104.891	14.125	-.507	.081
SIU	111	7.00	38.00	21.036	3.7122	1.427	4.626
OCB	111	13.89	37.65	28.648	5.818	-.977	.194
GHO	111	8.16	36.32	18.899	4.665	.849	1.453
DSS	111	24.70	52.00	39.132	6.067	.055	-.446
TAP	111	10.00	25.00	18.812	3.333	.409	.532
R20	111	4.11	5.98	4.7945	.3505	.229	.772

N – number of students
Min – Min. value
Max – Max. value
Mean – Arithmetic mean
Std. - standard deviation
Sk – skewness
Ku – kurtosis

Table 2. Basic descriptive indicator and the indicator of deviation of normal distribution for the variables of motor creativity (fluency - CFLU and originality - CORI)

Variable	N	Min	Max	Mean	Std	Sk	Ku
CFLU	111	2.00	22.00	11.24	3.259	.040	.082
CORI	111	0.00	5.00	1.225	1.866	1.774	2.513

N – number of students
Min – Min. value
Max – Max. value
Mean – Arithmetic mean
Std. - standard deviation
Sk – skewness
Ku – kurtosis

The next step was correlating results (Pearson's linear correlation) obtained by motor testing and motor creativity testing. Table 3 shows the results obtained by correlation of all motor variables and the variables of motor creativity CFLU (fluency) and CORI (originality):

Table 3. Table 3: Coefficients of correlation and the achieved level of significance between motor variables (SLO, SIU, OCB, GHO, DSS, TAP and R20) and the variables of motor creativity (fluency - CFLU and originality - CORI)

	CFLU	CORI
SLO	r = .458* p =.000	r = .438* p =.000
SIU	r = .154 p =.107	r = . 113 p =.238
OCB	r = -.427* p =.000	r = -.418* p =.000
GHO	r = -.252 p =.017	r = -.247 p =.026
DSS	r = -.040 p =.678	r = -.052 p =.585
TAP	r = .267* p =.005	r = .234 p =.024
R20	r = -.411* p =.000	r = -. 361* p =.000

r – Pearson's correlation coefficient
p – level of significance

It has been noticed that the majority of motor variables statistically significantly correlates with the variable (fluency) - CFLU. The result leads to the conclusion that in the case of some motor tasks there is a link between motor successfulness and motor creativity, or more precisely, the ability of production of creative motor response. It has been assumed that the children motorically more successful in the stated motor tasks had achieved better results in the test of motor creativity, that is, they had been able to give higher number of motor response to the given tasks in comparison to children who had been less motorically successful. The highest correlation with CFLU (fluency) is shown in the case of motor task Standing long jump (SLO) and the task Obstacle cource backwards (OCB). The lowest correlation is evident in the case of motor task TAP. It should be noted that numerous authors suggest that in children the motor task long jump is not to estimate explosive strength (as it is the case with older children and adults), but the coordination of a whole body. It is similar with motor tasks Running 20 m (R20) and Tapping rate (TAP) which do not originally estimate speed and the speed of alternative movements, but in the case of children these tests are used for estimation of the way they solve coordination problems (Gajic: 1985, Malina: 2004, Kukolj: 2006, Bala & Popovic: 2006). It is between coordination as motor ability and intellectual abilities (especially with younger age) that a link has been noticed in numerous researches (Ismail: 1976, Kirkendall i Ismail: 1976, Ismail i Gruber: 1976, Sturza: 1999). Having in mind that in the test of motor creativity a child solves a specific motor problem, it might be that this very moment contributed to the link between the mentioned motor tasks and CFLU (fluency).

Similar results (as well as their analysis) have been obtained after the correlation of motor variables with the variable of motor creativity CORI (originality). The highest correlation is established in the case of the motor task Standing long jump (SLO), the motor task Obstacle cource backwards (OCB) and Running 20 m (R20). It has been assumed that the children who had achieved the best results in the variable of motor creativity CORI (originality), i.e. those children who had given the largest number of original motor responses had been the most successful, and vice versa. It has to be emphasized here that in this case statistically significant correlation with the motor variable Tapping rate (TAP) has not been established. The same is with the motor variables Sit-ups (SIU), Going through hoops carrying an object (GHO) and Deep foward bend while seated straddled (DSS).

By using T-test for small independent samples, it has been confirmed that there is a statistically significant difference (p = 0,003) between the sample of boys (n = 54) and girls (n = 57) in the variable of motor creativity – CFLU (fluency). Table 4 shows that the former scored better in the test of motor creativity than the latter. The average value of scores of motor creativity in boys was 12,4, while the average value of scores in girls was 10,2. By using T-test for small independent samples, it has been confirmed that there is a statistically significant difference (p = 0,004) between the sample of boys (n = 54) and girls (n = 57) in the variable of motor creativity – CORI (originality). Table 4 shows that the former scored better in the test of motor creativity than the latter. The average value of scores of motor creativity in boys was 2,18, while the average value of scores in girls was 1,08. The difference between boys and girls in motor effectiveness and creativity has been established, which can be explained, to a certain degree, by different encouragement of boys and girls by adults, in the first place their parents and teachers (Peric, 1989, Sturza, 1999, Serbetar, 2003, Malina, 2004, Djordjic, 2006).

Table 4: The significance of the difference in motor creativity (fluency - CFLU and originality - CORI) between the boys and girls

varijabla	Sex	n	Mean	SD	t	p
CFLU	Boys	54	12.407	4.063	3.090	0.003
	Girls	57	10.245	3.285		
CORI	Boys	54	2.185	2.266	2.935	0.004
	Girls	57	1.087	1.639		

n – number of students
Mean – Arithmetic mean
SD – standard deviation
t – t value
p – level of significance

CONCLUSION

Djordjevic (2005) holds that when intra and inter individual factors are born in mind, it could be noted that the higher level of abilities an individual posses, the greater creative performance someone can achieve is (if there is support of a setting, if the personality features are appropriate and if the time is mostly used for creative activities). Having in mind that the results of this research show that there is a correlation between success of children in the performance of certain motor tasks and motor creativity manifestation (fluency and originality), system positive influences by physical activity can have a decisive role, both in the development of motor successfulness and in the development of motor creativity. It is assumed that the mentioned features complement each other, especially in situations when children are faced with a motor problem of coordination nature. Consequently, during the period of childhood, we should strive to provide all the children with suitable conditions in order to ensure optimal development of movement skills and possibility of motor creative expression. It is therefore necessary to ensure "enriched" environment, indicating interesting, versatile and encouraging setting for a child, offering challenges and rising the standards of his/her success. What is also essential is a complex learning setting, provocations and rich opportunities for learning, abundance of equipment and requisites, the increase of motor contents with various developmental fields at early age, as well as the adults who are "curious" and willing to comprehend the ways children perceive, understand and represent the world.

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THE PROFESSIONAL COMMUNICATION IN THE TUITION IN PHYSICAL EDUCATION AND SPORT, A FACTOR OF PHYSICAL ACTIVITY OF THE STUDENTS

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The problem for pedagogical communication is an object of study of communication didactics. The development of that theory is based on the optimum transforming of the didactical knowledge to the specificity of the study on a particular educational discipline, the thing that is being examined in its specificity of the aspect of the cooperation between teaching and studying.

The analysis of the specialized literature prove the existing of different standpoints for the correlation cooperation – teaching, which are expressed in the methods for explaining of the pedagogical communication as subject – subjective process, as a operational-didactic technology /creating a particular background of the educational surroundings, increasing the effect of the mutual perceiving teacher – student/, V. V. Davidov, 1985, I. Marev, 1983, P. Nikolov, 1987, P. Petrov, 2005 and others.

In their versatile studies, authors prove their points of view on the basis of three approaches. In the **first** one the education is related to the process teaching – studying knowledge, skills, habits. The **second** approach reveals the forms and functions of the individual communicative activity. The **third** – defines the role function of the communication and its importance for the realization of the education.

In their research A.Leontyev /1974/, P.Petrov /2005/ and others are orientated to the third approach. The content characteristic of the teaching is explained more completely through didactic activities, introduced in a complete cycle of communicative connections and relations. The pedagogical communication is being observed as a process of exchange of messages, in which are objectified the results from the reality reflection. It is defined as a system of ways and methods ensuring the realization of the tasks and aims of the pedagogical activity. The social-psychological interaction between the pedagogue and the students is being guided through them.

We assume the concepts of communication and association as identical. We have in mind mostly the social-psychological interpretation of communication, through which it is explained as a versatile process realizing interpersonal attitudes and relations in a particular social context, including the components social communication, social interaction, social perception.

For a basis of our comprehension of communication, we assume the idea of activity, researched by N. A. Leontyev and developed nowadays by N. Popov, U. Mutafova, Sv. Dimitrova, I. Dimitrov, P. Petrov, A. Momchilova and others. Its development is comprehensible only in the light of the development of activity, as a condition for communication. In the process of active communication arouse and are being formed the relations, whose most expressed form is the common activity.

The forming of attitude and behavior in young students in the different forms of work in the physical education and sport, as well as their overall development as personalities is not possible without the competent pedagogical communication.

The aim of the research is to carry out a full valued pedagogical communication in the process of the motive training, in the various lesson and non-lesson forms of work on physical education and sport.

Tasks

1. Deep theoretical **analysis** of the problem;
2. **Research** of the forms of communication of the teacher with the students, the relations among them and their behavior depending on the complicity of the situations in the process of the motive education, the challenging sport contest for victory by the performance of sports-preparatory and relay games, their emotional condition etc.
3. **Ascertaining** the influence of the improved professional communication in the forms of physical education and sport on the physical activeness of the trained.

Organization and methods

The research is being conducted during the school year 2007/2008 in "Bratia Miladinovi" secondary school, in the town of Rouse, with students aged 8 to 9 years, 85 in number, allocated in Experimental /E group/ and Controlled /C group/ groups.

Basic **methods:** pedagogical observation, pedagogical experiment, questionnaire study, mathematical and statistical methods.

The process of teaching physical education and sport presumes not only a good knowledge of the program material, which is being taught by the primary pedagogue. Above all it is needed to create psychological situations, which stimulate the personal-operative development of students in the process of motive activity. In the E group special attention was paid to the educational function of communication: **cognitive**, **emotional** and **actual**.

The basic directions of that influence are orientated towards:

1.**The student's preparation for communication;**

2.**The creation of conditions for communication** between the teacher and the students and among themselves.

Correction of communication.

This has absolutely depended on the skill of the teacher to communicate with the children and on the forming of relations between them. In fact this meant the **start of the dialogic communication**. With its help the constructive cooperation among the participants in the education process, on the base of mutual trust and friendliness, was accomplished. **In game collaboration and joint motive activity** many pedagogical situations were created, in which the teacher presented the necessary knowledge for the performance of the various elements of the studied motive tasks of the main groups / track-and-field athletics, gymnastics, sport games/ and the additional / swimming, tourism, dances/. The problems and the overall purpose for their solving were jointly discussed. In fact that was reporting of the motive activity in the process of education and at the same time development of self-knowledge, stimulating cooperation and self-expression.

During the work for mastering motive habits and abilities, students not only acquired knowledge, learned to be in charge, to manage and adjust their own moves in accordance with the technical requirements regarding the implementation of the motive tasks. Gradually they changed from being focused on practical cooperation to a more mental, theoretical and eventually to deeper personal contacts**.**

In relation to this the results from the work for improving the motive abilities of students affect the actual preconditions in social and personal aspect, without which the complete formation of one of their main manifestations – **communication and active life position and realization,** would not be possible. The improved motive ability complies with their need to cooperate in the process of learning, to share, helps to form positive co-relations between students based on satisfying their necessity to communicate while performing motive tasks.

The student, who knows and manages well his moves, is always in a highly emotional state, which is an important condition in order to communicate with mates. **On this basis in the work process preconditions were formed for:**

1. **Coordination** of activities and relations between students;
2. **Distribution** of functions in the common motive activity;
3. **Cooperation** for coordination of efforts on the road to achieving the common goal.

Gradually the communication between mates became richer and their motions and actions freer. Their motive activity was based on their interaction in the process of learning. The need of a new personally-active approach in the process of teaching physical education and sport was formed, where from basically learning different motive actions, we move to their conscious and realized acquiring. Our task was to create a clear, precise and highly conscientious program for action. This helped for coordinating and uniting their efforts for reaching a common result of the activity, in order to form positive interpersonal relations.

Analysis of the results

1. **The established results from the research of relations** in the students' team in two groups, through the modified socio-metric test, allowed us to determine the number of socio-metric choices and rejects based on criteria, mentioned in the questionnaire card. The data received in the end of the school year show, improvement in both groups in comparison to the initial data. For group E though, the socio-metric choices are 62.06 %, against only 26.59% for group C. The difference between them is considerable – 35.47% in favor of group E. The rejections are respectively 37.94% for group E. and 73.41 %, for group C.

The comparative analysis of the results gives us a clear idea of the predominant development of group E in comparison to group C regarding the relations between students. This is due to the implementation of professional communication in the process of teaching physical education and sport, as a result of which a united team is built. Its characteristics are conscientious discipline and responsibility for one's behavior before the whole team, friendly assistance. Thus, every student gains the feeling of pride and consciousness, which is expressed by eagerness to actively take part in its activities.

2. **The profound analysis of the results of the research of the basic physical qualities** of 8-year old students, presented in table 1 shows, that their accelerated raise in group E is due to the systematic impact of the diverse forms of work during the physical education and sport classes, in order to develop communicational abilities in young students. This helps them to execute technically correctly the practical exercise running, as a result of which their spatial orientation is improved as well as the entire running characteristic, thus **increasing the speed of it.**

Table 1

Sex	Indexes	Experimental group					Control group				
		X1	S1	Increase Absol.	%	Pt	X2	S2	Increase Absol.	%	Pt
Boys	1	9.85	0.43	0.90	8.37	0.99	10.35	0.34	0.45	4.16	0.99
	2	151.70	2.88	21.99	16.95	0.99	142.85	2.14	14.28	11.10	0.99
	3	572.12	19.38	169.62	42.14	0.99	479.68	21.00	81.14	20.35	0.99
	4	44.80	1.50	7.70	14.66	0.99	50.50	4.23	3.80	6.99	0.99
Girls	1	10.50	0.46	0.92	8.05	0.99	10.65	0.45	0.55	4.10	0.98
	2	143	2.70	21.83	17.94	0.99	131.98	2.91	12.39	10.36	0.95
	3	509.27	27.04	138.77	37.45	0.99	459.42	13.58	86.52	23.20	0.99
	4	49.08	2.80	7.60	13.40	0.99	55.20	3.51	3.60	6.12	0.99

Comparative final data from the analysis of physical abilities of 8-year old students.

Indexes: 1. "Running 50 m.", (sec); 2. "Long jump with both legs from static position", (cm); 3. "Throwing a solid ball 1 kg with both hands above the head", (cm); 4. "Running 200 m" (sec).

3. According to the long jump data, **the explosive muscular power of lower limbs** is more tangibly increased in group E, where the communication between students is better. The difference in the final results for the two sexes is considerable, fig. 1. The absolute increase for boys and girls is respectively 21.99 cm, /16.95 %/ and 21.83 cm, /17.94%/, while the absolute increase for students from C group is much lower: 14.28 cm. /11.10 %/, for the boys and 12.39 cm, /10.36%/ for the girls. The statistical accuracy of the data in both groups is high, fig. 1, 2

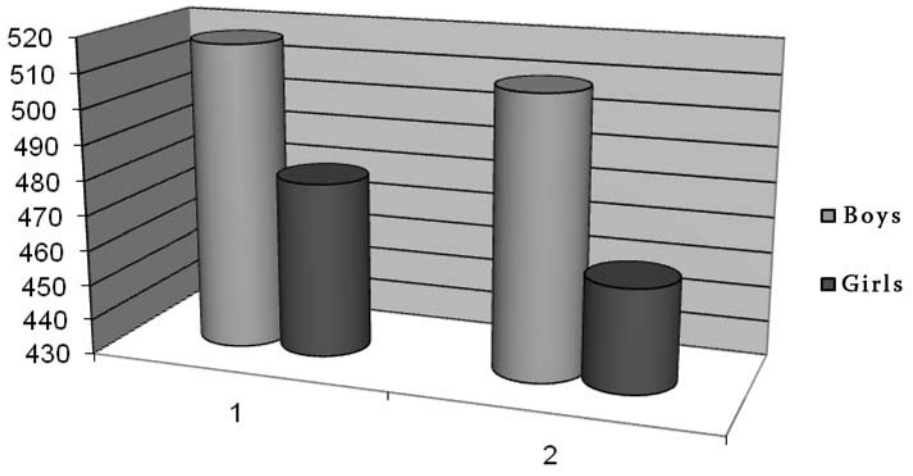

Fig. 1 Comparative final data from the research of the muscular power of lower limbs of 8 – year old students from both groups examined.

4. **The data from the research of the muscular power of upper limbs** is presented in Table 1 and fig. 1. It shows the positive changes that occurred for both sexes in the examined groups are not equal. The muscular power has been affected stronger in group E, where all effrts have been focused into improving the communicational abilities of young students.

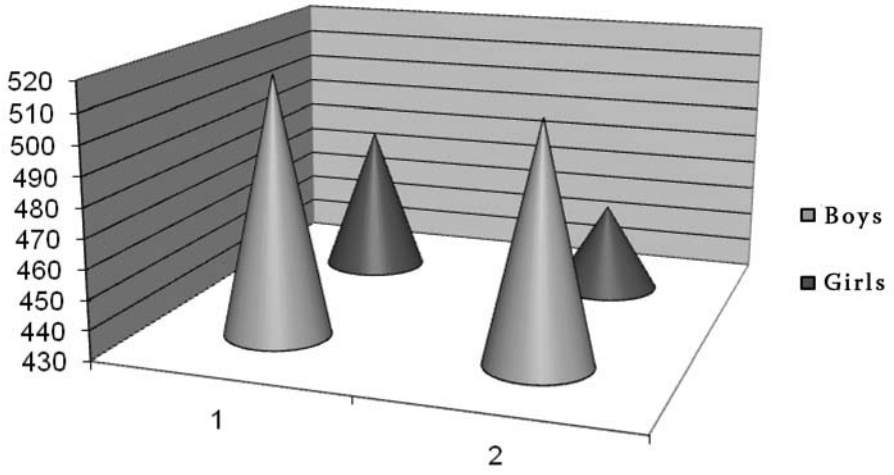

Fig. 2 Comparative final data from the research of the muscular power of upper limbs of 8 – year old students from both groups examined.

The absolute increase for boys and girls from group E is as follows: 169.62 cm. /42.14 %/ and 138.77 cm., /37.45 %/, regarding respectively 81.14cm. , /20.35 %/ for boys and 86.52 cm. /23.20 %/, for girls, fig 1. The results are supported with high statistical accuracy. **The results for the physical ability stamina are analogical.**

CONCLUSIONS

1. **The process of forming a communicative competence in young students** while performing motive activities is vigorous, along with the development of their physical abilities. It is accompanied by an intense process of social formatting of the student or the so called socialization. The formation of active attitude becomes possible not only towards the coevals but also regarding the surrounding world.
2. **For the increase of the necessity to communicate not only a social environment is needed,** but more importantly a team of people the same age, based on common motive activities and the principle of voluntariness and equality. Through skillful guidance of the children's team and professional management of the students' behavior in the teaching process, the teacher creates socially determined reactions in children. Outside the team, traces of the will and the character could be formed, but without being socially orientated.
3. **For the implementation of communication** in the process of motive activity, the socially-psychological climate within it is of great importance and depends on: the interpersonal relations and the individually-psychological features of the team members.

The communication of the teacher with the students is a highly qualified professional activity, which cannot be interpreted outside the context of the objective, instructional and the organizationally-technical components of the process of teaching physical education and sport.

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THE AFFECTIVE CHARACTERISTICS OF PHYSICAL EDUCATION AMONG THE 11-18 YEARS OLD HUNGARIAN STUDENTS

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Motto

"The efficiency of the student's learning could be increased or decreased with the changing of initial (cognitive and affective) characteristics in positive or negative direction,..."

(B. S. Bloom)

Introduction

The arrangement of the range of interest of the twenty-first century pedagogical researches follows a tendency of placing emphasis on affective characteristics. The examination of the affectivity which determines the performances and also which influences the efficiency of the learning, gets greater attention. The realignment of the priorities of the interest is due to the difficultness and lack of exploration of new connections because of the enormous empirical materials at cognitive areas, achievement and knowledge assessment fields. At the same time it was the versatile analysis of the school efficiency that showed if a research remains at the internal parsing of the cognitive areas, than the results of the students can not be explained adequately. The emotional dimensions either separately or together could have a strong impact on results that the student achieves at a certain subject in different cognitive fields (*Csapó,* 2000).

The emotions play a considerable role in the key motivation of the school's educational and instructive work. It is an important factor during the pedagogical application of motivation that -despite of its multidimensional characteristics- during the school years especially during the junior school years the affective elements prevail. It means that the internal tensions that provoke activity mainly appear in forms of emotions, interests and desires. Later, from the beginning of youth age the cognitive factors get greater and greater role without losing the basic affectivity of motivation (*Rétsági* and *Hamar,* 2004).

The affective factor has a great influence on the effectuality and efficiency of studying a certain subject. Positive emotional level increases and negative decreases the performance. A tendency can be seen during the last decade in the schools that there is a shift in the emphasis of the Physical Education lessons to the 'movement entertainment' and joy. Physical Education as a subject approaches to the 'let's feel good' concept. There is a big mistake if discontinue teaching forms of movements that are difficult to acquire, since these 'hard way presume sweat drops' have significant educator force (*Csepela,* 2000).

P.E. is way above the other theoretical subjects considering the level of fondness among the subjects in Hungarian schools. Physical Education belongs to the 'pleasure subjects' that is an important energetic and motivate base of the school education and learning. Ages and genders of the students show differences in the attachment to certain subjects. The positive emotional charge towards Physical Education slightly decreases with age, and the subject is more prior on the preference list of the boys than on the girls' list (*Báthory,* 1997).

The aim of survey

The appointed aim was to examine those emotions of the 11-18 year-old Hungarian boy and girl students attaching to physical education that may play a determining role in the process of the teaching-learning. In a more specific definition: according to our intention we wished to survey the 11–18 year-old boys' and girls' certain features and factors of affectivity to physical education, through positive and negative reactions. It was important to find those emotions attached to the physical education, which play determining role in the teaching-learning process of physical education. It was presumed that these emotions characteristically manifest in the function of genders against the age.

Methods

Participants

The examination sample consisted of 2840 11-18 year-old students: 1367 boys and 1473 girls. The students' age and sex distribution was summed up in Table 1.

Table 1 The age and sex distribution of the examined persons (person)

Gender/Age	11–12 year	13–14 year	15–16 year	17–18 year	Sum
Boys	244	359	517	247	1367
Girls	304	387	519	263	1473
Sum	548	746	1036	510	2840

The data registration carried out in five geographically homogeneous (regional) distribution schools of Budapest and 21 schools from the countryside. There are also primary schools, primary and secondary grammar schools, Catholic primary and secondary grammar schools, primary and music schools primary and technical schools, secondary grammar schools, technical schools, technical and secondary grammar schools, vocational institutes, vocational school and hostels among the educational institutions.

Instruments

The emotional responses were surveyed with the help of a question list assembled together earlier. The questionnaire was meant to measure the emotional affection, the affiliation or the rejection for the physical education classes. The students may have expressed their positive or negative feeling towards the content with answering 'yes' or 'no' to the statements (See Supplement). The data procedure and the questionnaires filling were taking place in the 2006/2007 school year.

Data analysis

Ten factors were constituted from 48 questions of the questionnaire. Particular numbers of questions were ordered to the factors surveying the positive and negative emotional background for the school physical education. On the basis of our aims and the set up hypothesis two emotional factors were examined in this study:

- Delight of the recreation (henceforward: 'joy'), to which the 15, the 17 and 22 No. question are attached.
- Positive attitude for physical education and sport (henceforward: 'positive attitude'), to which the 1, 5, 14, 18, 29, 31, 32, the 37 and 38 questions concern.

The numerical value of the factors was granted by the proportion of the positive answers in %. Following the basic statistics calculations, Mann-Whitney- and Kruskal-Wallis-test were used to justify the hypothesis. The connection of the examined factors was determined using Spearman's rank correlation to identify the differences of certain emotional areas, age groups and genders.

Results

Means and differences

Figure 1 presents the proportion of the boy students 'yes' answers in percentile form.

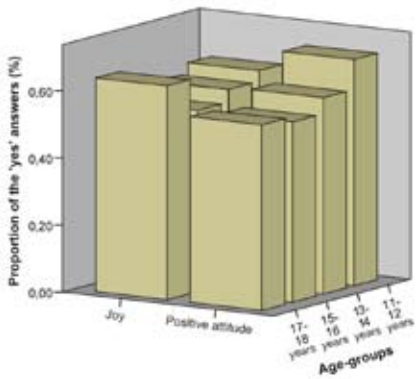

Figure 1 The boy students mean results (N=1367)

The 'joy' emotion received 60% support in cases of the 11-12 year-old boys. The support of the 'positive attitude' is high, exactly 67%. Only 57% of the 13–14 year-old boys gave positive answers to the 'joy' emotion. The support of the 'positive attitude' shows resignation that fell back to 58%. In cases of the 15–16 year-old boys the 53% 'yes' for the 'joy' emotion indicated a small-scale decline. After another decrease, the positive judgment of physical education fell back to 53%. The 'joy' emotion attained the highest value until now with a considerable increase (63%) among the 17–18 year-old boys. The 'positive attitude' factor shows a little rise, but the value (55%) does not attain the level of the 11–12 year-old and the 13–14 year-old groups.

Figure 2 presents the proportion of the girl students' age groups 'yes' answers in percentile form.

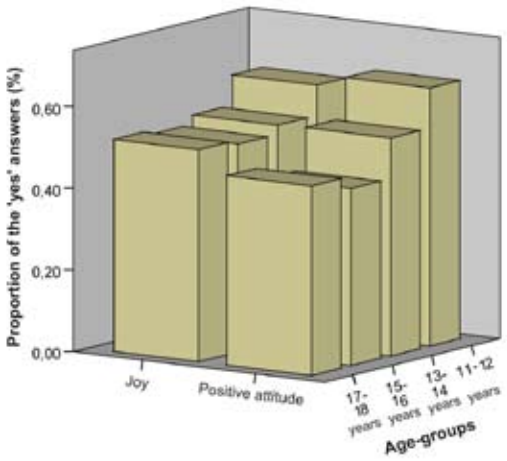

Figure 2 The girl students mean results (N=1473)

The 'joy' emotion received a 60% support in the cases of 11–12 year-old girls. The support of the 'positive attitude' is high, exactly 63%, but lower than the boys' results. The 13-14 year-old girls' value of the 'joy' emotion is approaching the 50% level , so 53% gave affirmative answer altogether. The support of the 'positive attitude' is also 53%, which went back ten percentages in this way. Among the 15–16 year-old girls the 'joy' emotion is decreasing further. The proportion of the positive answers is no more than 50%. The 'positive attitude' is not positive already, because only 43% of the girls marked 'yes' answer. It is typical of the 17–18 year-old girls' means that the positive answers show small-rate elevation compared to the previous age groups. This is 51% by the 'joy' case and 46% by the 'positive attitude' case.

On one hand the Mann-Whitney- and the Kruskal-Wallis-tests' results reflect the gender differences – boys and girls –, on the other hand among certain age groups – 11–12 years, 13–14 years, 15–16 years and 17–18 years –strong significant difference can be found. According to the examination of the combinations of genders and age groups – 11–12 year-old boys, 11–12 year-old girls, 13–14 year-old boys, 13–14 year-old girls, 15–16 year-old boys, 15–16 year-old girls, 17–18 year-old boys and 17–18 year-old girls – there are small but significant differences.

The results of the context examination

Table 2 shows the rank correlation results of the examined two factors concerning boys. The data are not separated according to age groups in this table, and later in Table 3.

Table 2 Results of the Spearman's rank correlation among the emotional factors of the boy students (N=1367)

	Joy	Positive attitude
Joy		0,593***
Positive attitude	0,593***	

* p<0,05; ** p<0,01; *** p<0,001

From the correlation values of the table it can be clarified, that there are strong significant context among the two examined factors of the 11–18 year-old boys. The 'positive attitude' and the 'joy' show the tightest context (rho=0,593, N=1367, p<0,001). Analyzing the boy age groups' correlation data separately, the most visible trend is that the 'positive attitude' and the 'joy' emotions indicate continuously growing context.

In Table 3 the 11-18 year ones girls' rank correlation results are shown.

Table 3 Results of the Spearman's rank correlation among the emotional factors of the girl students (N=1473)

	Joy	Positive attitude
Joy		0,586***
Positive attitude	0,586***	

* p<0,05; ** p<0,01; *** p<0,001

The correlation values of the table confirm the result received from boys, that the context is significant strongly between two factors (rho=0,586, N=1473, p<0,001). Analyzing the girl age groups' correlation data separately, the same tendency which was received at the boys was experienced. The context of the 'positive attitude' and the 'joy' emotions are growing continuously.

Conclusions

The positive attitude towards the physical education and the sports shows a favourable picture in the case of the examination sample. It may not written that 'on the whole', because watching the 'positive attitude' factor for the 15-16 year-olds decreasing was experienced. In the cases of the girls the values go over to the negative range. This is a serious warning for the educators dealing with physical education!

The students' affective features play a relevant role in the process of the teaching-learning. Among all the 11-18 year-old students' groups the delight of the physical education activities, the recreation brought by the sport activities and the wish of the desire and recreation are reported. The joy emotion dominates the fewest for the 15–16 and the 17–18 year-old girls. The positive answers' rate of the former group is hardly over than 50%. This is a phenomenon which can be attributed to the result of the maturing process presumably.

At this stage it is important to recall the already dealt endeavour from the introduction part that the athletic entertainment, the pleasure and the wellness have to be in the centre at school P.E. The above mentioned author (*Csepela,* 2000) committed to that conception – which we also support – that this can not be considered progressive development, if it brings underplay for P.E and sport activities in the achievement. From that matter the two (joy and efficiency) is not preclude each other. On the contrary! One of the phenomena may intensify the other one treated with a proper pedagogic sense and profession.

It was presupposed that the surveyed emotions express themselves in the function of the genders and the age characteristically as an examination hypothesis. This hypothesis will be proven, because on one hand the boys are more recipient towards P.E. than girls and on the other hand the positive emotional attitude decreases – especially in the girls' case – as they get older. The degree of the decrease shows age and gender characteristics.

It is established that the students' affective features play a relevant role in the process of the teaching-learning following the summary of the examination results. This statement is true to the physical education subject, where the students go through a coloured world in emotions through the exercise. In the school there are few activity which similarly rich in emotions, like sports and workouts. Essential to emphasize on it, that the physical education subject, in this manner the P.E. teacher plays an attitude-formation role in the school. The positive emotions that evolved during teaching and learning Physical Education also increase the pedagogical effectiveness of the whole education process.

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Supplement

Data of student

Country:		**City/town:**	
School:		**Class/grade:**	
Gender:	male – female	**Age:**	

Emotional reactions inventory in Physical Education

School physical education (PE)

I have nothing against PE, I like movement activities.	Yes	No
I have enough energy; PE is no trouble for me.	Yes	No
I have worries because of some exercises.	Yes	No
I have not got enough strength for all exercises.	Yes	No
PE should be more often in a week.	Yes	No
I would not mind if there was no PE at all.	Yes	No
I am afraid I do not master exercises so well as those who are more skilful.	Yes	No
In our PE lessons we rest too much.	Yes	No
I like sports.	Yes	No
Formerly I liked physical exercise, but now I don't care.	Yes	No
I like PE, because I can do there what I like to do and what I can do.	Yes	No
I have confidence in myself in most exercises.	Yes	No
PE at school is boring.	Yes	No
I feel better after PE.	Yes	No
We have a lot of fun in PE classes.	Yes	No
I like risk taking in PE.	Yes	No
In all exercises I feel quite free and relaxed.	Yes	No
I feel discontented if I can't exercise.	Yes	No
I like the feeling of fatigue after PE.	Yes	No
After the exercises I feel much better it only seldom happens that I gasp for breath.	Yes	No
Exercises make my worries go.	Yes	No
PE improves my mood.	Yes	No
I like risky sports and exercises.	Yes	No
I like to test what I am better at.	Yes	No
Excitement in games and competitions is fine.	Yes	No
I mostly avoid demanding exercises.	Yes	No
During PE lesson I am nervous.	Yes	No
The excitement of competition means everything for me.	Yes	No
PE should be more frequently, even every day.	Yes	No
The PE lesson demands a lot of exercise.	Yes	No
The time for exercising is too short in a PE class.	Yes	No

In my opinion, the school PE inspires one to take up sports outside school as well.	Yes	No
I hate long distance running.	Yes	No
I hate weight training.	Yes	No
We are not very good at sports.	Yes	No
Sometimes I like to avoid a PE lesson.	Yes	No
Sometimes exercises are strenuous in PE, but I like them.	Yes	No
I enjoy PE classes very much.	Yes	No
The constant need to focus my attention in PE annoys me.	Yes	No
I am able to concentrate perfectly in all exercises and sports in PE.	Yes	No
I do not know what the purpose of school PE is.	Yes	No
At times I feel tired after the exercises.	Yes	No
I always encourage myself to show the best performance.	Yes	No
Every competition absorbs me fully.	Yes	No
I feel better if I properly solve a problem in a PE class.	Yes	No
I am not very enthusiastic about physical exercise.	Yes	No
In PE, not everyone can do what they would like to.	Yes	No
I avoid PE whenever possible.	Yes	No

THIRD CULTURE KIDS - THROUGH THE EYES OF A PHYSICAL EDUCATION TEACHER

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INTRODUCTION

We all see and experience the manifestation of globalization and we all need to search for our roots and belongings to be able to remain standing on a stable piece of land under our feet. Today's education needs to face this problem even more than ever before. Education is also part of the birth of a new global society and is in the focus of the development of the society and the individuals as well. The mission of education is that it enables each individual to reach their own peaks of their talents and bring their personal dreams come true. [1]

As the world is becoming more and more international, the education systems are undergoing reform, restructuring. Old structures are getting transformed and new ones are developed. One of the new educational systems is International Education with the chain of international schools. Children who live and study in an international environment will look at the world from a different perspective than their parents or their compatriots who grew up and studied only in their home countries.

If a teacher meets these children in his or her practice, he or she will encounter and face new situations and problems that are different from those what they used to during their teaching practice.

Why is the world of international education different from the national ones? Why are the children who grew up internationally different from their "home grown peers"? Do they grow their roots into their passport countries or into the countries where they are living? What does continuity mean in their lives? Do sports and Physical Education help them to overcome their cultural difficulties? Do we teach Physical Education in the international education system differently from how we would teach PE in a local school?

We are searching the answers for these questions in this study through analyzing the current research documents and literature and through the pedagogical experience of the author who has already spent a decade teaching children in international education.

Brief history of international education

The first overseas schools had their roots in colonialism. The first "modern" international schools were born after the First World War. The model for these schools was the International School of Geneva in Switzerland, which was established in 1924 for the children of the employees of organizations such as the League of Nations, the World Bank, the International Labor Office, the International Red Cross, etc. The mission of this school was to cater students with a diversity of languages and cultures and to prepare them for university education in their own countries. The outcome was the International Baccalaureate exam.

After the Second World War more and more international schools were formed since the allied troops remained in Europe. The emergence of the USA as a world power generated international exchanges not only in Europe, but in the Middle East, too. So a number of international schools were established on an American or British-style educational model throughout Europe and the Middle East.

So we can say that an important characteristic of International Education is that it is historically and currently "Anglo-Saxon" based. This also means that the official language of these schools is English.

In 1963 the European Council of International Schools was established. In 2001 it became the Council of International Schools. This organization gathers the International schools throughout the world, but only those that undergo and pass their accreditation process.

The "participants" of international education: Third Culture Kids

What does the expression "Third Culture Kids" mean? Who are these children?

The phrase "Third Culture Kids" was first used by Ruth Hill Useem to describe young people raised in a country other than that of their parents. These children are those, who are taken abroad by their parents, they accompany their parents into another culture. On the one hand they can be the children of refugees and immigrants; on the other hand they are the children of academics, international business parents, missionar-

ies, officials from other countries, and employees of international organizations. They blend culture of their passport country with their country of residence and become truly multicultural. [10]

According to a definition *"A Third Culture Kid (TCK) is a person who has spent a significant part of his or her developmental years outside the parents' culture. The TCK builds relationships to all of the cultures, while not having full ownership in any. Although elements from each culture are assimilated into the TCK's life experience, the sense of belonging is in relationship to others of similar background."* [11]

For TCKs it is easier to relate to others who have lived abroad than to those who have stayed close to their roots.

Special phenomena and problems in TCKs' lives

Most Third Culture Kids learn more than one language, but do they speak any of those perfectly? It happens that the parents of a child represent two (or more) different cultures, so the child learns two languages at home, speaks a third one in school and communicates with a fourth one with his or her babysitter. Can it cause any negative effects? Some literature says that it may cause dyslexia.

We emphasize that the school prepares its students to be responsible global citizens who instill respect for self and others and who accept and respect different cultures and traditions. They have three dimensional experiences about the world and it makes them tolerant and opened towards other cultures. But they live in an inclusive, familiar and protective community. They have a closer relationship with their teachers and more dependent on their parents than other children. This retards growing up and can be a barrier in becoming responsible adults in they lives.

The biggest problem can be though the emotional flattening that may be the result of the unsolved grief that they carry on from their early childhood, caused by frequent moving. This grief is connected to the loss of people (friends, nannies, etc) and places or even objects as well that they experience in their early developmental years. The effect is that after a while they prevent themselves from deeper relationships since they know unconsciously that it will come to an end.

Moving home to their passport countries is always the most difficult move for them. They are hidden immigrants there: they look like the people there, speak that language without any accent, but they think differently. So where is home in reality for them?

Their typical characteristic is said to be that they do not grow their roots deeply into the soil, but they have far-reaching roots close to the surface like a water plants. It is not worse or less than the other kind, just different… [2, 9, 10]

Do sports and Physical Education help TCKs to overcome their special difficulties?

Those growing up far from their home countries need to be encouraged to try a variety of sports, activities and hobbies, and to learn new skills. Swimming, tennis and horseback riding, for example, are sports that can be pursued almost anywhere. The more sports and activities children are involved in, the better equipped they will be to find groups to fit into as they move, especially as they return home. Sports and other skills like music or arts are called *"portable skills"*. The importance of getting involved with something for which they feel a passion cannot be emphasized enough!

"*Joining the track team helped me overcome my social and emotional shock. Interacting with other athletes and becoming more involved with teamwork really boosted my self confidence…Their willingness to accept me made me feel finally welcome… I suddenly was no longer outsider."* [2]

Actuality of the topic

Though millions of children are already in this system throughout the world for decades (we can even talk about a century!) and their number is growing constantly, scientific literature has been dealing with this phenomenon for only 15-20 years. These literatures approach the psychological sides of the problems. Pedagogical aspects have not been researched yet.

Characteristics of International Education through an example

The author gained her experiences in international education while teaching Physical education at the American International School of Budapest for almost a decade.

The school system is Anglo-Saxon. There are 14 grade levels that are built up the following way:

Lower Elementary School	4 years: from PreKindergarten to 2nd grade.	From the age of 4 to 8.
Upper Elementary School	3 years: from 3rd to 5th grade.	From the age of 9 to 11.

Middle School	3 years: from 6th to 8th grade.	From the age of 12 to 14.
High School	4 years: from 9th to 12th grade.	From the age of 15 to 18.

According to the statistics of the school, 57 nations are represented among the students. They spend three years at AISB in average, though many of them move even more frequently due to their parents' jobs. Classes are taught by different homeroom teachers and reorganized each school year. The specialist teachers (Physical Education, Music, Art, Computer, Library, etc.) may teach a child and follow his or her development for a longer period of time, if the teacher does not move away but stays at the school for more years.

The quality of education is ensured by the Accreditation Team of ECIS. They accredit the school every five years. The Accreditation Team examines the curricula, the scopes and sequences of the curricula and checks if the content of the grade levels' syllabuses are built upon each others. They also examine how these contents fit to the philosophy of the school and the system and philosophy of the ECIS.

Characteristics of Physical Education within this system

Curriculum: Is it European? Is it American? Or can we simply call it International?

The PE curriculum can be called American in the sense that the PE teachers themselves create their own curricula. [8]

The cultural background of the teachers (that is at the moment American, Canadian and Hungarian at AISB), their knowledge and personal strengths are always in the PE curriculum.

The content of it is mostly European since the core sports are: swimming, ballgames (soccer, basketball and volleyball), gymnastics, track and field, softball. Health as a subject is also included in the upper years. [12]

Problems throughout Europe that prevents well-written curricula from becoming widespread are the lack of equipment and facilities, the lack of the qualified PE teachers, especially in early childhood education, and the reduction of the number of PE lessons. [8]

Most of these problems do not occur in our practice, since the facilities and equipment are ideal. Even swimming (that is mentioned as a life skill in almost every European curriculum but because of the lack of facilities cannot be realized) takes a great part in the AISB PE education, since the school owns two swimming pools: a smaller one in the Lower Elementary buildings and a 25meters race pool on the other campus.**The fact that qualified teachers (not only in the area of PE but in other specials: Art, Music, Library, Computer, too) teach the children from the age of 4, these children can be taught to enjoy sports and maintain their love of physical activities from their early childhood.** After school activities are also offered for the students and from their Middle School years they can join the sport teams, too. These teams compete in the championships of the ECIS schools. **Though the conditions are ideal in this school, some weak points can be found here, too. If we compare the time and percentage of the PE classes at AISB with the Hungarian practice [3, 4, 5, 6, 7] we can draw an interesting parallel: the numbers of PE classes are surprisingly low. The average is only 8% of the schedule that means 2 or 3 PE lessons a week. (The previous ECIS Accreditation Team also noticed this fact and gave recommendations on increasing the hours of instructed Physical Education, especially at lower elementary level.)**

There is another controversial point: If a student is taking the full IB, PE classes do not fit into their 11th and 12th grades' schedules! (About 50% of the students do take the full IB each year.) They are overloaded with the academics and have no time for physical recreation… The statistics look good though, since they need to collect certain number of credits throughout their high school years. So if they are planning to take the full IB (IB of 4-5 subjects) they can collect all the required PE credits in 9th and 10th grades, which mean everyday PE for them, but nothing in the last two years.

So these youngsters, who would need the most physical exercise, have to improve their physical fitness two years in advance…

There is another difficulty: the population of the students' changes faster than in any local schools. Though the curriculum of the school is carefully designed and the content of the grade levels are well-adjusted to each others, if a student moves to another country and continues his studies in the same type of ECIS or CIS school, he may meet completely different contents though the objectives are similar in the new school's curriculum, too.

So each and every year we need to start our programs from the beginning because of the high number of new students though we need to make them reach higher standards in each grade levels. Because of this we cannot talk about stepping on the next stair and moving forward each year but we can say that we follow a „spiral" development that leads the students to higher levels as well, but always starting from the basics.

This means that we really do need to practice the magic words "differentiation" and "individualization".

This fact impacts *assessment* as well. The focus is on participation, sportsmanship, attitude and effort. In middle and high schools the knowledge of rules and sport etiquette are added to these, too.

The disadvantages and difficulties can be balanced out with the advantages of the great facilities and the fact that these children are *taught by qualified PE teachers from the age of 4*, brings a great success to the program and serves these children's needs.

CONCLUSIONS

In most international schools students learn under excellent conditions, in great facilities and from highly qualified and experienced educators, who help to develop the "whole child", not only the academics but social-emotional, kinetic, artistic, behavioral and a wide host of human growth and developmental issues.

Because of the small number of students in classes differentiation and individualization can be realized.

These children can have special problems though. Some of those can be solved or helped by Physical Education and sports.

Because of the traditions of the education system and the great facilities, each and every child has the possibility to get acquainted with the culture of physical health and sports of many kinds from which they can choose one as a life-long activity.

International schools have a special place in the students' life, since these are not only the venues of their education but they spend most of their afterschool-lives and big part of their family lives here as well.

A significant portion of the population of the students (and teachers, too) move away each and every year. Most children do not spend more than two or three years in one school. This fact does not only influence and define the lives of these children, but sets special tasks for the educators too. The question is not only how a curriculum can be completed, but the teacher also needs to understand these children with their special situations and with their reactions.

We, teachers, also need to accept the constant change in this rapidly globalized world and be able to become a solid point in our students' lives, even if we can only have a hunch about the long term fruit of our work.

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TEACHERS' COMPETENCES OF PHYSICAL EDUCATION PROFESSORS[1)]

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INTRODUCTION

Professional role of a teacher understands numerous patterns of behavior whose realization necessitates appropriate competences expressed through certain knowledge, abilities, skills and personal features and values (Lazarević, 2005; Rychen, & Salganic, 2003). In modern education it is generally accepted that all children deserve instruction of the highest quality for whose realization requires primarily certain significant teachers' competencies. (NAGC Position Statements, 2005). The results of the research point out to teacher's professional knowledge in his/her field of teaching, transparency in presentation enthusiasm for the subject he/she is teaching and emotional warmness as features of quality and successful teacher (Woolfolk, 1995; Woolfolk et al., 2008). The researches indicate that there is connection between teacher's enthusiasm for the subject and student's achievement (NAGC Position Statements 2005; Woolfolk et al., 2008), as well as connection between teacher's features such as emotional warmth, understanding and friendly relation towards students and students' attitudes towards instruction, class and teachers themselves (Woolfolk, 1995; Woolfolk et al., 2008). Numerous researches showed that successfulness of teachers depends not only on knowledge, abilities and skills he/she possesses but also on his personal features (Beishuizen et al., 2001). There is an opinion that good teachers are characterized by balanced and mature personality, experience-based knowledge and teacher's skills necessary for realization of instruction process (Đorđević and Đorđević, 1992).

If we observe teachers' competences from the point of view of opening of teacher's profession towards recognizing developmental needs of a child, interdisciplinarity of job, social situation and taking responsibility for one's own professional advanced training (Kovač-Cerović i dr., 2004), then it can be said that they are the assumptions of the professional role of a teacher, and that they represent starting point for conception of basic teachers education in the course of studying as well as of permanent professional advanced teacher training. Hence, the competencies necessary for carrying out professional teacher's role in modern school require modifications of the curricula in education at university institutions. The activities are also directed at standardization of teacher's competences by defining conditions that a teacher should fulfill, as well as at prescription of obligations of obtaining of a license for work in an educational institution (Book of Regulations on work permission for teachers, tutors and professional collaborators, 2005). Permanent professional advanced teacher training is realized through programs of professional advanced training of education-related employees, which are directed at updating of knowledge within the field of the discipline they teach, at development of teaching skills and motivation of teachers in performance of their jobs (Maksić and Ševkušič, 2007).

The attention in this paper is directed at PE teachers' competences. The reasons that motivated us to choose this profile of teachers refer to the fact that they make a significant part of teaching population and that they realize PE instruction as compulsory subject, both on primary and secondary level of education. Additionally, there is a need to recognize teachers' competencies related only to particularities of PE classes, that are manifested, before all, in the domain of educational aims, planning and realization of instruction as well as of quality and frequency of interactions between teachers and students and students between themselves.

The results of the research of PE teachers' competencies based on the evaluation obtained by the students of the Faculty of Sport and Physical Education (Radisavljević, 2005) indicated that future PE professors recognize the importance of teachers' competencies for quality instruction and realization of the aims of PE instruction, but at the same time there certain differences appeared in assessment of the level of importance of certain competences. Beside this recognition of teachers' competencies from the point of view of theoretical knowledge possessed by the students, significant source of information on this topic is an immediate, personal experience in realization of instruction possessed by the teachers themselves. That is a variable of particular

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importance for more comprehensive understanding of the importance of competencies fundamental for realization of complex teachers' role.

Therefore the basic aim of this research is assessment of teachers' competencies by PE professors from the aspect of their importance for quality PE instruction. We also wanted to examine whether there is a connection between assessment of importance of teachers' competencies and gender of a PE teacher and the length of their service.

RESEARCH METHOD

Sample of subjects

The sample of this research, which is of explorative character, consisted of 81 PE professor in primary and secondary schools in Serbia of an average length of service of 17,6 years. According to the gender structure the sample consisted of 53 male PE professors (65,4%) and 28 female PE professors (34,6%). According to the length of service the teachers were classified into four categories: 1-5 years (13.58 %), from 6-10 years (22.22%), from 11-15 years (9.87%) and over 16 years (54.32%).

Instrument

The research implemented a non-standardized *Questionnaire for assessment of teachers' competencies* (Center for professional development of employees, 2003). The questionnaire was conceived to contain assertions that describe five teachers' competencies, more accurately explained through key entries whose number varies from 4 to 8 in certain competencies. The questionnaire thus contained an overall of 42 assertions, assessed with marks from 1 to 5. The competences refer to certain segments of a complex teachers' role, both in the field of direct work with students and realization of teaching process, and in the field of development and further professional advanced training of professional knowledge, abilities and skills.

The instructions for the Questionnaire were adapted to application in the filed of PE instruction, so the subjects were asked to assess first the assertions related to description of each of the five competencies from the aspect of importance for successful realization of PE instruction, and then to assess each competence by its entries.

Statistic data elaboration

Besides the descriptive statistics, Mann-Whitney U test and Kruskal-Wallis test (Tenjović, 2002) were used for data elaboration.

RESULTS AND DISCUSSION

Within the research, the PE professors assessed, by applying the *Questionnaire for assessment of teachers' competencies of the* Center for professional development of employees, (2003) the following five teachers' competencies: **(**1) Use and development of professional knowledge and values (2) Communication and interaction with students, parents, colleagues and local community (3) Planning, programming, management and realization of instruction, exercises and learning (4) Observing and assessment of students' progress (5) Planning and evaluation of one's own continuous professional training.

The results indicate that all five competencies are appraised with high average marks by the PE professors (Table 1). The average values, on a scale from 1 to 5, range from 4.46 - 4.60. whereas the highest mark was given to the assessed competence **Observing and assessment of students' progress,** followed by the competencies of **Communication and interaction with students, parents, colleagues and local community** and **Planning, programming, management and realization of instruction, exercises and learning,** which are also manifested in the activities related to direct work with students and instruction. The competencies related to professional training of teachers and their permanent improvement (**Use and development of professional knowledge and values; Planning and evaluation of one's own continuous professional training***)*, although, appraised with high average mark, are still valuated less when compared to competencies realized in the immediate work with students and in realization of instruction. The reason of the lowest grading of importance of competency related to development of knowledge and professional advanced training might be in the fact that 54% of teachers from our sample are with length of service of over 16 years .

Table 1. Assessment of teachers' competences – *Descriptive statistics M, SD, (N=81)*

Competencies	M	SD
1. Use and development of professional knowledge and values	4.46	.653
2. Communication and interaction with students, parents, colleagues and local community	4.49	.654
3. Planning, programming, management and realization of instruction, exercises and learning	4.48	.709
4. Observing and assessment of students' progress	4.60	.492
5. Planning and evaluation of one's own continuous professional training.	4.46	.690

Students, future PE professors (Radisavljević, 2005), appraised with slightly lower average marks the importance of the assessed competencies (range from 4.27 to 4.46), and as the most important assessed the competence **Use and development of professional knowledge and values**, which could be expected since this competence understands primarily theoretic knowledge on the content of teachers' work and relations towards educational aims and knowledge on characteristics of development of children through the teaching process which the students of the final years of the Faculty of Sport and Physical Education are familiar with. Both the students and teachers working in schools, appraised with the lowest mark the competence of ***Planning and evaluation of one's own continuous professional training,*** which can be interpreted by the fact that they did not experience the need to be engaged in that domain of teachers' profession since they are still not involved in teaching practice.

Assessment of teachers' competencies according to gender of the subjects

If we observe the assessment of teachers' competencies according to gender of the subjects, the results showed that female professors appraised with higher average marks the teachers' competencies (4.50 - 4.71) when compared to male PE professors (4.36 - 4.55). However, this difference was not statistically significant (Table 2). It is also noted, that there is a certain distinction regarding the sequence of importance of certain competencies in the sample of male and female professors. Further research on a bigger sample, more evenly structured according to gender, could give a verification of the noticed tendencies towards manifestation of differences in evaluation of importance of the tested teachers' competencies, observed according to gender of the subjects.

Table 2. Assessment teachers' competencies according to subjects' gender – descriptive statistics M, SD and Mann-Whitney U test U (N=81)

Competencies	gender	M	SD	U	p
1. Use and development of professional knowledge and values	m f	4.36 4.64	.097 .092	590.0	.088
2. Communication and interaction with students, parents, colleagues and local community	m f	4.49 4.50	.092 .121	740.0	.982
3. Planning, programming, management and realization of instruction, exercises and learning	m f	4.42 4.61	.102 .119	628.0	.196
4. Observing and assessment of students' progress	m f	4.55 4.71	.069 .087	618.0	.146
5. Planning and evaluation of one's own continuous professional training.	m f	4.38 4.61	.102 .107	629.5	.207

*p< .05

The next step in the analysis of differences in assessment of teachers' competencies according to subjects' gender referred to consideration of each of the assessed competences defined through their key entries. The competence of ***Use and development of professional knowledge and values*** was defined by seven entries (Table 3).

Table 3. Competence: Use and development of professional knowledge and values observed according to subjects' gender - *Descriptive statistic M, SD and Mann-Whitney U test (N=81)*

Entry	gender	M	SD	U	p
1. Teacher is familiar with the content of his/her work and its relation to educational aims	m f	4.64 4.57	.522 .573	699.0	.609
2. Teacher understands relation between processes of learning –exercising and content, is able to create work in the environment for learning-exercising	m f	4.58 4.68	.535 .476	682.0	.478
3. Teacher understands how children develop, how they should practice and learn, understands the process of knowledge acquisition	m f	4.57 4.75	.665 .441	651.0	.267
4. Teacher actively develops and applies professional knowledge both on the level of personal qualification and with regard to school as part of the society	m f	4.42 4.36	.719 .731	705.5	.686
5. Teacher acts in compliance with ethical standards of the profession and in compliance with his social role	m f	4.43 4.57	.821 .573	707.5	.693
6. **Teacher begins from the fact that all students are entitled to study and exercise**	m f	4.58 4.82	.602 .612	562.0	**.021***
7. Teacher acts and works within laws and rules	m f	4.53 4.43	.868 .836	681.0	.471

*p< .05

The results indicate that both male and female PE professors appraised with high average marks, ranging from 4.36 to 4.82 (Table 3), all the aforesaid entries of the competence ***Use and development of professional knowledge and values***. A statistically significant difference appeared only in assessment of the entry **Teacher begins from the fact that all students are entitled to study and exercise**. Although both male and female PE professors appraised with high average mark the importance of this entry, still the results indicate to the conclusion that female professors significantly more show sensitivity and readiness to recognize and accept the right of each child to learning and exercising, with regard to PE professors.

The Competence **Communication and interaction with students, parents, colleagues and local community** was defined by seven entries (Table 4). All the stated entries, are assessed with high average marks (4.29-4.89) by PE professors of both genders. Only in assessment of the entry of *Teacher develops positive relations with students,* there were statistically significant differences in favor of female gender (Table 4). It can be said that female PE professors, when compared to males, dedicate more attention to understanding and accepting needs and feelings of children in school context, to respect and consider child's personality, advancement and success, which creates the base of their competence for development of positive relations with students. This feature of teachers' to develop positive relations with students showing understanding for their needs was identified in numerous researches as characteristics highly evaluated by students (Beishuizen et al., 2001; NAGC Position Statements, 2005; Woolfolk, 1995; Woolfolk et al., 2008).

Table 4. *Competence:* ***Communication and interaction with students, parents, colleagues and local community*** *according to subjects' gender - Descriptive statstic M, SD and Mann-Whitney U test (N=81)*

Entry	gender	M	SD	U	p
1. Teacher realizes good communication with students	m f	4.68 4.82	.510 .390	648.0	.220
2. **Teacher develops positive with students**	m f	4.60 4.89	.599 .315	554.0	**.016***
3. Teacher recognizes individual differences and reacts in compliance with them	m f	4.55 4.75	.574 .518	598.0	.085
4. Teacher stimulates positive behavior of students	m f	4.83 4.86	.379 .356	722.0	.755
5. Teacher takes the role of the person responsible for students' education	m f	4.55 4.39	.637 .629	633.5	.219
6. Teacher efficiently and constructively works with other teachers, non-teaching and additional personnel	m f	4.36 4.32	.762 .612	690.5	.568
7. Teacher communicates with colleagues and local community	m f	4.53 4.29	.608 .659	589.0	.086

*p< .05

The entries of the competence of ***Planning, programming, management and realization of instruction, exercises and learning***, are also appraised with high average mark by PE professors of both genders, ranging from 4.43 to 4.89 (Table 5). Statistically significant difference appeared only in assessment of the entry *Creation of teaching processes which motivate and engage students*. Female professors, when compared to their male colleagues, are more convinced about the importance of their own role in creation of stimulating environment for students and development of their readiness to be active and involved. Paying more attention to the competence which is in the foundation of the teachers' activity directed at creation of stimulating environment in which a student is active in learning, problem solving, and overall expressing, points to recognition of the significant role of the teacher as motivator within his complex professional role (Havelka, 2000; Ivić et al., 2001).

Table 5. Competence: Planning, programming, management and realization of instruction, exercises and learning - Descriptive statistici M, SD and Mann-Whitney U test (N=81)

Entry	gender	M	SD	U	p
1. Planning of suitable programs aimed at achievement of as good as possible results in learning and exercising	m f	4.60 4.68	.494 .612	654.0	.294
2. Harmonization of contents, teaching strategy and approach in compliance with background, needs and particularities of students in exercising and learning	m f	4.43 4.57	.537 .573	636.0	.232
3. **Creation of teaching processes which motivate and engage students**	m f	4.64 4.89	.522 .315	568.0	**.023***
4. Efficient structuring g of tasks for learning and practicing	m f	4.43 4.50	.721 .577	722.0	.821
5. Flexibility and sensitivity in different situations	m f	4.55 4.46	.607 .637	690.0	.553
6. Placing of clear and attainable aims to students	m f	4.72 4.75	.495 .518	709.0	.662
7. Stimulation and supporting of independent and cooperative exercising and learning of students	m f	4.60 4.46	.599 .637	652.0	.296
8. Active engagement of students in qualification and acquiring of knowledge	m f	4.74 4.79	.445 .499	685.5	.445

*p< .05

The Competence ***Observing and assessment of students' progress*** was defined by four key entries (Table 6). All the stated entries of this competence were appraised with high average marks (ranging from 4.50 to 4.77) whereas no statistically significant differences were identified in assessment with regard to the gender of PE professors. It can be concluded that knowledge, abilities, features and personal values that are fundamental for this competence are recognized by both genders of our PE teachers as very significant for realization of this segment of the complex teachers' role which refers to assessment and observation of students' progress.

Table 6. Competence: Observing and assessment of students' progress - Descriptive statistic M, SD and *Mann-Whitney U test (N=81)*

Entry	gender	M	SD	U	p
1. Teacher knows the role of assessment in teaching process	m f	4.74 4.75	.468 .518	722.5	.793
2. Teacher uses different strategies of evaluation which take into consideration relation between teaching process, process of exercises, learning and assessing	m f	4.58 4.50	.535 .577	687.5	.530
3. Teacher continuously observes students' progress and provides adequate feedback	m f	4.77 4.75	.423 .441	724.5	.813
4. Teacher keeps records (notes) on students' progress	m f	4.68 4.75	.510 .441	700.0	.594

*p< .05

The competence of ***Planning and evaluation of one's own continuous professional training*** was closely determined by six entries (Table 7). Each of the given entries was appraised by PE professors with high average marks, and lack of statistically significant gender differences in assessment indicates that, regardless of gender, all our subjects equally evaluated importance of the competence in the field of continuous professional training, both in the domain of planning and evaluation of this form of professional engagement.

Table 7. Competence: Planning and evaluation of one's own continuous professional training Descriptive statistic M, SD and Mann-Whitney U test N=81

Entry	gender	M	SD	U	P
1. Teacher critically thinks about one's own practice in order to improve quality of instruction, exercises and learning	m f	4.64 4.71	.489 .535	671.0	.385
2. Teacher evaluates teaching and learning programs	m f	4.42 4.32	.497 .548	683.5	.497
3. Teacher plans how to harmonize one's own long term aims with the aims of school and society	m f	4.25 4.14	.705 .651	675.5	.454
4. Teacher develops professional skills and competencies	m f	4.49 4.46	.697 .508	688.0	.538
5. Teacher understands processes, methodology and results of modern educational researches and is able to implement them in teaching process	m f	4.53 4.61	.541 .629	644.0	.368
6. Teacher plans and conceives personal advanced training	m f	4.70 4.64	.463 .488	701.0	.615

*p< .05

Assessment of teachers' competencies observed according to the teachers' length of service

The results demonstrated that no statistically significant differences were manifested (tested by Kruskal-Wallis test) in assessment of importance of the assessed competences according to the teachers' length of service. Therefore, each of the four groups formed according to the length of service (1-5 years; from 6-10 years; from 11-15 years; over 16 years) equally evaluated the importance of the tested competences for successful realization of teachers' activities related to PE instruction. However, on the level of individual entries which more accurately defined teachers' competencies, statistically significant differences were manifested in favor of the teachers with the length of service from 6-10 years when compared to other categories of teachers. Significant differences were manifested in assessment of the entry: ***Teacher recognizes individual differences and reacts in compliance with them,*** which more closely determines the competence *of* ***Communication and interaction with students, parents, colleagues and local community*** *(*χ^2 = 7.970, p=0.047). The professors pertaining to this category attach more importance to consideration of various needs and possibilities of a child, appraising progress that each child individually makes with regard to volume and level of his/her previous knowledge, and not by comparing them with the progress of other children.

Even on the level of the entry ***Placing of clear and attainable aims to students*** which more closely defined competence of ***Planning, programming, management and realization of instruction, exercises and learning,*** significant differences were manifested in assessment, when observed according to professor's length of service ((*χ^2 = 11.119; p=0.011). PE professors with the length of service from 6-10 years, when compared to other categories of professors, evaluate more teacher's ability to recognize and observe needs and possibilities of students and in compliance with it place appropriate aims in instruction and achievement to those children.

CONCLUSIONS

The research of teachers' competencies on the sample of PE professors from the aspect of their importance for realization PE instruction, demonstrated that the tested competencies were appraised by PE professors as very important for performance of their professional activities.

The teachers consider very important, both those competencies vital for quality pedagogical communication with students, their parents and wider community, competencies important for observation of progress and assessment of students, planning and realization of instruction, as well as those related to development of professional knowledge and values and planning and evaluation of their own continuous professional training. With all that no differences were manifested in assessment of importance of certain competences with regard to gender and length of service of PE teachers. However, a tendency, worth further verifications, was noticed that PE professors, regardless of gender, attach greater importance to the Competences, which more directly refer to communication with students and realization of teaching process, when compared to those related to development of professional knowledge and continuous professional advanced training.

More accurate analysis within each of five competences, when observed through their more detailed entries, demonstrated that female professors, compared to their male colleagues, attach greater importance to certain aspects of the competence in the domain of professional development, communication and interaction with students, as well as in the domain of creation of teaching process aimed at better motivation of students.

PE teachers of both gender, with length of service from 6-10 years, compared to teachers with less i.e. more years of length of service, attach greater importance to individual differences between students as part of pedagogical communication as well as to planning of progress and development of students by placing adequate and attainable goals.

The results indicate to a need for further research of teachers' competencies of PE professors, more directly pointed to specificities of PE instruction, respecting the age characteristics of student's population with whom the teacher realizes instruction.

Additionally, further researches of teachers' competencies of PE professors, are expected to contribute with their results to as quality as possible conception of both elementary education of teachers for a complex professional role, and of their continuous professional advanced training. It is necessary to work further on defining of knowledge standards, abilities, skills and certain personal features and values required for performance of the complex teaching profession. It is particularly significant to continue work on standardization of the appropriate instrument for assessment of teachers' competencies which would include competencies important on the level of overall teaching population, and which would be sensitive to specificities of the instruction domain of certain subjects.

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CHILDRENS AGGRESSIVE BEHAVIOR PREVENTION THROUGH A PLAYING ACTIVITY

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The actuality of the theme is defined of the following factors: the strengthening of the aggressive behavior of rising generation after totalitarian society, the insufficient understanding of the main point of the play as a medium and form for education; the white fields in the diagnostics of the physical loading as an essential precondition of change in the mentally comfort of the childish personality.

In the elaboration are offered ideas and an elaborated model of approaches and means for work which will help the pedagogical practice for protection the aggressive behavior in 5 year old children. With his application it will assist in optimizing of the physical loading in conformity with opportunities of these ones who are taught and their physical abilities. The various motive activity and the positive emotions that attend the movable plays, make possible the personal evaluation in children and the activating of their inner intellectual potential as condition for stopping of the aggressive actions.

The tasks of the examination are:

1. Studying of the Bulgarian and foreign available bibliography
2. The elaboration of the model for stopping the children's aggression and establishing the effect of its application into practice.

Organization and methodology

The examination was carried out in the nursery school "Delight" in Radnevo in the area of Stara Zagora in 2007/2008 year, with 54 children at the age of five. The stages of examining are:

The first one. **Collecting evidence** for the aggressive actions of the children during their stay in the nursery school for three months. The elaboration of a model for work in order to overcome their aggression;

The second one. Establishing the aggression's kind and the teacher's knowing of the aggression in the childhood, its extent and the specific features of the functional loading in the process of the playing activity. The application of the model for planning and carrying out of actions for overcoming the aggressive behavior in children at the age of five;

The third one. Finding the influence of the applied methodology over their behavior not only in the process of the playing actions but also during their whole staying at the nursery school.

Methods for work: pedagogical observation in different regime's moments; talks, debates; diagnostic experiment; mathematical-statistic.

The data for the children's aggressive behavior are collected with the help of an expert commission in pedagogical staff that is involved in the programmed for keying up their professional skills.

1. The concepts had been preliminary specified with them; aggression; kinds of aggressive behavior; indexes of aggressive behavior; aggressive arrangements, etc. It was carried out instructions for leading an interview with the aim of collecting information about children's mental knowing for this that investigate aggressive actions.

In the present context it was put the specification of the term aggression in more common meaning. According to the unit-lingual dictionary aggression is some kind of "conquest, offensive aspiration", "despoilment"/1,4/. In other scheme the aggressive behavior is described only in its psychological characteristics as "an effusive, exercising compulsion over the object or other person's behavior". In the concept are involved and the impulses i.e. the psychological forces of the aggressive behavior, precisely: "a fit of anger", "revenge", actions that are not inadmissible in taking part of competitive games, etc.

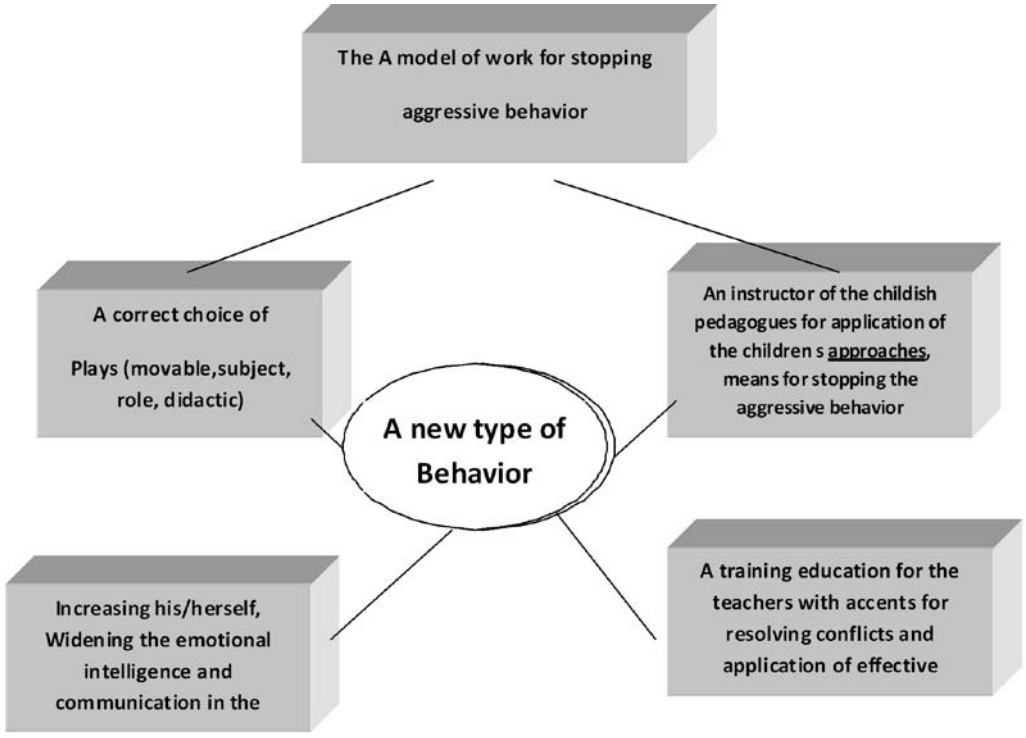
The understanding of the aggression was fixed for every participant in the expert commission and compared with the generally accepted components for aggressive behavior – verbal and expressive.

2. It was organized a debate with the teachers the aim of which was to be specified all kinds of aggression, indexes that fixed the aggressive behavior, identifying of its verbal manifestation in the process of the activity. The teachers who were involved in the experimental work at first should finish

writing the sentence: "Aggression is…" and then – to enumerate all children's manifestations which according to them could be defined as aggressive ones.

After the debate was carried out every of them returned to their initial understanding and added it. In data that were received of the comparative analysis was given an account of definitely widening the understanding of aggression and extending of the attention to the variety of indexes for its definition in the daily round. In the beginning the results choose that the childish pedagogues don't succeed in defining the concept properly and narrow so much its volume. Almost all investigated people don't give an account to the differences in expressive means and from there the indexes in the body's language, the speech, the gestures in which the aggressive behavior could be easily found. Except that the teachers don't pay enough attention of the real causes for appearing aggressive behavior – firstly as a result of external elements/ for example the influence to the wide social environment for learning of the aggressive behavior/, applicable in situations which are difficult ,oppressive and derogatory to children's reputation or they stand to the realization of their own desires and necessities and secondly as a result of processes which are directed inside, is the personal motivation, which is connected with their values, the genetic precondition, the lack of social abilities for coping with different situations, the loss of emotional intelligence and others./6/ Their attention fixes only the concrete causes in the immediate existence during the time of the beginning of the situation in which there are aggressive manifestations.

The received bilateral picture defined the building of the model for work in the following directions, **scheme 1.**



Scheme 1. A model of work for stopping the children s aggression

1. A selection of the kinds of plays with a competitive element or these ones in which children succeed in the process of communication and playing collaboration with their own personal attempt to apply a new kind of behavior.
2. Work for increasing his/her knowing for himself/herself,/4/ and widening of the emotional intelligence to these ones who are taught.
3. Carrying out instructions for the teachers in connection with the application of the approaches, means and methods for stopping the children's aggression.
4. Involving the childish pedagogues in training education with accents connected with resolving conflicts and making decisions for clearing up their personal concepts about the essence of the aggressive behavior and the opportunities for applying of effective practices connected with its overcoming.

In connection with this first direction, the selection was made between various games/ with a competitive character, didactic games, subject-role games, allowing the increasing of the emotional diligence/, in which is possible a suggestion for achievements based on the personal points of the participants on the one hand and on the group connections and communications in the process of the game on the other.

According to the second direction of work the children were involved in a modeling situations for communication in the frames of eight group meetings in time varying according to their interests and exhausting of the topical contents of the planned themes:" Who am I?",

"What kind of person do I want to become and how to realize it?" ," What can people achieve on their own?", "Who are my acquaintance and who are my friends?", "Who I like and who I want to look like?", "My mother and father are ….., because….. and I can ….., but I should….." and others.

The third direction. It was put an exceptional précising in connection with the best possible carrying out of work in building models for acceptable childish behavior. The teachers were known not only with the technology of carrying out of the model but with its inner pedagogic-therapeutically opportunities for a discreet influence on the childish personality. It puts an accent over the principle of discretion in the work with children who have an aggressive behavior and over the opportunities for suggestion in different forms.

According to the forth direction the work was comparatively the most delicate and difficult. The necessity of tolerance in working with the teachers insists on much tact as in great part of them are piled thoughtful stereotypes according to which taking out of the negative personal points or loss of abilities difficult connects with the opportunities for their overcoming but it directly reflects on derogatory to their professional competence. This creates a lot of psychological barriers without the overcoming of which the work could not be successful. For the aim we organized a technique of the inner declared improvement in the group. It was carried out in the conditions of learning each other through sharing an attempt and knowing with good practices.

The real work in overcoming of the aggressive behavior, with the help of playing actions in which are involved and movable games with bigger physical loading, was structured for every of the groups according the established kind of manifestations of aggression and the children's special features of the appropriate group.

The purpose of the approaches of work was dictated in two causes: the first one is connected with the aim of the work and it is directed in improving of the children's manifestations in the context for acceptable social behavior; the second one - it refers to the opportunity the results to be put under comparing analysis.

The results of the work are formulated on basis data – evaluations of direct observations over the childish behavior in different regime's moments of independent experts and of data which gives the teachers themselves for every of the group in which they are working.

They give a reason for the following conclusions:

1. The aggressive behavior is a fact attended children's life but it isn't totally invincible subordinating only to the genotype and the variety of social models which the society offers to the children in different forms.
2. The game in its wide meaning is not only as a main activity for the children of the preschool childhood but it is some kind of social learning which offers the opportunities for overcoming of the aggressive behavior. In enriching of the playing actions of different type with different extent of intensity children wide their social manifestations and activities /the sense of : collaboration, confidence, sympathy, etc/, and the reflection on stopping the great number of aggressive manifestations.
3. The integration of the specialists in the field of the physical education and sport the preschool education and the childish pedagogues is a way of an appearance and approving of good, social adequate practices and filling the white sheets in the theory and practice which are connected with the education of children ate the age between 3 - 7.

The additional effect of the performed work described in the present report could be presented in the following way: the work for improving of the children's social competence of preschool age is in direct connection with the increasing of the teacher's competence and emotional sympathy. Or as whole the same one reflects a positively over the real property of the educational result in the children of the preschool childhood.

In the context of the elaboration and the presented conclusions is the our conviction that the reasonable educational work should be more increasingly directed from the theoretical to the empiric educational.

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DIFFERENCES ACCORDING THE TYPES OF CORPORAL POSTURE BETWEEN THE PRE-CADETS AND JUNIORS OF THE YOUTH BASKETBALL SCHOOL

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INTRODUCTION AND GOAL

Improper bodily posture among children and youth in general is a problem of the modern lifestyle. If the problem is ignored, it may lead to structural deformities (dismorphisms) which are harder to correct and demand long term and difficult process of healing. It is of great importance to accentuate that only properly timed diagnosis of a deficit of proper bodily posture is a guarantee of sucess in correcting it. Improper bodily posture are created due to a weakend structure of the postural muscles compounded throughout the growth and development of an individual, and especially those that are discovered in the ealy age can be corrected through additional physical training. Early, well timed diagnosis is the most important element of a successful healing process (Paušić, 2007). With athletes, improper posture can cause numerous chronical health problems and injuries which will affect their sport success. It is unquestionable that, generally speaking, physical activity has multiple positive effects on particular organic systems and human organism as a whole, sports medicine doctors are pointing out that increased occurence of improper posture and deformities in children and youth actively engaged in sports activities (Kosinac 2002.). Professional sport has its detractors, and those are usually reflected in the health of athletes. As previously stated, basketball encompasses a complex motor activity within which multiple complex, variable and unpredictable movements and situations occur and which demand best possible responses. Basketball created a high amount of stress on the bony and soft structure of the spine, considering that it consists of multiple vertical jumps, turns, and approach jumps. Specificity often seen in team and individual sports is present, and it involves unilateral pressures during the ball carry using a dominant hand. Unilateral pressures combined with a large number of vertical and approach jumps on hard surfaces has a negative effect on the postural apparatus (Aagaard i sur., 1996; Bahr, R. i Bahr, A., 1997). Sudden spurts of growth among adolescents along with the inability of the musculoskeletal system to keep up with the sudden changes leads to improper bodily posture such as scoliosis, kyphosis, and lordosis). Being that improper bodily posture can take on diverse forms, these forms are defined by various authors through types of bodily posture. The basic goal of this research was to affirm whether there was a significant difference in types of posture between precadet and junior ages of a youth basketball school.

METHODS OF WORK

Research was performed on a sample of seventy-five precadet and junior age basketball players of the youth basketball school (precadets 13-14 god., juniors 17-18 god.). The conditions included that the precadets have not exceeded two years of basketball training experience, whereas the juniors have not exceeded four years of training experience

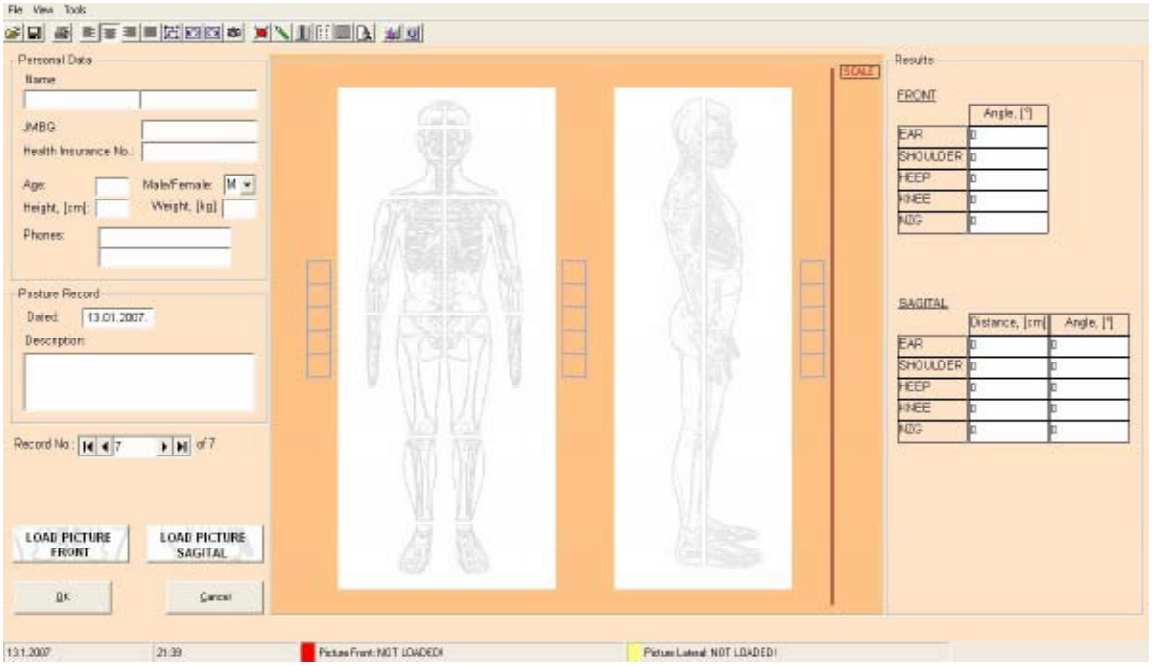
The sample of variables for the estimation of bodily posture contains numeric values of points of reference 4 in the saggittal view (Auxter, Pyfer i Huettig 1997; Palmer i Epler, 1998; Paušić, 2007).

Indicators of bodily posture in the saggittal view:

- *Digression of the upper edge of the left ear from the line of gravity* (SUHO)
- *Digression of the left acromion from the line of gravity* (SRAM)
- *Digression of the left anterior superior iliac spine from the line of gravity* (SZDJ)
- *Digression of the left medial epicondyle from the line of gravity* (SKOL)
- *Digression of the left medial malolus from the line of gravity* (SNZG)

Picture 1. *Points of reference*

The listed indicators of bodily posture in the saggittal view are expressed in degrees and are determined by the computer program. The measurement of the indicators of bodily posture was done via an apparatus (camera, computer with the „Posture Image Analyer" software, Paušić, 2006). The information input into the computer program was performed in the form of digital photographies of the subjects in the saggital plane. The entire measurement procedure was repeated four times for every indicator so that a measurement instrument of a composite type with four particles was gained. Results were processed through a descriptive analysis calculation of basic descriptive information for every saggittal indicator of bodily posture. (Mean, SD – Standard deviation, Skewness, Kurtosis, K-S d – Kolmorogov – Smirnov test for normality). Being that the variables of indicators were of the composite type consisting of four particles (repetitions), a coefficient of reliability was calculated based on the classical model of measurement, using Crombachov's alpha coefficient ($\acute{\alpha}_C$). Multivariant method of variance analysis (MANOVA) was used to get the difference between the two subgroups of subjects, precadets and juniors. The following parameters were used within this analysis: univariant variance analysis – ANOVA (F – F value, p – signification); Wilks' λ – Wilk's lambda coefficient , df – degrees of freedom, F – F value, p – signification. All the resulst were gatheret via the *Posture Image Analyser* computer program (Paušić, 2006), and were processed through the *Statistica 7* statistics program (StatSoft, USA).



Picture 2.

RESULTS AND DISCUSSION

Table 1. Basic descriptive information and certain metrical characteristics of saggittal indicators of bodily posture among precadets and juniors

	Mean	SD	Skewnees	Kurtosis	$\acute{\alpha}_C$	K-S d
			Precadets $n_1 = 33$			
SUHO	-3,40	-9,11	-0,32	-0,12	0,95	0,16; p>,20
SRAM	-3,22	-8,48	0,16	-1,01	0,94	0,12; p>,20
SZDJ	-5,10	-8,82	0,56	0,28	0,89	0,09; p>,20
SKOL	-1,53	-6,08	-0,07	0,37	0,91	0,10; p>,20
			Juniors $n_2 = 42$			
SUHO	-3,39	-9,22	0,30	1,94	0,90	0,09; p>,20
SRAM	-1,98	-7,85	-0,29	0,11	0,94	0,10; p>,20
SZDJ	-3,62	-12,21	-1,42	2,29	0,92	0,20; p>,20
SKOL	-1,22	-5,02	-0,39	0,10	0,92	0,11; p>,20

Table 1. contains basic descriptive indicators for the precadets and juniors of the youth basketball school. Crombach alpha values indicate that all the variables of saggittal indicators are normally distributed in relation to the marginal value, and that further information processing can be pursued. Variables SZDJ and SRAM indicate relaxed bodily posture with a pointed kypho-lordotic curve.

Table 2. MANOVA among the indicators of saggittal bodily posture among precadets and juniors

	F	p	MANOVA
SUHO	0,00	0,99	Wilks'λ = 0,86
SRAM	3,67	0,06	$df_1 = 4$
SZDJ	7,85	0,01	$df_2 = 70$
SKOL	0,55	0,46	F = 2,94
			p = 0,026

Variance analysis indicated a significant difference of all saggittal indicators when the precadet and junior subjects were compared. Pelvic positioning and shoulders (to a smaller measure) mainly attributed to the difference between subject subgroups. The subjects had a significant digression in all of saggittal points forward in relation to the line of gravity, which indicates a significant movement away from the main center of gravity. The average values of the indicators in the variables SDZJ and SRAM based on the subject groups indicate that juniors have lower amounts of digression from the line of gravity. (table 1.). Taking into consideration that the juniors' training experience is four years longer than the cadets', we can conclude that a musculature stabilization has occured among juniors along with the strengthening of the musculature engaged in the maintenance of upright posture. In the phase of accelerated growth and development, in which the cadets are, due to sudden growth and inability to maintain static-dynamic balance of the postural muscles, the muscular structure which maintains shoulders in the proper position gives way, causing kyphotic posture, which frequently causes the pelvis to compensate and move anteriorly.In order to maintain the functional upright posture, it is necessary to ensure the balance between muscular groups responsible for the orthostatic posture. During the training process, it is necessary to accentuate the strengthening of postural musculatur, extensors of the lower extremities and back, along with the strengthening of the abdominal muscles. If a balance of the basic posture of young basketball players is to be achieved, it is necessary to perform exercises for the development of strength and endurance of the back muscles, which results with a static-dynamic balance in the postural musculature.

CONCLUSION

The results of this research indicate that the subjecs have a significant anterior digression from the line of gravity in all saggittal points. The juniors have an average lower amount of digression from the line of gravity in the SDZJ and SRAM variables, which indicates that they have a better posture compared to the precadets of the youth basketball school. In conclusion, we can infer that the juniors have spent more time in the training process and that there has occured a stabilization of the musculature, that is, a strengthening of the postural musculature. It is of great importance that basketball coaches dedicate an amount of attention to the preparation of the locomotor apparatus from perpubertetic age, and mainly in regards to the strengthening of the postural muscles. The training sessions need to be adjusted to the age of the athletes, with a focus on general physical preparedness, and not simply on specificities of the sport. It is important to focus on flexibility exercises and the quality of recovery after intense training sessions, or competitive matches. Proper and systematic development of young basketball players can prevent negative effects on the posture to a great extent, and consequently decrease the risk of injury.

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DETERMINATION AND COMPARISON OF SOMATOTYPES OF A YOUNG VOLEYBALL AND HANDBALL AGE GROUP

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INTRODUCTION AND GOAL

Morphological anthropometry is a method which encompasses measurements of the human body, processing and studying of the acquired measurements. In top levels of sport this method is used for the selection of candidates for a particular sport or discipline, tracking and evaluation of the training process, objective evaluation of the general development of the body, control of the nutritional status of athletes, along with the tracking of recovery of athletes in the process of rehabilitation. (Mišigoj-Duraković,1997. and Milanović, Heimer 1997.)

Current findings lead to the conclusion that the quality of female athletes mainly depends on bodily capabilities along with the morphological status which demands athletic build with a prominent longitudinal dimensionality.

It is also necessary to point out that the research of determination and comparison of somatotypes performed based on the population of female handball and volleyball players are rare, but nevertheless it is also necessary to point out some of the most significant ones.

Bayios et al (2006) performed research based on 518 female athletes, the subjects of which were members of the first division of the greek national basketball, handball and volleyball league. Experts used twelve anthropometric components necessary for the calculation of the index and construction of the body. The results showed that the basketball players were the tallest ((P <0.001), had the lowest values of fatty tissu, and that their somatotype was defined as a simetrical endomorph (3.4 – 2.7 – 2.9). Handball players had the highes percentage of body fat, and their somatotype was indicative of two of the characteristics so they were defined to be of the mesomorph-endomorph type (4.2 – 4.7 – 1.8).

The basic goal of this research was to determine and compare somatotypes of the described sample of subjects. Considering the current research and comparison of the results among top athletes of the Greek national league, a subgoal was the answer to the question of whether it was possible to determine the somatotype of a sample of subjects, along whether there was any interaction among those somatotypes. Also, the received information can be used as a guideline for coaches and professors of physical education during the selection of young volleyball and handball players.

METHODS OF WORK

The research was conducted based on a sample of 28 handball, and 29 volleyball youth players – cadets whose only condition was that they were active practitioners of volleyball or handball for longer than 3 years. The research process involved subjects ages 12-16, which had consistent training process experience for a minimum of 3 years. Variable sample consisted of 10 component according to the Heath - Carter method (1967.) which is used to determine the form and constitution of the human body, consisting of 3 components – endomorpic, mesomorphic and ectomorphic. Endomorphic component represents relative adiposity, mesomorphic relative skeletomuscular robustness, and the ectomorphic represents relative leannes or linearity.

The sample of variables for the estimation of somatotypes according to the Heath Carter method (1967) is carried through 3 components – endomorphic, ectomorphic and mesomorphic within which there are 10 subcomponents.

Endomorphic:

1. Skin pinch of the upper arm (triceps)
2. Skin pinch of the back (subscapular)
3. Skin pinch of the stomach (supraspinal)
4. Skin pinch of the lower leg (medial lower leg)

Ektomorphic:

5. body height
6. body weight

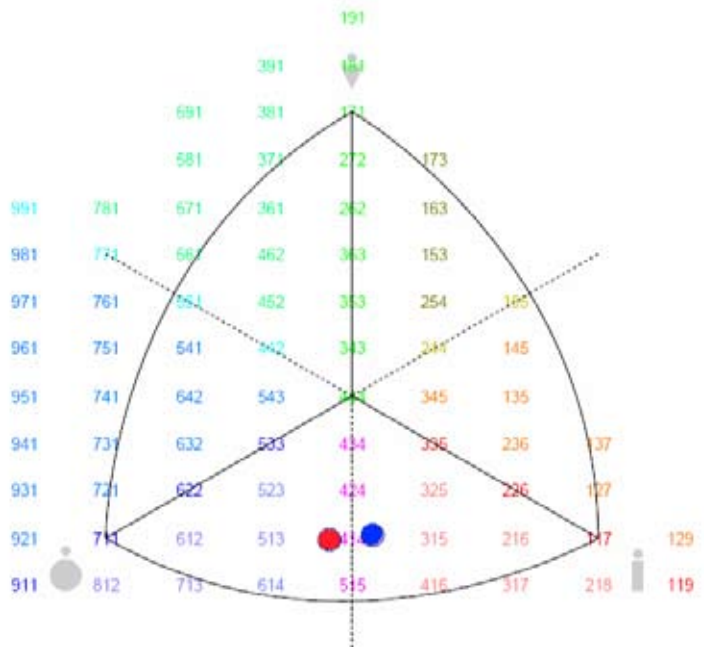
Mezomorphic

7. knee diameter
8. elbow diameter
9. upper arm circumference when contracting
10. lower leg diameter

The listed indicators of morphological markings are expressed in milimeters in the endomorphic component, centimeters and kilograms in the ectomorphic, and in centimeters in the mesomorphic component. They are determined by a computer program. The measurement of the indicators of morphological markings was accomplished using instruments (scale, anthropometer, cephalometer, sliding circumeter, caliper, Harpenden brand, centimeter tape) and the *Somatotype Calculation and analysis 2001.* computer program (Sweet Technologies Runtime Revolution Limited, MetaCard Corporation Licensed to Jelena Paušić). The entire process of measuring, in every indicator, was repeated three times in order to get the measuring instrument of the composite type with three particles. The received results of all variables were processed using different statistical methods of the *Somatotype Calculation and analysis 2001.* computer program. The results of the determination of somatotypes were processed first, and then received in the namesake program for variance analysis (ANOVA) and basic descriptive indicators were determined : arithmetic mean (AS) and standard deviation (SD), F- value, p- threshold of significance.

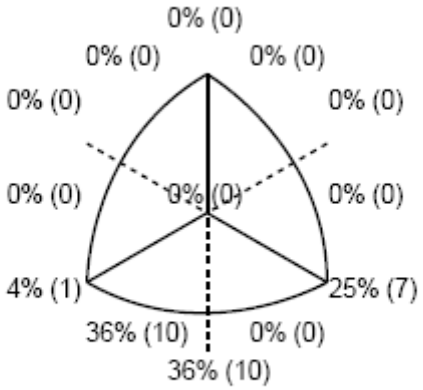
RESULTS AND DISCUSSION:

Analysis was done by calculation of the three components individually, but also by grouping of the somatotypes and the comparison of frequency (*Somatotype – Calculation and Analysis V1.1. Heath and Cartera,1990*). An important element in these occurences is the ability to analyze an entire somatotype in two or three dimensions using corresponing formulas, which lead to the application of conventional statistical analysis.

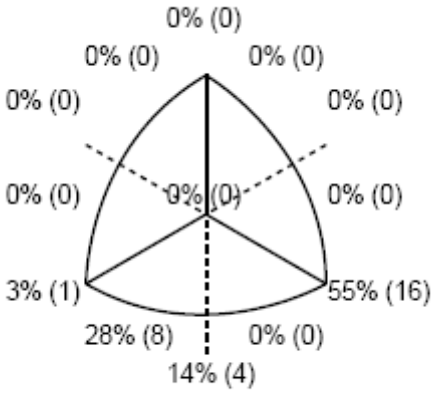


- Volleyball players
- Handball players

Diagram of somatotypes is a graphic representation of the total appearance of all profiles from every document, including volleyball and handball players. A graphical description of the first variable (blue) under the title «Volleyball players» falls in the category of the endomorh-ectomorph somatotype with the second factor being the main one. «Handball players» (red) belong to the same combination of somatotypes, with the endomorph element being the main factor, that is, they belong to the ectomorph-endomorphic bodily constitution.



The somatotype diagram shows degrees based on which it was determined which somatotype a particular profile of a total of 28 girls belongs to, under the subsample «Handball players». In this manner we can explain how 4% of the subjects, which in actuality means 1 subject, belong to the exclusively endomorphic group, and 36% of the girls, which means 10 subjects, belong to the endomorph-ectomorphic group. Equal number of subjects was defined as an endomorph-ectomorph, while 25%, meaning 7 girls, was described as an ectomorph.



Twenty-nine girls within the subsample «Volleball» were analyzed, among whom only 3%, meaning 1 subject, belonged to an exclusively endomorphic somatotype, 8 girls, or 28% were in the ectomorph-endomorphic constitution, while 14%, or 4 girls, are in the endomorph-ectomorphic somatotype. A high number, 55% of the girls, or 16 of them are a balanced ectomorph.

ANALYSIS OF THE VARIANCE VOLLEYBALL-HANDBALL PLAYERS

Anova according to components

	VOLLEYBALL		HANDBALL		F	P
	AS	SD	AS	SD		
END	2.86	0.79	3.64	0.76	14.4	0.001
MEZ	0.18	0.27	0.32	0.47	1.93	0.167
EKT	3.38	1.74	3.11	0.85	0.92	0.344

Analysis of variance based on the components of somatotypes: endomorphic, mesomorphic, and ectomorphic indicates that the girls differ significantly exclusively in the component of the endomorphic somatotype. Average values of indicators across the subject groups in the endomorphic component indicate larger values of the skin pinch among girls who practice volleyball.

	AS	SD
VOLLEYBALL	2.86 – 0.18 – 3.38	0.79 – 0.27 – 1.24
HANDBALL	3.64 – 0.32 – 3.11	0.76 – 0.47 – 0.85
ANOVA	F = 5.31	**p = 0.024**

Analysis of the variance based on somatotype produced measurements of indicators of significant difference in relation to somatotypes, which leads to the conclusion that girls who play volleyball were a more prominent ectomorph type. Endomorph type of bodily constitution is the predominant one among girls who play handball.

Volleyball and handball are multistructural sports which equally work and develop all psychomotor and intellectual aspects of a child. Systematic training can to a greater or lesser measure affect all existing aspects. A well programmed training content should primarily contribute to the development of capacities and aspects, as well as a degree of adoption of technical and tactical knowledge.

A crucial kinesiological problem is in the forming of definite anthropological concepts, which takes for granted a tracking of dynamic changes in the structure of dimensions and affirming of the contribution of congenital and acquired component. In order to do that, it is necesary to establish developmental characteristics of children and to be well acquainted with the properties and elements of those children in the segments necessary for the establishment of permanent parameters of development. In other words, it is necessary to investigate adaptational characteristics of children in regards to changed primary systems of stimulus. (Prof. Dr.sc. Ratko Katić and colleagues, Anthropological concepts of athletes). In regards to current research and theory development, it is imminent that prominent endomorphic component negatively affects the training process and development of the youth female handball players. When it comes to physical preparaction, it is necessary to maintain a high degree of specialized endurance in order for the team to play with high intensity during the entire game. Players should be moving with maximum intensity in defence and offence, frequently joining the counterattack and returning to defend (Izet Gec, Besalet Kazazović, Handball Theory and Practice). Their endomorphic component negatively affects explosive strength, agility, speed and aerobic capacity.

Volleyball specificity is in the impossibility of keeping the ball in possession. For this reason, volleybal players, regardless of high ball speeds, have to be properly positioned in reference to the ball so that they can return it. Besides the mentioned specificity, volleyball is characterized by a rotation of the players withing the playing field. For this reason, it is necessary to pay great attention to the principle of universality in the training process, especially among the youth age groups. Volleyball players have a prominent longitudinal skelletal dimension which is most important for competitive success, while prminent subcutaneous fatty tissue has a negative influence on competitive success. (Dr. sc. Zoran Grgantov, Formation of anthropological concepts in volleyball). Volleyball players have shown adequate and positive endomorphic balance, which confirmed their potention for a quality continuation of the training process.

CONCLUSION

Results of this research lead to the conclusion that it is possible to determine the somatotype and constitution of the body characteristic for the two sport disciplines in the youth age group of girls who actively practice handball and volleyball. Also, through further tracking and observation, along with measurements and reasearch, it is possible to get to concrete answers in the problematic of practicing the same sports. This is the occupation of coaches and professors of kinesiology who can use the estimation of somatotypes in the pedagogical segment where they can be advisors and experts in redirection of the youth in a given sport. Besides the fact that the difference is confirmed and statistically significant, we have also confirmed the hypothesis that the subjects belonging to the somatotypes of these two sports disciplines differ significantly even in the component of skin pinches, which leads to the fact that the fatty tissue percentage in relation to the musculature is significantly lower among voleyball players in comparison to handball players. Discussions and assumptions on what is the exact reason for this manifestation are not comparatively performed among these age groups. They are exclusively individually present in numerous reasearch and it is therefore impossible to make concrete conclusions about whether a specific segment of the game, process of training and genetics affects the endomorphic components within which these two groups significantly differ.

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THE INFLUENCE OF EXTRA CURRICULAR ACTIVITIES ON MOTOR ABILITIES OF SECONDARY SCHOOL FEMALE STUDENTS

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1. INTRODUCTION

Program of Physical Education teaching also includes facultative extracurricular activities which are planned with one lesson per week out of regular lessons. In most cases the choice of students are sport activities, or so called sport sections. Sport recreative activities include those activities and disciplines which cannot be applied in regular Physical Education teaching, and it is individual choice of a group on the basis of material and technical facilities of school/ 1, 2, 4, 6, 7 & 9/ predispositions and wish to play chosen activity, to know more about it and to challenge their mates.

The realized result in sections /10/ can be shown through different competitions. The basic competitions are class competitions, then follow school competitions, municipality competitions, regional competitions and republic competition. The most common thing is that students who are active sportsmen take part in these competitions and in this way the work of PE teacher and participation of students from school sections is brought to question. Budja /3/ disputes the participation of registered sportsmen on school sport competitions. A member of a school team can be each student who is not registered in any sport club. It means that a student who trains handball cannot be a member of a school handball team, but he can be a member of any other school sports team (since he is an amateur in that sport).

In this case in the sports section athletics was chosen, the contents of which (steady running) were realized during the second term of 2007/2008 school year, as an extracurricular activity.

2. SUBJECT AND GOAL OF THE RESEARCH

Subject of this research is motoric abilities, i.e. their manifestation depending on different quantity of physical exercise.

Goal of the research is to analyze what are the effects of Physical Education teaching (with two lessons per week), and what are the effects of additional physical exercise (school athletic sections) on transformation pf motoric abilities of female students.

3. METHODOLOGY OF THE RESEARCH

This research has longitudinal experimental character. It was realize din Agricultural-veterinary school with the boarding school "Svilajnac" in Svilajnac, Republic of Serbia, in the second term of 2007/2008 school year. This research had experimental and control treatment which lasted ten weeks. 56 female examinees participated in this research and they were divided into two sub specimens - according to the criterion of physical exercise: experimental group with 26 examinees and control group with 30 examinees.

3.1. The specimen of variables

For evaluation of motoric abilities four standardized movement tasks were applied: long jump from the spot - for evaluation of explosive power of leg muscles, lie down - sit down for 30 seconds - for evaluation of repetitive power of stomac muscles and muscles in the hip joints, steady punt running - for evaluation of maximal aerobic endurance and a 500 meter running for the evaluation of endurance.

3.2. Experimental control treatment

Experimental treatment was realized on Physical Education regular lessons, in the form of additional physical exercise, which included two extracurricular activities that lasted one hour. The female examinees who participated in experimental treatment with additional exercises were doing exercises with aerobic character in the form of steady running. In addition to continuous method, interval and competitive method were used for the endurance improvement. The female examinees, who were hindered to do additional exercises

due to school duties, did it as a homework activity, during the weekend with planned training and list of evidence which contained success realization data. In the beginning of the experiment all female examinees had undergone detailed medical check. For monitoring of training and proper contents of experimental treatment a 20 meter steady punt running and 3000 meter were applied once a month.

Control treatment was realized on regular Physical Education lessons during 35 lessons. The contents realized were planned by official curriculum for year one and two in secondary schools.

3.3. Mathematical and statistical data processing

In data processing the following methods were applied: medium values (M), standard deviation (SD), minimum (Min) and maximum (Max) of all values, variation coefficient (VC), trust interval (TI), asymmetric measure (Skj.), flatness measure (Kurt.) and Kolmogor-Smirnoff test. From univariant procedures univariant analysis of variance (Anova), and univariant analysis of covariance (Anokova) and t-test were applied. From multivariant procedures multivariant analysis of variance (Manova), multivariant analysis of covariance (Manokova) and discriminative analysis were applied.

4. THE RESULTS OF THE RESEARCH

In accordance with the subject and goal of this research and methodological approach, in this part of paper motoric abilities of experimental and control group will be analyzed from intial and final evaluation. Analysis will be done on four motoric variables.

4.1. Analysis of motoric abilities of experimental and control group of female examination initial and final evaluation

In experimental group of female students' experimental treatment with positive effects influenced improvement of average results in all four researched variables. Average improvement of the results in final measurement in long jump from the spot is 16.03 cm, in lie down - sit down for 30 seconds improvement was 4.16 repetitions, in steady punt 20 meter running improvement was 121.50 des. And in a 500 meter running improvement was 122.54 des.

The biggest aberrance from medium value which is denoted by standard deviation is for a 500 meter running with the value of 180.10 on final evaluation.

Table 1. Central and dispersive parameters and measures of asymmetry and flatness of the state of motoric abilities of experimental group of female examinees on initial and final evaluation

Variables	M	SD	**Error**	**Min**	**Mah**	**VC**	**Trust interval**		**Skj.**	**Kurt.**	**KS-p**
EFSK- ei	138.35	25.14	4.93	72.00	187.00	18.17	128.19	148.51	-.55	.39	.902
EFLS -ei	18.73	2.89	.57	14.00	23.00	15.44	17.56	19.90	-.20	-1.37	.413
EFIZ - ei	203.54	64.83	12.71	87.00	337.00	31.85	177.35	229.73	.27	-.38	.984
M 500 - ef	1425.23	197.73	38.78	900.00	1901.00	13.87	1345.35	1505.11	-.06	1.30	.544
EFSK- ef	154.38	29.66	5.82	115.00	270.00	19.21	142.40	166.37	2.29	7.05	.212
EFLS - ef	22.89	3.78	.74	15.00	30.00	16.50	21.36	24.41	-.04	-.69	.822
EFIZ - ef	325.04	80.54	15.79	196.00	459.00	24.78	292.50	357.58	.47	-1.00	.308
M 500 - ef	1302.69	180.10	35.32	800.00	1700.00	13.82	1229.93	1375.45	-.29	1.33	.799

Minimal and maximal values of researched motoric characteristics are in acceptable range for the age.

The values of scunis with negative pre sign denote very positive asymmetric curve. The value of kurtosis is for long jump from the spot on final evaluation the biggest and it is 7.05, which denotes heterogeneity of the results and platikurticity of the curve. Kurtosis is smaller in other variables is less than three, which denotes that results are homogeneous and that curve is leptokurtic. The values of Koglomorov_Smirnoff test show that the distribution of values for the results of researched variables on initial and final evaluation is in the frame of normal values. (Table 1)

Table 2. Central and dispersive parameters and measures of asymmetry and flatness of motoric abilities of control group of examinees on initial and final evaluation

Variables	M	SD	Error	Min	Max	VC	Trust interval		Skj.	Kurt.	Ks-p
EFSK - ki	141.30	20.32	3.71	110.00	180.00	14.38	133.71	148.89	.14	-.99	.961
EFLS - ki	17.73	2.96	.54	13.00	25.00	16.68	16.63	18.84	.43	-.29	.772
EFIZ - ef	189.10	51.32	9.37	105.00	344.00	27.14	169.93	208.27	.73	1.01	.972
M 500 - ki	1519.67	203.11	37.08	910.00	1917.00	13.36	1443.81	1595.53	-.56	1.45	.968
EFSK - kf	142.07	19.74	3.60	110.00	188.00	13.90	134.69	149.44	.17	-.29	.564
EFLS - kf	19.03	3.65	.67	11.00	25.00	19.19	17.67	20.40	-.50	-.55	.998
EFIZ - kf	228.47	52.81	9.64	143.00	377.00	23.11	208.74	248.19	.48	.53	.971
M 500 - kf	1476.93	208.53	38.07	900.00	1901.00	14.12	1399.05	1554.82	-.25	.73	.846

It can be seen in Table 2. that the results of examinees in control group were improved in all researched variables in final evaluation in relation to initial evaluation. The biggest aberrance from the medium value which is denoted by standard deviation is for a 500 meter running with the value of 203.11 on initial evaluation.

Minimal and maximal values of researched motoric characteristics are in expectable range for this age.

The values of scunis with negative pre sign denote very positive asymmetric curve. The values of kurtosis are for all researched variables for both evaluations is less than three, which denotes that the results are homogeneous and that the curve is leptokurtic.

The values of Koglomorov - Smirnoff test denote that the distribution of values for the results of the researched variables on initial and final evaluation, are in the frame of normal division. (Table 2)

4.1.1. Analysis of the difference between experimental and control group of examinees on intial and final evaluation in relation to the state of motoric abilities

In this chapter it will be proved or refused that there is a significant difference between experimental and control group of examinees on initial and final evaluation in relation to researched motoric variables

Table 3. The significance of differences between experimental and control group of examinees on initial and final evaluation in relation to the state of motoric abilities

Analysis	**n**	**F**	**p**
Manova - i	4	1.855	.133
Discriminative - i	4	1.262	.292
Manova - f	4	11.394	.000
Discriminative - f	4	11.170	.000

The value of multivariant analysis (Table 3) indicates that there is no statistically significant difference between experimental and control group of examinees on initial evaluation in relation to four researched motoric variables, since the level of statistical significance is p=.133. This is laso confirmed by the value of discriminative analysis which also denotes that there is no statistically significant difference and clearly defined borders between experimental and control group on initial evaluation in relation to four researched variables. The realized level of statistical significance is p=.292.

On the basis of the value of multivariant analysis of the variance on final evaluation it can be stated that there is significant difference between experimental and control group of examinees in relation to all four researched variables, with the level of statistical significance of p=000. Discriminative analysis as one of more precise statistical procedures also denotes the existence of significant difference and lesrly defined borders between experimental and control group of examinees in relation to researched variables.

Table 4. Significance of differences between experimental and control group of examinees on intial and final evaluation in relation to the state of motoric abilities

Anova	F	p	F	p
Long jump from the spot	.236	.629	3.428	.070
Lie down - sit down 30 s	1.616	.209	15.002	.000
Steady punt running 20 m	.864	.357	28.864	.000
A 500 meter running	3.086	.085	11.021	.002

With univariant analysis of the variance between experimental and control group of examinees on initial evaluation there was no statistically significant difference in any of four variables. On final evaluation, there was statistically significant difference between experimental and control group of examinees in three variables: lie down - sit down for 30 seconds, steady punt running 20 meters, and a 500 meter running. Statistically significant differences are in favor of experimental group of examinees. Statistically significant difference on final evaluation between experimental and control group of examinees was not shown in long jump.

Table 5. Discriminatory coefficients between experimental and control group of examinees on final evaluation in relation to the state of motoric abilities.

Variables	Discriminatory coefficients
A 20 meter steady punt running	.383
A 30 second lie down-sit down	.102
Long jump from the spot	.013
A 500 meter running	.000

The biggest contribution to the difference of experimental and control group of examinees in motoric space is given by the variable - a 20 meter steady punt running with the discriminatory coefficient of. 383. (Table 5)

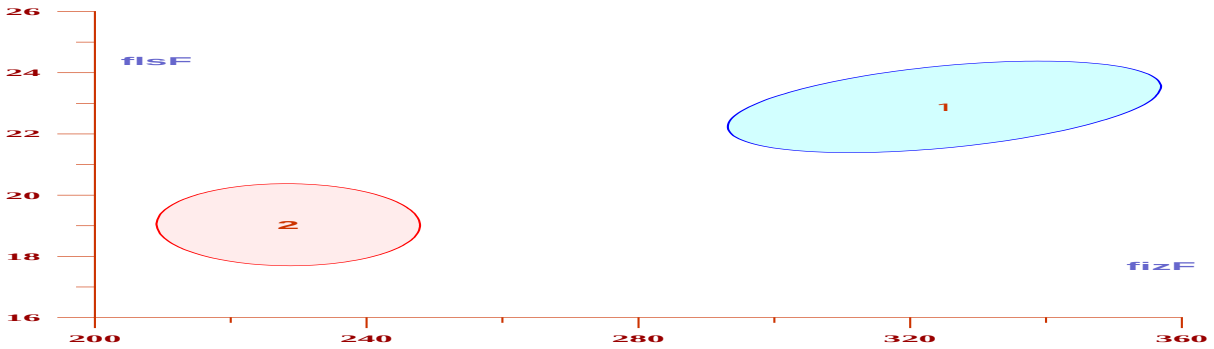
Homogeneity is bigger in control group for both evaluations. Lesser homogeneity in experimental group for both evaluations implies to the group of examinees with higher results in comparison to other examinees who, thanks to their motoric characteristics and their improvement, caused by the effects of experimental treatment made results by which they fulfilled conditions to be in the team for relay race. (Table 6)

Table 6. Homogeneity of experimental and control group of examinees on initial and final evaluation in relation to the state of motoric abilities.

Groups	m/n	%
Experimental - i	16/26	61.54
Control - i	21/30	70.00
Experimental - f	20/26	76.92
Control - f	27/30	90.00

On the basis of the graph (trust interval) it is possible to see position and characteristics of experimental and control group of examinees on final evaluation in relation to two most discriminative variables: a 30 second lie down - sit down, and a 20 meter steady punt running.

Graph 1. Ellipses (trust interval) of experimental and control group on final evaluation in relation to two most discriminative states of motoric ability.



Legend: experimental group (l) and control group (2); a 20 meter steady punt running (fizF) and a 30 seconds lie down - sit down (flsF)

In the graph (1) horizontal line is a 20 meter steady punt running and ordinate (vertical line) is a 30 second lie down-sit down.

It is possible to see that in relation to a 20 meter steady punt running and a 30 secnd lie down - sit down, experimental group (1) has bigger values in comparison with control group (2).

4.2. Analysis of the difference of the treatment of experimental and control group of examinees in relation to motoric abilities

By application of multivariant analysis of covariance, by equalization of the results of initial assessments, the aim was to see the real effects of realized treatments on the transformation of motoric status of female examinees.

Table 7. Significance of differences between the treatment of experimental and control group examinees in relation to the state of motoric abilities on final evaluation.

Analysis	n	F	p
Manokova	4	18.947	.000
Discriminative	4	24.048	.000

On the basis of the results of multivariant analysis of covariance it can be stated that there is statistically significant difference between experimental and control treatment of examinees with the level of statistical significance p=000. Discriminative analysis, also, indicates statistically significant differences and clearly defined borders between experimental and control treatment with the level of statistical significance p=.000. (Table 7)

Table 8. Significance of differences between the treatment of experimental and control group examinees in relation to motoric abilities on final evaluation by variables.

Anokova	F	p
Long jump from the spot	11.357	.001
A 30 second lie down-sit down	12.407	.000
A 20 meter steady punt running	26.910	.000
A 500 meter running	14.436	.000

Application of univariant analysis of covariance was used to determine which variables had undergone statistically significant changes because of the realized treatments. By the data analysis in Table 8. we can see statistically significant difference between experimental and control group for all four variables . Statistically significant differences are in favor of experimental treatment.

Table 9. Significance of differences between treatments of experimental and control group of examinees on the basis of trust interval corrected arithmetic middles in relation to the state of motoric abilities on final evaluation.

Groups		Variables	Corrected middles		Trust interval.	
Experimental	Control	EFSK - f (EFSK - i)	155.67	140.96	6.12	23.29
Experimental	Control	EFLS - f (EFLS - i)	22.58	19.30	1.47	5.10
Experimental	Control	EFIZ- f (EFIZ - i)	321.87	231.22	56.00	125.30
Experimental	Control	M 800 - f(M 500 - i)	1347.24	1438.33	-137.92	-44.26

Trus intervals for all four variables have no zero. It can be stated that there is difference between experimental and control treatment. The difference is in favour of experimental treatment.

Table 10. Discriminative coefficients between the treatment of control and experimental group in relation to the state of motoric abilities on final evaluation.

Variables	Discriminatory coefficients
A 500 meter running	.986
Long jump from the spot	.628
A 20 meter steady punt running	.581
A 30 seconds lie down-sit down	.400

Discriminatory coefficients in Table 10. indicate that the biggest contribution to difference between different treatments in relation to researched variables (i.e. the difference is the biggest) in a 500 meter running with the discriminative coefficient .986. and the least in variable a 30 send lie down - sit down, with discriminatory coefficient .400.

Table 11. Homogeneity and the distance (Mahalanobis") of the treatment of examinees in relation to the state of motoric abilities on final evaluation.

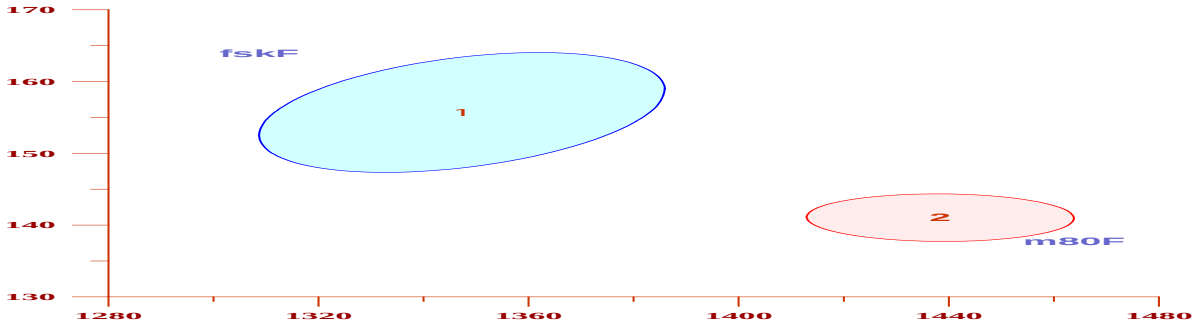
Group	m/n	%	Experimental	Control
Experimental	22/26	84.62	.00	2.73
Control	29/30	96.67	2.73	.00

Defined characteristics of experimental group are present at 22 out of 26 examinees, homogeneity is 86.62% (bigger) which indicates that four examinees have other characteristics and not the characteristics of their group. Defined characteristics of control group are present in 29 out of 30 examinees; homogeneity is 96.67% (bigger).

By calculating Mahalanobis' distance between experimental and control treatment there is one more indicator of differences or similarities. Distances of different spaces can be compared. The results from the Table 11. denote that the distance between experimental and control group of examinees in final evaluation is bigger and is 2.73.

On the basis of the graph (trust interval) the position can be seen an dthe characteristics of experimental and control group of examinees on final evaluation in relation to two most discriminative variables: a 500 meter running and long jump from the spot.

Graph 2. Ellipses (trust interval) of experimental and control group of examinees on initial and final evaluation in relation to two most discriminative states of motoric abilities.



Legend: experimental group (1), control group (2); a 500 meter running (m80f); and long jump from the spot (fskF).

On the basis of Graph 2. it can be stated that the highest values are in a 500 meter running and in long jump from the spot on final evaluation were achieved in experimental group of examinees. The results were conditioned by positive effects of experimental treatment.

5. DISCUSSION

On the basis of the analyzed results of experimental and control group of examinees, it can be stated that experimental treatments which was realized in experimental group influenced positive transformations of motoric abilities in comparison to regular curriculum of Physical Education which was realized in control group of examinees. The efficiency of experimental treatment, manifested in the improvement of experimental group in comparison to control group in the following variables: long jump from the spot, a 30 second lie down-sit down, a 20 meter steady punt running and a 500 meter running.

Long jump from the spot measures explosice power which coefficient of innateness is 0,80. Explosive power is characterized by muscle contraction which is excited by maximal stimulus of central nerve system, during which maximal number of nerve and muscle fibers is engaged with an aim to perform concrete motoric task (movement of body, or action of body to the thing in space).

The result in long jump from the spot depends on motoric potential of examinees, general and special motoric education and morphological characteristics of examinees.

Improvement of the results within experimental group on final evaluation indicates that contents of experimental treatment had strongly enough physiological influence to provoke positive changes in result improvements.

It is assumed that repetitive power is genetically influenced with the innate coefficient of 0,50. and it is limited by the strength of certain segments of our body, i.e. certain muscle groups. Test lie down sit down measures only muscle strength and a lot depends on motivation.

In a 20 meter steady punt running and a 500 meter running there is statistically significant difference between experimental and control group of examinees depending on the treatment. Statistically significant difference is in favor of experimental treatment.

Endurance is one of the most contradictory motoric characteristics. Some experts classify it in essential physical abilities of a man, while others deny its existence, first of all because of saturation of movement tasks for its evaluation by psychological factors, first of all by motivation. The three most common sub factors of endurance are: cardiovascular, muscle and speed endurance.

In research of Keller's /6/ and Petkovic /8/, positive influences of additional exercises in the form of steady running were noticed and it influenced the improvement of motoric abilities of primary school and secondary school children.

The realization of program contents of a school section represented strong motivatin for statistically significant improvements of the results in endurance variables in experimental group of examinees.

Realization of experimental treatment and its positive effects caused that some of female examinees take part in school mixed team for relay race which won the first place in competition of secondary schools in half marathon which took place in Novi Sad, republic of Serbia.

The results in two last half marathon and marathon races which also took part in Novi Sad, have motivated students, so that running is their favorite form of physical exercise as extracurricular activity.

6. CONCLUSION

On the basis of the results and differences of initial and final evaluations, as well as effects of the treatment, it can be stated that there are positive effects of extracurricular activities in the form of a school athletic section which influenced positive transformation of motoric abilities of female examinees in secondary school.

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THE CONNECTION BETWEEN ACADEMIC COMPETENCE AND PHYSICAL ACTIVITY OF YOUNG PUPILS

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Introduction

The role of physical activity has until to day been most frequently and thoroughly studied in the context of physical and motor development, while the remaining development fields remain from research viewpoint more underrated. This is especially true with regard to research in the field of the role of physical activity on the social development of a child. In spite of that, sport and physical activity are part of an overall context of social relations and cultural practices in which social development occurs. In recent years two many questions have been asked about sport participation as a social process. First question focuses on why sport experiences take the forms they take, why people do sports or why they are inactive, and the second question focuses on how is sport participation tied with socialisation process by individuals (Horne et al., 1999).

To recognise and understand the role of sport in children's social development it is necessary to observe the connections between developmental characteristics and characteristics of physical activity habits of children. Therefore we designed the study with object of investigation on socialisation process through and with physical activity by children in development period of late childhood. The research was focused on children in development period of late childhood. Late childhood represents for the social development of an individual one of the most important periods, since the child in this period passes from the "carefree" pre-school environment into a school environment with its commitments, schedule and homework. The most important elements of the social development in this period are peer friendship, relations with the "significant other" (the teacher, the parent) and academic performance or more precisely, the ability to express the knowledge in the most appropriate manner. Academic competence is part of child's social behaviour. Same studies found out that untreated social skills problems are related to poor academic performance. Steiner (2001) says that inferior social maturity or lagging behind in social development means more conflicts with teachers and an inferior academic performance even in gifted students.

Observing the connections between physical activity and academic competence is in fact observing between physical activity and social behaviour in school environment. Some research for example pointed out a positive relationship between sports participation and academic competence. Horne, Tomlinson and Whannel (1999) mention that consequences of organised sport participation are reflected in producing better academic achievement and aspirations, reducing deviant behaviour and establishing strong achievement orientations. In many studies, Shephard with colleges (1984; 1997) found leisure-time physical activity to be in correlation with academic performance. Adding physical activity to other child's school obligations and downsizing the time dedicated to other subjects does not cause school grades and results to drop in standardised tests. On the contrary, many children have by this way improved their academic performance. These findings are valid for children in late childhood, i.e., before the beginning of puberty. In a 1997 review study Shephard studied the influence of everyday physical education classes on academic performance of elementary school children. He stressed that greater participation in physical activity develops the social skills important to academic performance.

Following the existing findings was particular emphasis in the presenting study put on the connections between the frequency and quantity of physical activity in leisure time and academic competence by young pupil. The first aim of the research was to study the physical activity behaviours in leisure time of Slovene young pupils. The second aim was cross-section study of academic performance skills on the same sample. The third aim was to study the influences of physical activity on the academic performance skills by young pupils.

Methods

The research *"The Connection between Academic Competence and Physical Activity of Young Pupils"* is a part of postdoctoral basic research project *"The role of physical activity in child's social development in late childhood"*, which is performed on behalf of Slovene Research Agency financial support for period from 1st of January 2007 till 31st of December 2008.

Sample of participants

The research was carried out on a representative sample of 1783 Slovene children, 48% boys and 52% girls (figure 1). Children were visited in school year 2006-2007 4th, 5th and 6th grade of primary school (figure 2). The youngest pupil, included in research, was 9 years old and the oldest 12 years, average age of the sample was 10.4 years. In research was involved children from 17th different primary schools (one of them was tested school) in all 12th statistically Slovenian regions. Social-economical status of children, studied with the education level of their parents, showed equality of sample.

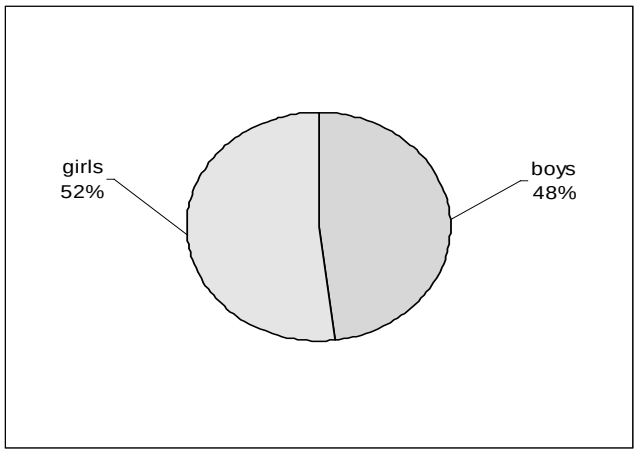

Figure 1: Sample of respondents according to gender

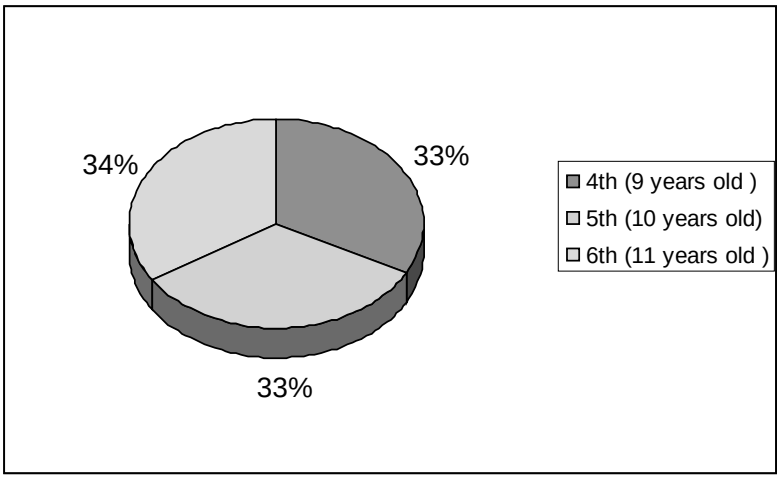

Figure 2: Sample of respondents according to grade in primary school

Sample of variables

The frequency and quantity of children physical activity in leisure time were studied by means of a questionnaire, composed on the basis of current research. Academic competence was measured by Social Skills Rating System (Gresham & Elliott, 1990).

The questionnaire of physical activity includes the following variables:

- personal data (gender, age, school, grade),
- frequency of participation in leisure time physical activities (how many times per week and for how long),
- participation in an organised form of leisure time physical activities (current and previous participation and duration of participation in such activities),
- frequency of watching television, working on the computer and playing video games in leisure time (how many times per week and for how long),
- number of hours spent sitting during home work for school.

The SSRS ("Social Skills Rating System, Gresham and Elliot, 1990) test is made for use by children between 3 and 18 years of age. The administration time is 10-25 minutes per questionnaire. The questionnaires were filled in a group, only in especial cases individually (children with special needs). Research to day has proved statistical validity, reliability and objectivity of the test (Walthall et al., 2005; Chewning, 1992). Walthall and his collaborators (2005) have established that the test is suitable for girls and boys and different ethnic groups. The academic performance scale includes following variables:

- reading performance,
- mathematics performance,
- motivation,
- parental support,
- general cognitive functioning,
- overall classroom behaviour.

Data analyses

All obtained data were processed by frequencies and descriptive statistics in the statistical program SPSS, version 14.0. One-Way ANOVA was used to tested the differences among the children's physical activity behaviours and academic competences.

Empirical Results

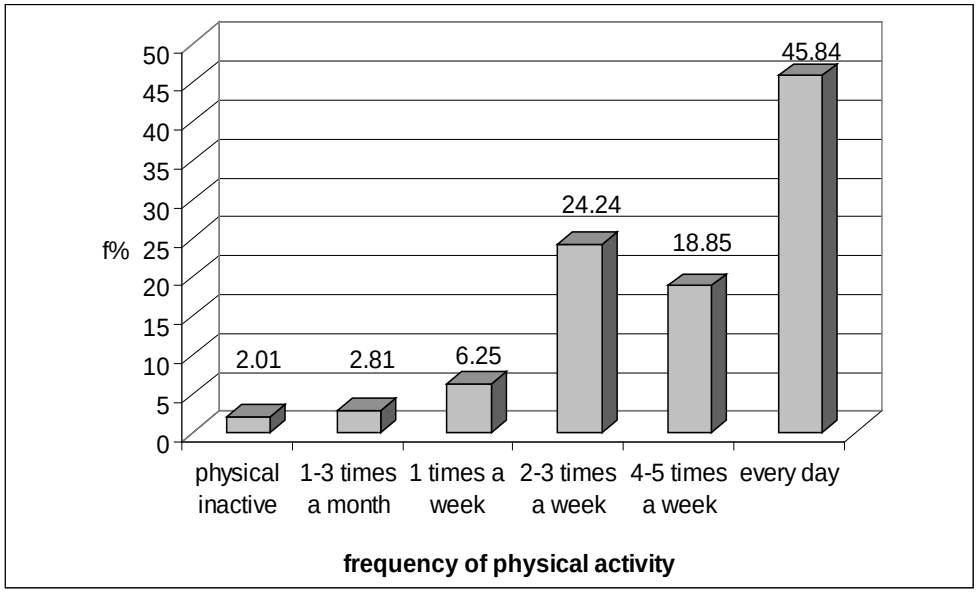

Figure 3: Physical activity Slovene young pupils

The results in figure 3 showed, that the majority of Slovene children are physical active in leisure time every day at least for half an hour (45.84%), followed by two to tree times physical activity a week (24.24%). This results reflects that the most Slovene children (nearly 90%) are regularly active. The figure 3 illustrated frequency of physical activity only in leisure time of participants. Besides that, Slovene young pupils are active in obligatory physical education classes tree times a week.

Completely inactive in leisure time are 2% of Slovene children in age of ten years. These children get only physical activity by regular school classes. 9.1% of Slovene children are active in leisure time occasionally.

The results of research showed positive level of physical activity of Slovene young pupils. Most children in these age are in Slovenia still enough active for their developmental and health needs.

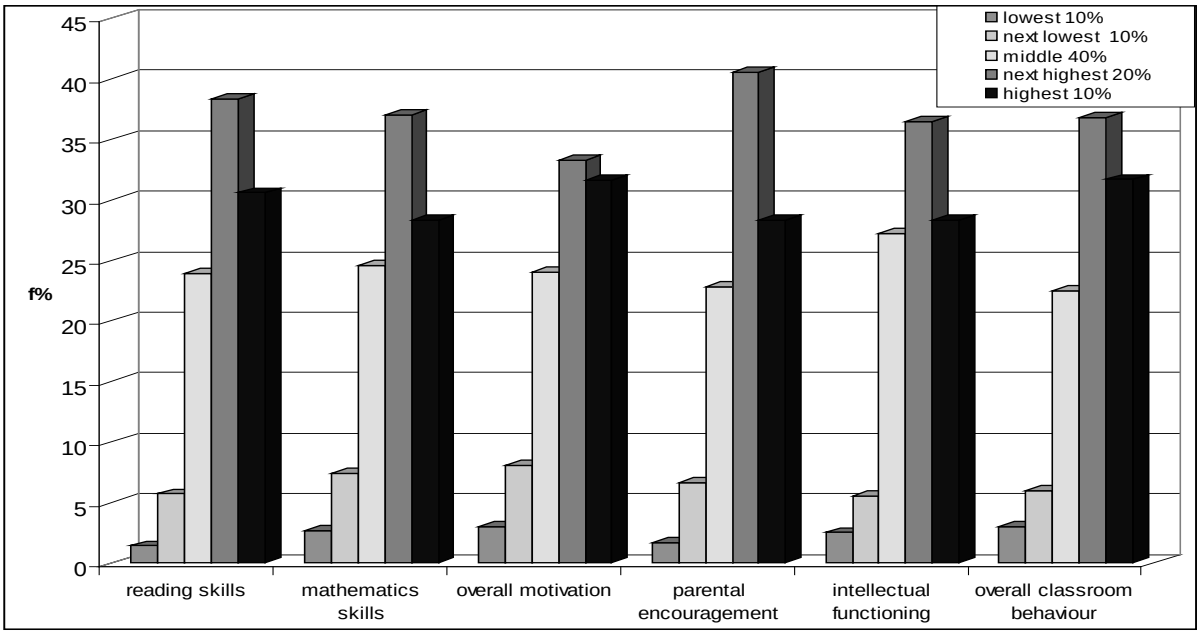

Figure 4: The academic competence of Slovene children regarding to teachers opinions

Figure 4 presents six different academic skills in relation ti five level groups. In research were studied reading skills, mathematics skills, overall motivation, parental encouragement, intellectual functioning and overall classroom behaviour. Each academic skill separates children in five categories regarding the level of skill's development: the highest 10%, the next highest 20%, the middle 40%, the next lowest 10% and the lowest 10%.

Reading skills are the most developed academic skills of Slovenian children. 69% of children are placed in the highest two groups. Teachers also thought that Slovenian children received great encouragement by parents to succeed academically. 68.9% of children are placed in the highest two categories.

The less developed academic skills of Slovene children are the overall motivation to succeed academically. 11.1% of children are placed in the lowest two categories.

Table 1: Leisure time physical activity in relation with academic competences

One-Way ANOVA		Sum of Squares	Df	Mean Square	F	Sig.
reading skills	Between Groups	23.12.	3	7.705	6.176	0.000
	Within Groups	1895.02	1519	1.248		
	Total	1918.14	1522			
mathematics skills	Between Groups	28.70	3	9.356	8.109	0.000
	Within Groups	1722.63	1493	1.154		
	Total	1750.70	1496			
overall motivation	Between Groups	17.41	3	5.803	5.266	0.001
	Within Groups	1666.15	1512	1.102		
	Total	1683.56	1515			

parental encouragement	Between Groups	9.17	3	3.058	3.098	0.026
	Within Groups	1493.10	1513	0.987		
	Total	1502.28	1516			
intellectual functioning	Between Groups	22.92	3	7.638	7.107	0.000
	Within Groups	1625.02	1512	1.075		
	Total	1647.93	1515			
overall classroom behavior	Between Groups	18.67	3	6.225	5.795	0.001
	Within Groups	1627.36	1515	1.074		
	Total	1646.03	1518			

One-Way ANOVA (table 1) confirmed significant connections between child's academic competences and characteristics of their leisure time physical activity (p=0.000). With increasing of physical activity frequency and quantity increase all academic competences. Children, who are more physical active in leisure time, have more developed reading and mathematics skills, they are more overall motivated to succeed academically, have greater intellectual functioning and better overall classroom behaviour. All connections were significant with less then 1% of risk. The less strong connection was found between child's physical activity and academic competence of parental encouragement to succeed academically. However, still in this case was connection significant (p=0.26).

Conclusions

The results of representative study on the sample of 1783 Slovene children had confirmed significant connections between child's academic competences and characteristics of their leisure time physical activity (p=0.000). This findings are in correlation with the results of study, conducted in June 2000 on a sample of 2023 Slovene ten-year-olds in Gorenjska region. The analysis of differences, performed using contingency tables and Pearson's chi-square test, also in this case confirmed the relationship between a higher frequency of leisure time physical activities and higher academic performance (p=0.000). Most scholars with excellent cumulative grade point averages were found among children that were physically active every day (Zurc, 2008).

However, the presented study showed that obligatory physical education at schools is not enough for child's need for regular physical activity. Taking part in additional extra-curricular physical activity in leisure time is necessarily for every child. The results of the project offer opportunities for creating the high quality in leisure physical activity, appropriate to child's developmental needs.

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THE INFLUENCE OF MOTOR ABILITIES, MORPHOLOGICAL BODY CHARACTERISTICS AND CONATIVE REGULATORY MECHANISAMS IN SOCCER MOTORICS IN SECONDARY SCHOOL CHILDREN

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INTRODUCTION

Football is a sport characterised by a large number of various uncommon movements performed by football players in changeable situations which result from the game. Having analysed football it is established that the success in football depends on a great number of different abilities and characteristics.

Among them situational-motor skills play an important role. They determine the football game, and consist of the following: precision of hitting the ball with a foot or head, juggling the ball, agility (Jerković, 1991).

Modern football requires from players a maximum performance of their motor skills. It is related to the maximum speed (the speed of reaction, the speed of individual uncyclic movements (the explosive strength of a shot, take-off, (Gabrijel, Jerković, Barišić, 1991).

Football, as one of the most popular sports, is played at different levels of competition. By all means, these different levels require different levels of capabilities and it is logical that in the process of development of the player there will be an omnipresent tendency of upgrading the level of personal qualities, which will enable taking part at the higher level of competition. The existing scientific papers in the field are fragmentary, so it is difficult to scientifically establish the equation of the detailed description of success in football.

The aim of the research is to establish the importance and the relative amount of the influence of morphological characteristics of the body, pathological affective regulatory mechanisms and basic motor skills on the efficiency of the performance of the technical elements of football in high school students, aged 18 to 19.

METHOD(S)

The respondents

The research was carried on a sample of 271 high school students attending 3rd and 4th grade of the Secondary School in Gračanica, in 2004/2005.

The sample of the predictor variables

In order to assess the primary pathologic affective factors the battery of tests 18 PF was applied, which is constructed on the ground of the factor analysis of the verbal stimuli from the Cornel index, N4, MMPI and MPI (Momirović, 1979; in Horga, Ignjatović, Momirović, Gredelj 1982). The sample of the tests of pathological affective regulatory mechanisms: anxiety (A – 1), inhibitive conversion (I – 7), aggressiveness (T – 15), schizoid (l – 17).

The sample of morphological variables of the body is chosen in sync with the model of the structure of the morphological status, determined in the range of earlier research (Momirović et al., 1969). The longitudinal dimensionality of the skeleton: the body height (AVISTJ), arm span (ARASR), arm length (ADUŽR). The transversal dimensionality of the skeleton: bicrystal span (ABIKR), biachromial span (ABARAS), diameter of the wrist (ADIRZ). The volume and the mass of the body: the mass of the body (AMASTJ), the perimeter of the upper arm (AOBNDL), the perimeter of the upper leg (AOBNTK). Subcutaneous fat tissue: skinfold measurement of the upper arm (AOBNDL), skinfold measurement of the abdomen (AKNSTOM), skinfold measurement of the lower leg (AKNPTL).

The battery to estimate the basic motor abilities has been chosen from the measure instruments, which in earlier research (Gredelj, Metikoš, Hošek, Momirović 1975) proved as a reliable information exponent. The variables for the assessment of coordination with the bat (MKTKK3), slalom with three medicine balls (MKOS3M), practice of figure eights with the bend (MAGOSS). Variables for the assessment of the explosive strength: lying medicine chest ball chest throw (MESBML), standing long jump (MESSD), running 20m, (MEST20M). Variables for assessment of the speed of frequency of movements: foot tap (MBFTAN), foot tap

against the wall (MBFTAZ), hand tap (MBFTAR). Variables for the assessment of repetitive strength: push ups on parallel bars, sit-up (MRSPTL), deep knee-bends with weights (MRLDCT). Variables for the assessment of balance: standing on one ft width-wise on the bank with eyes closed (MBAU1Z), standing on one ft length-wise on the bank with eyes closed (MBAP1Z). Variables for the assessment of precision: aiming with the long rod (MPCDS), aiming at the vertical target with the foot (MPGVCN), aiming at the horizontal targent by hand (MPGHCR). Variables for the assessment of flexibility: tipping with the stick (MFLISK), hip extension (MFLZLG), touch toe on the bank (MFLDPK). Variables for the assessment of speed: running 20m (MBR20MLS), running 50m from the stand-up start (MBR50MVS).

The sample of criterion variables

The sample of football motor tests is taken over from Gabrijelić, Jerković, Vubrech, Elsner (1982): juggling with the ball (ONŽL), handling the ball in slalom (ONVLS), and measuring the strength of the shot (ONMSU).

Results

Table 1 contains the results of the regression analysis of the importance and the size of influence of the predictor system of variables on the system of criterion variables, which is reduced to the unique criterion variable. The mark R signifies the coefficient of the multiple correlations (.653), and R Square signifies the measure of the common variability (.427). Sigma stands for the standard error of the prediction of the criterion variable (.000).

Table 2 contains the data of relevance and size of the influence of the individual predictor variables on the system of criterion tests, which is reduced to the unique variable. The highest individual Beta coefficients were found for the following variables: MBR50S – the running speed on 50 m (- .221), MRSPTL – touch-toe (.178), MPGHCR – hand aiming at the horizontal target (.170), ABARAS – the shoulder width (.162), MBFTAR – hand tap (.150), MBFTAZ – feet tap against the wall (.122). The variable of aggressiveness T15 with the Beta coefficient (.103) is close to the limit of the statistic significance (Sig. = .067).

Discussion

With regard to the values of the coefficients (R=.653) multiple correlation, the common variability (R Sguare =.427) and Significance (.000) a high level of correlation between the system of variables of predictor and criterion is evident.

The analysis of table 2 suggests that of all variables assessed, only 5 motor ability tests, and 1 test of morphological characteristics were significant individual predictors of criterion variables. The variable for assessment of running of 50 m was projected on the criterion variable with the highest regressive coefficient. The reasons for the highest coefficient of the determination of this test can be found in the manifest structure of the movement during the motor tasks in football. In the ONVLS test – dribbling the ball slalom, the primary task is carried out by fast running. In the ONSU test – the strength of the shot, the running start is preceded by the hit on the ball. The test ONŽL – juggling the ball, is performed by short and quick stretching of one leg and depends on the segment speed of the lower limbs. This motor skill conditions the running speed on 50m.

The variable for the assessment of hand aiming precision at the horizontal target is projected on the criterion variable. The reasoning behind the dominance of this test (if compared to other two accuracy tests) is the peculiarities of the examinees used in this experiment. Namely, the examinees were high school students who participated in different activities such as handball, basketball and volleyball. These activities are a part of their school curriculum. Such a content of the school class/period develops first of all the accuracy of the upper limbs, as the manipulation with the ball is performed using the hands, which is an additional factor for more dominant development of the accuracy of the upper limbs if compared to the lower limbs.

The positive influence of the shoulder width is a consequence of the assumption that students with and athletic physique would score best on the football tests, which resulted also in higher measures of transversal dimensionality of the shoulders. We assume that that students in question are those who practise some kind of physical activity which implies training or recreation (any kind of sport). It could be one of the reasons for their athletic physique and better locomotion if compared to the students who have lower transversal measures of the shoulders, which affects the significance of this morphologic dimension in the football motor skills.

The positive projection on football as a performing variable, from the space of segment speed is the variable hand tap. The logic of this connection can be found in the importance of segment speed of hands and the importance of the speed of synchronization of the hand movements and feet movements with the variable dribbling of the ball in slalom. In the course of work it has been established that there is a great correlation be-

tween the variables of feet tap and hand tap, which is indicative of the fact that this test has greatly influenced the criterion variable of foot juggling, as it is of huge importance to timely place the foot which juggles.

The positive projection of the ft tap test against the wall is logical. Namely, in manifest structure this movement resembles the structure of the movements in juggling the ball, as the movement of hitting with the foot against the wall is done by turns, and the movements of the lower leg and the upper leg are almost identical. The posture of the body, with both measuring instruments is upright, with an arm in the optimal (similar) position for keeping the balance. The ft tap test against the wall bears some resemblance to two other tests of football motor skills (dribbling the ball – slalom and the strength of shot). With the slalom ball dribbling quick taps of the ball are repeated, with the short swing of the lower leg that movement being even more noticeable and intensive with the shot test, because the ball is to be shot as far as possible, and its efficiency is affected by the factor of speed of hitting the equipment.

The examinees whose motor profile was mainly defined by maximal values of speed and repetitive force had a greater chance of achieving better results in football motorics. It is interesting to mention that the statistically significant effect of aggressiveness (T15) on the criterion variable of the football motor skills was not obtained, but the results show that it was very close to the statistic significance (Sig. 067). The previous research (Mraković, Gredelj, Metikoš and Orešković, 1972; Halilović, 2003 et al.) showed that there is a positive correlation of these characters traits with the motion which require higher excitation of the functioning of the central nervous system. In this research two football motor tests were applied. These tests require maximum display of speed and strength (ONVLS i ONSU). It can be assumed that maksimum display of speed and strength and all these basic motor skills are partly dependent on the above mentioned characteristics of the central nervous system functioning. We can assume that this factor of neurotism would have a higher predictive value if all the technical elements of football were performed in a competitive environment. The reason why the statistically significant influence of pathological affective regulatory mechanisms on the football motor skills does not exist could be found in the sample of the examinees. High school students who were not active athletes (football players) took part in this research, so they were less interested in this kind of testing.

Conclusion

The results of the regressive analysis have pointed to a statistically significant multiple correlation, which shows a strong influence of morphological characteristics of the body, motor skills and pathological affective regulatory mechanisms on the criterion variable of football motor skills. Consequently, the chosen variables of the predictor system have statistically significant effects on the success in the motor skills of the given tasks in the game of football. And individually, the highest coefficients of correlation (Beta) were achieved with the criterion variable, the variable – the running speed of 50 m, the touch-toe, manual aiming at the horizontal target, shoulder width, hand taps, feet taps and feet taps against the wall. The unique variable of football motor skills was influenced to the greatest extent mainly by the variables for the assessment of basic motor skills, and that neurotism was not statistically relevant in this sense.

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Table 1: The results of regresion analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**,653(a)**	**,427**	,327	,82027662

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	115,244	40	2,881	4,282	**,000(a)**
	Residual	154,756	230	,673		
	Total	270,000	270			

Table 2: Beta coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Signification
	B	Std. Error	Beta		
(Constant)	-4,141	3,099		-1,337	,183
AVISTJ	,000	,002	,025	,247	,805
ARASR	-,001	,001	-,052	-,555	,580
ADUŽN	-,001	,002	-,075	-,821	,412
ABIKR	,004	,004	,070	,986	,325
ABARAS	,007	,003	**,162**	2,227	**,027***
ADIRS	,010	,020	,031	,472	,637
AMASTJ	,002	,009	,019	,199	,843
AOBNDL	-,002	,003	-,061	-,661	,510
AOBNTK	,002	,002	,109	1,222	,223
AKNDL	,011	,014	,072	,815	,416
AKNSTOM	-,013	,009	-,142	-1,444	,150
AKNPL	-,014	,015	-,091	-,941	,348
MKOS3M	-,018	,021	-,047	-,830	,407
MKOKOP	,054	,052	,064	1,030	,304
MAGOSS	-,016	,046	-,022	-,337	,737
MESBML	,002	,003	,032	,529	,597
MESSD	,003	,003	,059	,782	,435
MEST20M	-,172	,316	-,039	-,545	,587
MBFTAN	,007	,029	,015	,230	,818
MBFTAZ	,041	,021	**,122**	1,961	**,050***
MBFTAR	,035	,014	**,150**	2,456	**,015***
MRASKR	-,011	,010	-,074	-1,111	,268
MRSPTL	,023	,008	**,178**	2,941	**,004****
MRLDCT	-,007	,008	-,060	-,863	,389
MBAU1Z	,006	,038	,010	,170	,865
MBAP1Z	,032	,092	,020	,353	,724
MBAU1O	,002	,002	,067	1,149	,252
MPCDS	,000	,002	-,009	-,168	,867
MPGVCN	,003	,003	,062	1,102	,271

MPGHCR	,008	,003	**,170**	2,989	**,003****
MFLISK	-,004	,004	-,056	-,961	,337
MFLZLG	,000	,006	,004	,060	,952
MFLDPK	-,013	,008	-,103	-1,652	,100
MBR20MLS	,083	,460	,015	,181	,857
MBR50S	-,434	,174	**-,221**	-2,498	**,013***
A1	,005	,006	,042	,726	,469
I7	,004	,011	,018	,333	,739
T15	,010	,005	,103	1,839	**,067**
L17	,002	,006	,014	,246	,806

R ,653** , R-Square ,427, F 4.282,

SESSION 2

TOWARDS OBJECTIVE KNOWLEDGE IN PHYSICAL CULTURE

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INTRODUCTION

Philosophy of science is a relatively new discipline which has been trying to connect philosophy with fields of scientific research. Depending on orientation of a philosopher and a scientific field, the aim of philosophy of science is to reveal what the nature of science, or the nature of scientific method, or the logic of science is, or, to research the relation of scientific fields, etc. The development of philosophy of science as a discipline depended on the development of science. Because of that, an accelerating development of philosophy of science has started with the extreme development of science in the modern time.

Why philosophy of science in physical culture?

Physical culture, also, as a professional activity and a scientific discipline, has needs for constant testing of its place, role and developing tendencies in the process of global growth of scientific knowledge. Being aware of that fact, or not, the truth is here, the question is only when we reach it by our conscious work and cognition. For, if we want to follow global scientific knowledge, we have to keep touch with the flows of scientific and philosophical thought, and build them adequately into the structure of cognition in physical culture. The problem of origin of sciences warns us to be careful in explaining philosophical conceptions, but daring in interpreting knowledge from our scientific field. With the help of interdisciplinary approaches and with our own effort, we can come to new knowledge. That is why philosophy of science is necessary in physical culture, too.

One of main aims of philosophy of science is to reveal nature of scientific method, that is, logic of science. In the most general sense, the problem of method is the problem of logic. That's why logic is defined as a philosophical discipline about forms of worthy idea and about methods of cognition. *„**Method** supposes the means and ways of determining if a theoretical construct or a statement is true or false"* (Ž.Ristić, 1995:183). In G.Petrović's opinion (1998:149), there are two basic methods to conclude and prove: ***inductive*** and ***deductive***. Historically looking, theory of science has always been between *„a traditional model of cognition-epistemological monism"* and *„a new model of cognition-theoretical pluralism"* (J.Berberović, 1990:12-17).

One of the main aims of this work is to find out what methods of concluding and proving were used in order to come to cognition in research of physical activity of students in educational process. On the basis of this knowledge, there is an attempt to contribute to thought of „a new model of comprehension-theoretical pluralism", on the sample of a number of representative scientific-research works in physical education. Analysis of the applied research methods, and their critical examination have to serve as a basis for innovating knowledge in physical education and the other entities in physical culture.

An attempt of the critical examination of methodological bases of knowledge in physical culture will be done, taking Karl Popper (1902-1994), as an example, as one of the most influential philosophers of 20th century in the field of methodology of science, and his capital works in philosophy of science: *The Logic of Scientific Discovery* (1973), *Conjectures and Refutations* (2002) and *Objective Knowledge (An Evolutionary Approach*), (2002).

After the whole analysis, taking Thomas Kuhn (*Structure of Scientific Revolutions*, Nolit, 1974), a paralel line of a possible setting of a new theoretical paradigm in physical culture will be drawn.

PHILOSOPHICAL CONJECTURES OF KARL POPPER

Karl Reimund Popper (1902-1994), a mathematician, a physicist and a philosopher, *„one of the most original, most profound and most versatile thinker of our era"*[1)], belongs to the ten most important philosophers of 20th century. His work established meditative currents of the most outstanding philosophical themes, stimulating authors of many other scientific disciplines.

There are three capital works of Karl Popper: *The Logic of ScientificDiscovery*, *Conjectures and Refutations* and *Objective Knowledge (An Evolutionary Approach*), which gave him the reputation of one of the greatest philosophers of 20th century in the field of methodology of science.

1) Popper, K. (1973): *The Logic of Scientific Discovery*, Nolit, Belgrade. (Staniša Novaković: An introductory study: Methodological and philosophical viewpoints of Karl Popper, p. 39).

The Logic of Scientific Discovery (1973)[2], as it is assumed from the title of the work, analyzes scientific theories and scientific methods. Interests of the author have been directed towards the following main problems: the problem of induction, the problem of demarcation of scientific statements from metaphysical ones, and of possibilities to find adequate criteria for such demarcation (the criterion of falsifiability); cognitive status of methodological rules; kinds of statements needed for operating in scientific theories, with special turning attention to so called „basic statements" or to the problem of empiric base; the problem of practical appraisal of scientific theories, taking into consideration a degree of their testability or simplicity; the problem of theory of probability; the problem of quantum theory; the problem of practical appraisal of scientific theories, taking into consideration their resistance in the most severe clashes with empiric testing.

On the basis of Popper's conception of science, it could be noticed that he shows no importance for the inductive method:

„According to a widely accepted viewpoint-which I shall oppose in this book-empiric sciences can be described by the fact they use so called 'inductive methods'. According to that viewpoint, the logic of a scientific discovery would be identical to the inductive logic, that is, to the logical analysis of inductive methods. It is usual to call a conclusion 'inductive' if it goes from singular statements (sometimes they are also called 'special' statements) as the reports about results of observation or experiments are, towards universal statements, as hypotheses or theories are. But, from the logical point of view, it is far from being obvious that we have right to derive universal statements out of singular ones, no matter how numerous the latter ones are."[3]

Contrary to the stated opinion concerning the inductive method, Popper supports the method of deductive testing, offering deductive causative explanations and their testing (with the help of anticipation), that is, what is usually called hypothetical-deductive method, the same both in natural and social sciences.

The central problem concerning Popper's conception of science and one of the main problems of his *The Logic of Scientific Discovery* is, what he names, **the problem of demarcation**, that is, the problem of differentiating the statements of empiric sciences from all other nonscientific, or, as Popper says, metaphysical statements. So, the main problem that should be discussed approaching study of human knowledge, is **the problem of demarcation**, that is, the problem to find **criteria of demarcation**. Answering the comment about refusal of induction as a method of cognition, Popper says:

*„My main reason for refusing the inductive logic is just because it doesn't offer us a convenient sign of recognition for empiric nonmetaphysical character of a theoretical system; or, in other words, because it doesn't offer us a suitable **'criterion of demarcation'**. The problem to find the criterion which could enable us to make a difference between empiric sciences, on one side, and mathematics and logic, as well as 'metaphysical systems', on the other side, I name **the problem of demarcation.**"* [4]

In a detailed analysis of Popper's work, Jelena Berberović emphasizes the key attitude that could characterize his conception of philosophy of science: *„In the history of science, **it is theory** that opens the way to new knowledge, **not experiment, it is idea, not observation**."*[5]

Conjectures and Refutations (2002)[6] is another key work of Karl Popper where he deals with the questions already opened in *The Logic of Scientific Discovery*. In the preface for the mentioned book, Popper gives an outline for discussion on this theme:

*„The way how knowledge develops, and specially our scientific knowledge, happens by anticipations, not justified yet, (and can be justified), by guessing, temporary solutions for our problems, through **hypotheses**. These hypotheses are controlled through criticism: that is, by attempts to refute them, and it includes strict critical testing."*[7]

The main question in this book that Popper was dealing with for more than two decades (1937-1961) is: When should a theory be considered as scientific? or: Is there a criterion for establising scientific character or scientific status of a theory? In order to come to new answers to this question, Popper did not ask: When is a theory true? nor: When is a theory acceptable?, but he wanted to make a difference between science and pseudoscience. Popper also knew for the former generally accepted answer: that science differs from pseudoscience or „metaphysics" on the basis of its empiric method, essentially inductive, and that it starts with observation or an experiment. But, he was not satisfied with such attitudes and he searched for something that, in his opinion, might be closer to truth (or ***„verisimilitude"***). The new approach in the methodology of science Popper named ***„the problem of demarcation"*** and he defines it in this way:

*„The solution of this problem of demarcation is the **criterion of falsifiability**, because it claims that only*

2) The first edition in German language Logic der Forschung, 1934; The Logic of Scientific Discovery, English expanded edition, 1959; translation into Serbian language, 1973.

3) Popper, K. (1973): *The Logic of Scientific Discovery*, Nolit, Belgrade, p.60.

4) Ibid, pp. 67 and 68.

5) Berberović, J. (1990): Philosophy and the world of science, "Svjetlost", Sarajevo, p. 46. (Underlined by B.B.)

6) The edition in English language, London, 1976; translation into Serbian language 2002.

7) Karl R. Popper (2002): Conjectures and Refutations (the Growth of Scientific Knowledge), Zoran Stojanović's publishing firm, Sremski Karlovci, Novi Sad, p. 25.

those attitudes or systems of attitudes capable of contradicting possible and comprehensible observations, will be thought as scientific ones.“ [8)]

Discussing this problem, Popper goes on with his firm attitude: *„No scientific theory can be deduced out of observational attitudes, or described as truthful-function of observational attitudes“* [9)]

The main Popper's question, by which he essentially differs from most other epistemologists, is not how a scientific theory really originates (Quid facti?), but the question of its justification (Quid juris?). Actually, the way of coming to a theory is not of a decisive importance, but its acceptability, its argumentative strength. Poper was very much against the convictions of those philosophers who thought that the inductive method is the one that characterizes science. He thinks that facts have always been recognized as the facts within a (hypothetical) theory, not as the facts by themselves, because, as such, they are nothing, and they mean nothing until a man (a scientist, a research worker, a philosopher) explains their meaning.

On the basis of Popper's opinion, scientific theory exists thanks to the failed attempts to falsify it, not by the action of confirmation, and therefore he formulated a new methodological proposal for the ***criterion of possibility of falsification*** to take place of the former ***criterion of possibility of anticipation***. The new method of attempts and errors Popper explains in the following way:

*„The method of attempts and errors is **the method of elimination of untrue theories** by observational attitudes; and the justification for it is a completely logical relation of deduction that allows us to claim falseness of universal attitudes, if we accept authenticity of singular attitudes.“* [10)]

In the preface to the second edition, Popper stated the essence of his philosophical conception in one concise sentence: ***„Our complete knowledge grows only through correction of our errors.“*** [11)]

Objective Knowledge – (An Evolutionary Approach (2002)[12)], is the third key work of Karl Popper where he continues his thinking, already started in the previous works: *The Logic of Scientific Discovery* and *Conjectures and Refutations.*

Popper supports **the growth of scientific knowledge** which shows that theories themselves are something provisory, of the hypothetical character, and that they also suffer constant revision, improvements, and that better and prolific theories take their place. In that sense, science can be seen as a battlefield of rival hypotheses, and Popper's phylosophical credo would be that we are, actually, never sure if the truth is what we know, because it is always possible that our knowledge might be wrong. Because of that, Popper introduces the idea of **„versimilitude“**, and says the following:

„Our main concern in philosophy and science should be search for the truth. (...) But search for the truth is possible only if we speak cleary and simply, and if we avoid unnecessary technicalities and complications. From my standpoint, the aspiration towards simplicity and lucidity is a moral duty of an intellectual: the lack of simplicity is a sin, and pretentiousness is a crime.“ [13)]

The basis of his methodological programme Popper named as **critical rationalism**, which Jelena Berberović explains in this way:

*„Popper, on the other hand, thought that an empirical element cannot be taken as a dominant component of cognition, and standing under the strong influence of Kant's philosophy, he always emphasized the rational side of all our cognitive results and underlined its priority in relation to complete experience. **It is thinking in which the real power of human knowledge is, all human cognitive abilities are united in it, it is the real expression of our intellectual powers, and its highest function is the critical one. Critical thinking is the most valuable in cognition and it assures constant growth and progress of cognition.** “* [14)]

One of the key theses of this work is that most phylosophers can be classified as representatives of subjective theory of knowledge, that is, of the meditative direction which deals, first of all, with cognitive processes. On the other hand, Popper's interest is in examining knowledge as it is itself, independently from the way it was formed, that is, knowledge itself, **objective knowledge**. In other words, Popper supports *epistemology without the subject of knowledge*[15)] and states the following idea:

*„The main theme of this talk will be, what I often call, having no better term, **'the third world'**. To explain this term, I will emphasize that we, not taking the words 'the world' and 'the cosmos' too seriously, can differentiate between these three kinds of world or cosmos: first, **the world of physical objects or physical conditions**; second, **the world of condition of consciousness or mental condition, or perhaps, propensity of behaviour**;*

8) Ibid, p.85.

9) Ibid, p.87.

10) Ibid, p.107.

11) Ibid, p.28.

12) The first edition in English language, London, 1979; translation into Serbian language 2002.

13) Popper, K. (2002): Objective Knowledge (An Evolutionary Approach), Paideia-Belgrade and CID-Podgorica, p.47.

14) Berbereović, J. (1990): op. cit., p. 140. (Underlined by B.B.)

15) Karl Popper's presentation stated on 25th August 1967. At the third International congress for logic, methodology and philosophy of science; first published in the anthology of studies from that congress and completely transferred into the edition of the book "Objective knowledge" in 1979.

and third, ***the world of objective contents of thinking****, specially scientific and poetic ideas and works of art."*[16]

Explaining his first thesis, Popper emphasizes that traditional epistemology studied knowledge or thinking in the subjective sense – in the sense of a usual use of the words „know" and „think". That approach led the scientists in the field of epistemology into something irrelevant. Although they intended to examine scientific knowledge, they, in fact, examined something irrelevant for scientific knowledge, and he continues:

„For scientific knowledge simply is not the knowledge in the sense of a usual use of the word 'know'. While knowledge in the sense 'know' belongs to what I call 'the second world', the world of subject, ***scientific knowledge belongs to the third world, the world of objective problems and objective arguments."***[17]

The final elements of the discussion on the relation between subjective and objective knowledge, Popper postulates in the existence of two senses of knowledge and thinking:

„(1) ***Knowledge or thinking in the subjective sense****, that consists of condition of spirit, consciousness, propensity of behaviour or reaction and (2)* ***Knowledge or thinking in the objective sense****, that consists of problems, theories and arguments as they are themselves. Knowledge in that objective sense is completely independent from one's claim to know something; it is also, in the same way, independent from one's conviction or propensity to agree with it, to assert it, or to act in accordance with that knowledge.* ***Knowledge in the objective sense is knowledge without the one who knows: it is knowledge without the subject of knowledge."*** [18]

The importance of making a distinction between the subjective and objective approach to knowledge comes from the above stated contents. While the subjective approach is primarily interested in the process of creating knowledge, more exactly, goes from the cause to the effects, the objective approach insists that it should be started from the results, from the effects to the cause, what is, after all, the way science itself acts.

EMPIRIC FACTS AND/OR THEORIES IN PHYSICAL EDUCATION

In the light of Karl Popper's philosophical system, the results of 124 M.A. works and Ph.D. dissertations on physical education defended at the FSPE in Belgrade in the period of 30 years (1964-1994)[19], specially from an angle of the application of inductive and deductive methods of concluding, will be presented and analyzed. (Table 1.)

Having insight into the applied research methods and techniques, it could be noticed that the dominant research method is: the experiment (52,44% in the M.A. works and 59,52% in the Ph.D. dissertations) and two research techniques: measuring-testing and the questionnaire (35,37% in the M.A. works and 23,81% in the Ph.D. dissertations). Here, also, the rule that the most active form of scientific research in examining the phenomena in pedagogy is the experiment was confirmed, and that its use was more dominant in the dissertations, than in the M.A. works (59,51% : 52,44%). On the other hand, a more intense applicability of measuring-testing and the questionaire in relation to the dissertations has been noticed (35,37% : 23,81%). The reasons for this approach are in the level of seriousness, theoretical-methodological complexity and authenticity of the research in the dissertations in relation to the M.A. works.

The historical method and description (the method of theoretical analysis) have been a bit more used in the dissertations in relation to the M.A. works. In the both analyzed examples it has been noticed that the relation of the use of induction is much more dominant than the use of deduction (87,81% : 12,19%) in the M.A. works and (83,33% : 16,67%) in the dissertations.

Table 1. Collective results of the used research methods and techniques in the M.A. works and the Ph.D. dissertation

Ordinal number	Research methods and techniques	M.A. works		Ph.D.dissertations		Relation (%) Induction - Deduction	
		f	%	f	%	M.A.w.	Ph.D.d.
1	Experiment	43	52,44	25	59,52	**87,81**	**83,33**
2	Measuring (testing)	21	25,61	7	16,67		
3	Questionnaire	8	9,76	3	7,14		

16) Ibid, p. 101. (Underlined by B.B.)

17) Ibid, p. 103. (Underlined by B.B.)

18) Ibid, p. 103 (Underlined by B.B.)

19) Bokan, B. and Radisavljević, S.(1995):Physical education in M.A. works and Ph.D. dissertations, Book 1, Statements, The Faculty of physical culture, Belgrade.

4	Historical method	5	6,09	3	7,14	**12,19**	**16,67**
5	Description (Method of theoretical analysis)	5	6,09	4	9,52		
	Total	82	100,00	42	100,00	100,00	100,00

How to explain the phenomenon of the dominant use of induction in the research of the phenomena in physical education in the analyzed works?

The first reason for the phenomenon is in the fact that physical education, as one of the entities of physical culture (the assumption is that it also applies to the other entities), belongs to new scientific disciplines, which on their path of development towards scientific ripeness, at first use the inductive approach in concluding, on the basis of empiric facts got in research procedures, more dominantly. In this way, of course, this approach is not underestimated but the question is, if physical education comes to the truths primarily by the inductive way and why the deductive concluding was considerably less used.

The second reason for this phenomenon is in the fact that physical education is an interdisciplinary scientific field, consisting of a biomedical scientific field, a socio-humanistic scientific field and a specific (close-professional) – original scientific field. In the process of cognition, the closest cognitive layer in the consciousness of a scientist belongs to natural and medical sciences which, historically more dominant, have developed the inductive approach in concluding, and thus have rather neglected the approach of hypothetical-deductive knowledge. The man, in the process of physical exercise, is also a natural being, but, first of all, he finds his generic being in his social, the least examined and almost neglected being.

The third reason is that in the most works there is no starting theoretical system, that is, theory, for building the hypotheses for the research, but they start from similar experimental models that got certain improvements in the use of the experimental factor. The key relation between facts and theories hides there, because in most works, it has been proceeded from the facts as theoretical systems, and in the end there always were new facts, not theories. In other words, it was „research for research", like the idea that art should exist only for art (Fr. L'art pour L'art), whose aim was not falsification of the former theories, but confirmation of those already proved. In Popper's opinion, it is not the way of the objective cognition, it is not the way of the hypothetical-deductive approach, but the way of the induction which repeats what science already knows, and in that way the process of scientific knowledge does not grow, but stagnates.

That approach in science Thomas Kuhn names „normal (usual) science"[20], and in order to exceed that situation, he suggests a „paradigm"[21], a new idea that should „defeat"(„refute") normal science and establish revolutionary new science. Kuhn thinks that measurings undertaken without a paradigm don't have the capability to form conclusions:

„But, it is difficult to make nature fit into one paradigm. That is the reason why the secrets of normal science are so challenging and why measurings undertaken without a paradigm so rarely lead towards any conclusions."[22]

A SUGGESTION FOR A NEW RESEARCH PARADIGM IN PHYSICAL CULTURE

In Madsen's[23] opinion, science consists of three components that are not simultaneously in it, but successively: *empiric research, theoretical thinking and philosophical thinking.*

On the basis of the structural survey of sciences in the field of physical culture that the author stated at the International conference dedicated to philosophical aspects of this field[24], an attempt for further development of ideas in the field of the structural survey of epistemology of sciences, in general, is being done, with a special turn to the condition of epistemology in physical culture.

Starting from the *new model of cognition – theoretical pluralism* and holistic approach to the theory of objective cognition, three components of science that successively participate in the process of cognition can be shown. (Figure 1.)

20) "In this essay **'normal science'** means the research that is firmly based on one or more past scientific achivements, the achivements that are accepted by the scientific society for giving the basis for its further practice for some time" [Khun, T. (1974): The Structure of Scientific Revolutions, Nolit, Belgrade, p.50.]

21) "**Paradigms** are universally accepted scientific achievements that offer the model-problems and solutions to the society of practicians for some time" [Ibid, p. 35.]

22) Ibid, p. 193.

23) Madsen, K.B. (1985): Cited by: Ristić, Ž. (1995): On Method and Knowledge Research, The Institute for pedagogy research, Belgrade, p. 196.

24) Bokan, B. (2004): Towards Constitution of Philosophy of Sport, Philosophy of Sport and Other Essays, Proceedings Book, Edited by: Dušan Macura&Milan Hosta, Faculty of sport & Eleventh academy, Ljubljana, Slovenia, pp. 45-52.

On the basis of the analyzed M.A. works and Ph.D. dissertations in physical education up to present time in epistemology, there is a dominant empiric direction (85%) with a minimal theoretical participation (15%), and non-existent philosophical metalevel (0%). (Figure 2.)

Physical culture, as a new scientific discipline, needs a new approach, a daring new paradigm about the necessity of philosophical thinking as the third component level of science, undeveloped up to the present time. Only in that way the process of objective knowledge in physical culture, too, can be the holistic one. Previous currents in the development of methodology and the resulting knowledge were insufficient in the deductive concluding, and new generations of scientists in physical culture must be aware of the necessity of a new research paradigm.

Figure 1. Three levels of knowledge – components of science (By Madsen, 1985)

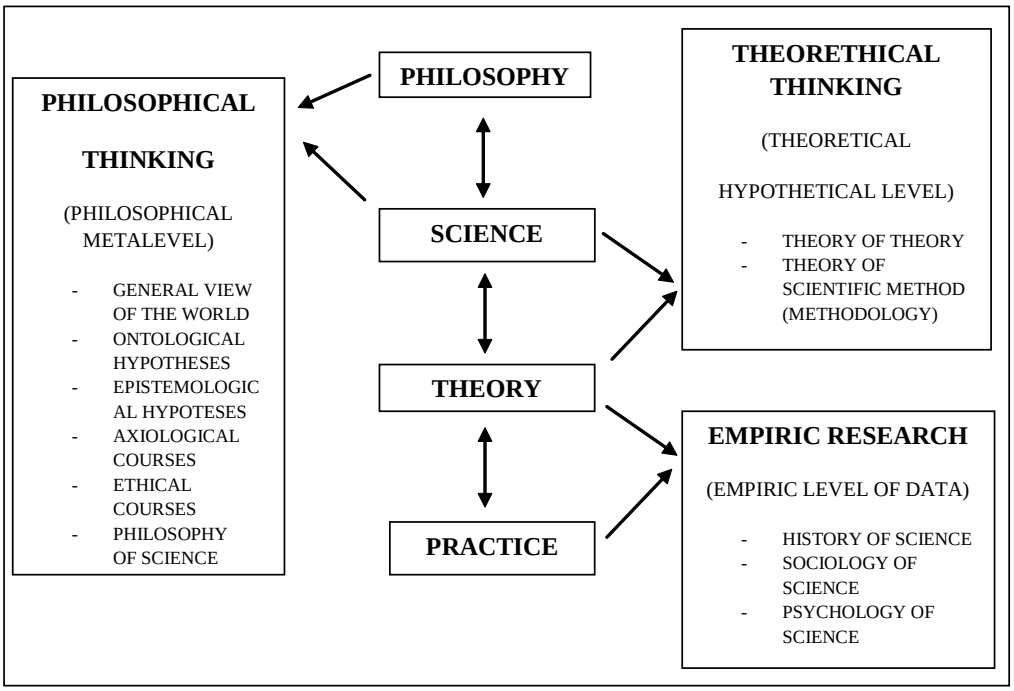
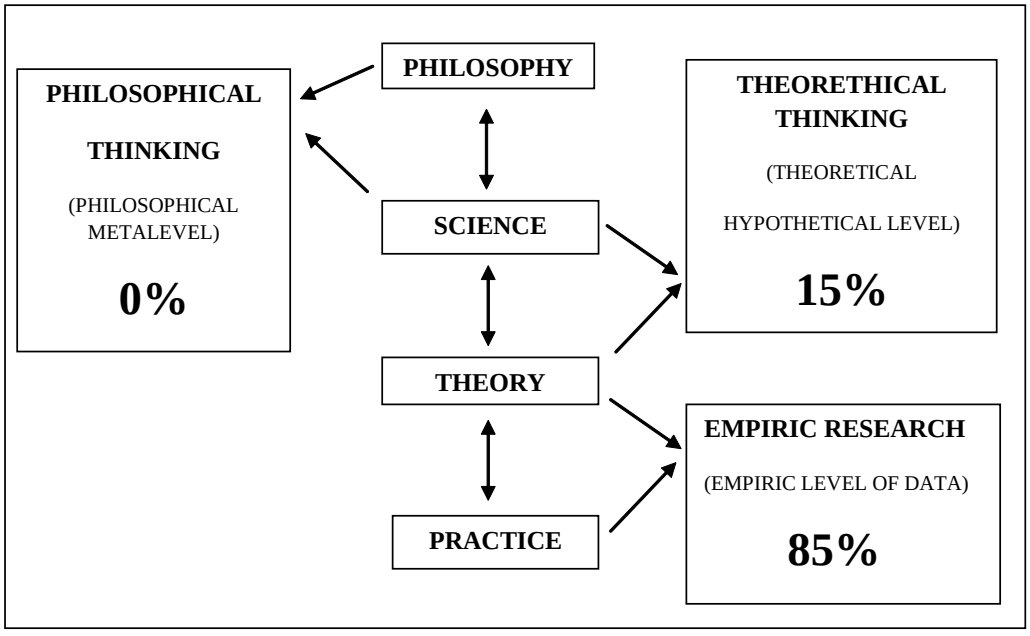


Figure 2. Three levels of knowledge in physical education



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APOTHEOSIS OF THE PHYSICAL EXERCISE

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Christian ethics

In the world we live in and the civilization we belong to (tentatively called – the European civilization, since at least three civilizations have merged to form it: the Western, Christian Orthodox and Islamic one) (1), any discussion of man, of personality – as single, unique and irreplaceable, boils down to a single issue: man and his freedom. Freedom – as the ability to act and be effective, unlike in the teachings of the determinists who, of all the possibilities deny precisely this one, teaches man that by accepting certain rules, he can avoid anarchic and self-indulgent behavior. These rules, which man voluntarily accepts, can be technical or ethical.

Technical rules refer to expediency, and tell man that if he wishes to achieve a certain aim – he has to accomplish certain tasks. For example, if a man wants to create a stimulative device, he needs to adhere to certain rules; but at the same time, he cannot be bothered by how these stimulative devices will be used, or whether they are morally wrong or right.

Ethical rules and norms, unlike technical rules, teach man to modify his goals and his behavior, mold them to fit the positive or negative categories of duty. For instance, do not do certain things, for it is not morally right, or inappropriate. But, whether or not man will follow these rules is solely up to him, is his choice alone. It is up to his conscience which is, as a part of every normal human being, his moral knowledge. (2)

Our conscience is, and this should be emphasized, the innermost, subjective basis of ethics. But there is also an objective basis of ethics made up of guidelines set up by customs, laws, and states. The subjective (conscience) and objective side of ethics are, at all times and in all places, relative categories and they depend on the personality in question. It is for this reason that ethics (3) needs an absolute basis, which can be: nature, man or God.

In the culture of the ancient Greeks, ethics was primarily grounded in nature and, at the time, it was considered necessary to live in harmony with it. In addition, nature was considered to be pantheistic, a divinity in its own right. That is why Aristotle thought that man by virtue of his very nature was a political animal. Thus, slavery had to be morally acceptable as well. Later on, with the coming of the sophists, man was thought to be the basis of everything, including ethics. Their teaching was that man was the measure of all things, a teaching which later flourished during humanism. The start of the 20th century only confirmed man's vanity encapsulated in Maxim Gorky's famous quote – Man, how lofty that sounds!

Prior to the emergence of Christianity, Heraclitus was the first to dissent from this teaching, as he realized that man was far from perfect. It is because he is tied by physical and social conditions of his existence that man cannot be the measure of all things. On the journey to cure pride, a journey that took him further away from teaching about nature, Socrates taught his disciples – *Know thyself*. And finally, in direct contrast to the teachings of the sophists, Plato announced that – *God is the measure of all things*. Later philosophers, all running from God, eventually returned to him. For instance Kant, who believed in absolute autonomy and a learning free from any stronghold of either earth or heaven, realized that this kind of ethics requires God, who is there to guarantee its compulsory nature.

Christian ethics, which wisely holds the middle ground, sees in the union of God and man the birth of the Son of God who is measure of all things. Therefore, the freedom as the unselfish gift that man has received from the Creator, it sees as man's ability to do something that God wills, or quite the opposite, what God would not want. Freedom implies responsibility, and without this responsibility there would not be a worthy man; but at the same time, freedom without responsibility would also not be worthy of God. (4)

Freedom is, as we can freely conclude from everything that was said here, either the acceptance or rejection of truth – be it scientific in nature or of any other kind. In addition, we can, as it seemed to Leibnitz, think of the truth of reason (which is established by means of evidence), or the truth of facts (which is established by means of experiments). It is more appropriate, if we are headed toward the truth, to distinguish between: formal and logical truth, ontological truth and deonotological truth. In addition, we need to emphasize that logic can only be used to further formal knowledge; ontological truth can be used to build a congruence between our thoughts and the empirical reality, wherein lies the truth about a being; and we use deontological truth to build a congruence between our thoughts and the idea or ideal of the necessary, and its criterion for the idea of righteousness. (5) This is why Plato called the idea of goodness – the highest science, and Kant deemed it – victory of the practical mind over theory.

In short, we can present this story in the much simpler and understandable words of Justin Popović who said that intelligence, in its highest form, is nothing without love. (6) In other words, *if we have no love within us, or no God in our hearts, we are nothing.* And we will remain nothing. It is of this that Christian ethics speaks.

Physical exercise as nourishment for man

If we consider physical exercise (also) as nourishment for the body of man, which can be used to enhance his control over his goods which lie at the foundations of his movement and his moves, we must ask ourselves what is happening to man and his physical exercise. (6)

On the one hand, we can note a complete absence of any desire to participate, even partially, in any form of physical exercise. As if there were no need for this kind of nourishment. And we can ask ourselves why this is so: is this the result of a heedless attitude towards physical exercise, or is it the result of an inert process which we have begun to take part in (un)consciously?

On the other hand, physical exercise as a gift from the Almighty Creator, through man's will alone, a man who has been educated to embrace the hedonistic and anthropocentric way of life, is kept at a distance and is not used for the benefit of mankind. Under the influence of the New Age, man forgets his place in this world and with unforeseeable enthusiasm turns to "better" possibilities. Among them he seeks out, and finds, new idols and cults, the most recognizable of which are: *the cult of the body, the cult of sports results, the cult of profit.* Man does not use physical exercise for his own benefit, but for the benefit and development of these cults, which he admires and (to the exclusion of everything else) respects.

When ***man's movement, defined by form and character, made with the aim to develop some of man's psycho-physical skills, is in other words his physical exercise***, we cannot help but be confused; firstly – why does man not use it for his own good, and secondly – why does he use it to his own detriment.

It is a fact that we, unfortunately, more often than not come across the absence of the desire to use physical exercise as nourishment for man, and for this we can recognize several causes – from a complete ignorance of the value of this sort of nourishment, despite the warning that "at the beginning there was movement … and it stayed … primarily as exercise" (M. Matić), to a complete lack of responsibility towards one's body and the ignoring of its needs, all the way to the (only slightly) disturbing fact that by means of education, which has been altered to meet the requirements of the New Age, man is bound to technological innovations which tell him that the need for this kind of movement-exercise, is a waste of time and as such –unnecessary. When man finds himself in such an inert state, and thinks accordingly, the road to complete isolation is not far behind. And this road leads, unfortunately, to the annihilation and self-destruction of one's personality, which, we must remember – is unique and irreplaceable. And all this through man's will, for his own (lack of) freedom.

Contrary to this sparsely described state, we find the complete opposite approach to physical exercise. Euphoric and highly utilitarian physical exercise only at first glance can be classified as a phenomenon of the time we live in. It is actually the product of several decades of work on the acceptance of the idea of a hedonistic and anthropocentric way of life. Naturally, it is only of the "chosen few" who can and want to be part of the "New World" and who put their own ego first.

If in the world of fashion, and this can be extended to include the new trend as well, all the men wax, not to mention what the women do, it is quite a "sacrilege" not to keep up with the latest fashions. And if both men and women with huge muscles are in fashion – here come the young, as well as those who have not been young in years, heading straight for the gyms and fitness centers, to stand among nickel-plated machines and in front of mirrors - to admire - their new trend, and to admire their (new) body. If necessary, and message from the "New World" is stressing that is both necessary and trendy, they will hire a personal trainer. Also muscular in build, a personal possession, used to show off and for a little bit of exercise, these "personal trainers" are irrefutable evidence of one's material wealth and social status. And the love for one's own body is – "limitless" and ever present. It is "cool". It will develop into the ***the cult of the body***. And thus the human body will become the "new divinity" that we will worship, respect and – admire. It is the new idol "worth" living for. Worth exercising for. ***Everything for the body, the body for nothing*** - **O tempora! O mores!** (8)

That athletes are our most prized ambassadors has been a well-known fact for quite a while. It is also well-known that in their desire to mount the victory stand, Olympic and otherwise, they are ready to use any (un)lawful device even if they know that it will only "give" them a few more years of life. We know that the motto – that the most important thing is not to win but to take part not longer rings true, and that the (only) thing that matters these days is winning. Victory is so important that is has given birth to a new (in)famous motto – do or die. This is widely familiar among politicians, as it is among businessmen. With great craftiness, and with even greater (personal) interest, they use sport and athletes. They have managed to raise sports results, the best of course, to the level of an idol and build ***the cult of the sports result***. They have succeeded in

making sports results the measure of supremacy of one nation over another, one athlete (man) over another; they have succeeded in using the achieved sports results, behind which lies great effort and much sweat, countless hours of practice, and the desire – *to be the best and to excel among others*, to change the image of not only themselves but also of others. (9) In all this, from the stories of athletes as the best ambassadors, all the way to the imperative do or die, sports results matter, and the athlete is merely the device used to achieve it. But, unfortunately for the athletes, who live in the assumption that it is they who matter, that they are the best ambassadors, they will be forgotten as early as tomorrow, and will sink to the bottom of reality that is life. And at this bottom, devoid of Faith and Hope, not to mention Love, without the sports results that they have built into their idea of happiness, their dreams born of hedonism and anthropocentrism are shattered. There was no room in them for the words of Christ "*You can do noting without me*". (10) Unfortunately for them. Unfortunately for us as well?

From the vortex of cosmopolitanism, a world without borders, with free trade (also without borders) and with the skilful concealing of the fact that this applies only to the chosen and powerful few, comes profit (gain) which is the very center of all these teachings. Of course, in this *globalization* which affects everyone and everything, sport and athletes play their "very significant" part. Ways are sought out and found to: (a) on the one hand, motivate athletes to achieve better, the best, sports results, (b) on the other hand to attract audiences to the stadiums –to buy tickets, of course or to their TV sets – so that they could notice and buy the products whose advertisement has been paid for during the broadcast. To this neoliberal and globalist circle, in whose center lies profit, we can add all those who started from their initial ideas – how to make more profit, and arrived at the realization of that idea, everyone who did it in his own way and within his own role (doctors, coaches, marketing geniuses and promoters…). Along with them, sport and athletes are means of achieving enormous profit in this closed circle, and nothing must be done to spoil this "idyllic image," not even by the state. (11) Thus, sport is put directly in the function of acquiring profit and sports results and sports spectacles, as the best means of marketing, in the function of building the ***cult of profit***. The neoliberal motto: *anything for a profit, profit for nothing,* but profit of the chosen few, has been especially built into the professional and spectacular segment of registered sport, if it even exists like that anymore.

No matter from which angle we look at the attitude towards one's own physical exercise, the picture is not a pretty one. It would be well worth our while to notice it, to learn from its moral. But how we will react to it, depends on us. Let us remember the words of the apostle Paul –we are allowed everything, but everything will not be beneficial for us.

Remembering the future

In our attempts to understand, or explain, the purpose of a being, we can use one of the metaphysics or ontologies: the pagan (all-natural) metaphysics or Christian metaphysics.

The pagan (all-natural) metaphysics is based on eminent monism, which states that the purpose of this world cannot be sought for outside its existing borders. Naturally, this refers to the borders that are known to us. Thales, by stating that water is the ancient source of everything in this world, set the foundations of monistic teaching and extracted *substance* as the most important concept. Later, Spinoza characterized it all as belonging to nature and set the foundations for materialistic theory and materialism, and Hegel, learning about world reason, laid the foundations for idealistic theory and idealism. In both cases, whether we are talking about matter or reason, they were equated with the world. Without them, nothing existed, or in other words, they were to be found in everything that existed.

Christian metaphysics is based on transcendental monotheism, in whose center is the view of the world that extends its borders. Christian metaphysics is based on the existence of a divinity and its teachings state that God is the most real being. From this highest point, everything seems to gain some kind of meaning. It was for this reason that Christian metaphysics consists of teachings about God, nature and man.

In their attempt to know God, Christians can choose from among one of the following teachings: *mystical, theological or philosophical. **Mystical teachings*** are based on the assumption that man feels a living God with his heart, and that he receives Him with his whole being. In these attempts nothing can sway him. This is the faith that will not falter. But, it is compromised by extensive focus on the subjective experiences which lead to ecstasy, which in turn is beyond the control of reason and which deadens the will. ***Theological teachings*** are based on the acceptance of the Scripture as the basic source of knowledge. God is not revealed in it; instead, God is revealed to theological thought and to man. Theological thought accepts the Revelation, interprets and systematizes it, relying on everything that the human mind has to offer. The theological ideal lies in faith and moral teachings based on the Word of God. But, just like any other ideal, this one cannot be fulfilled in its entirety, which leads to a *new* motivation for a *new dynamics.* In addition, we should emphasize that God does not change with time, because He transcends time. "I am the same." "Before me there was no God and there will be none after me." (12) ***Philosophical teachings*** start with man and lead to God (unlike theological teachings which start with God and lead to man). In philosophy there are also attempts to discover God.

In this "discovery" of God, especially in teachings of materialistic philosophers, some go so far as to belittle God and call him unworthy names. Nevertheless, there are philosophical contemplations (Nikola Kuzanski, 15th century) which state that scholarship without a religious slant is not more than learned ignorance. It was Bacon who reminded us that small sips from the cup of knowledge lead us further away from religion, while other, much deeper ones, unconditionally lead us directly to it. (13)

The everlasting secret of man, who is to himself the greatest secret of all (Njegos) still catches our attention and makes us think: who is man and where is he headed; both man and the world he lives in. In this world, not only the present one, in which it is easiest to go *downstream,* but since the time of Epicures, who used Democritus' theory that man is made up of atoms, both big and small, to determine that after death all man's atoms decompose, the denial of every moral responsibility of man was born. This paved the way for the invitation – man, enjoy your life while you can; enjoy it before it is too late. ***Carpe Diem*** – seize the day. Taking joy from life, which is the center of hedonism and anthropocentrism, still lasts to our day and age.

Despite the teachings of New Testament anthropology, that man is tripart in his unity (the body, the soul, the spirit), man still, adhering to his base and egocentric desires, thinks only of his body and its pleasure. No matter whether it be his physical inactivity, which he uses to indulge his body in its desire to avoid any kind of physical exertion, or hyperactive physical exercise which, unfortunately is used in the function of creating new idols and cults, man does not understand the significance of his three-dimensionality. He does not understand that the spirit lies in the soul, the soul in the body, and the body in this world (St. Nikolaj Velimirović). He does not understand the significance of the road he is on and does not remember the words of the apostle Peter who said that if there were no resurrection, all our faith and our teachings would be in vain. In his pride, man does not accept that the resurrection is the start of something new, because he is not ready for exertion and movement upstream. For this reason he clings to teachings which please his hedonism, and which, entwined in the theory of the circle, tell him: everything that has a beginning has an ending. So – seize the day (Carpe diem).

Quo Vadis, man!

Literature

1. We can make a distinction between five different civilizations in this day and age: the Western, Christian-Orthodox, Islamic, Hindu and the Far Eastern one.
2. For more information read: Spektorski, E.: (1992) *Hrišćanska etika (Christian Ethics).* St. Simeon Mirotočivi, Vrnjačka Banja.
3. Ethics and moral are terms which, in this text, are used as synonyms.
4. In one of the many attacks on His Holiness Patriarch Paul of Serbia, and regarding his Christmas Epistle and that of the Serbian Orthodox Church for the year 1995, where he pointed out the problem of the "white plague" and infanticide as part of it, numerous non-profit organizations spoke out against denying women their freedom and right to use their bodies as they wished. In response, the staff of His Holiness issued a reply: "The Serbian Orthodox Church and Patriarch Paul know that freedom, in addition to other characteristics that make man a person, a human being of an order higher than any other living creature on earth, is his inalienable decision, the ability to do as God wills, or to against his will. We do not deny anyone's right to be the master of his own body. But we do know that this right inherently includes responsibility, and that freedom without responsibility would not be worthy of man, and responsibility without freedom would not be worthy of God." NIN, no. 3019, pg. 24.
5. Aristotle called logic the organ of knowledge, saying that there would be no scientific knowledge without it. But this scientific knowledge is only formal. This was not known to the medieval scholastics nor is it known to many scientists of today who by insisting on numbers and mathematic formulas forget about the given physical world.
6. For more information read: Justin Popović.: (1992) *Srna u izgubljenom raju (A deer in the lost Eden).* The Voice of the Church, no. 4., pg. 9.
7. For more information on physical exercise read: Živanović, N.: (2000) *Prilog epistemologiji fizičke kulture (A contribution to the epistemology of physical education).* Panopticum, Niš.
8. Oh what a time! Oh what customs!
9. For more information on using sport for economic or political purposes read: Živanović, N.: (2000) *(A contribution to the epistemology of physical education).* Panopticum, Niš.
10. The Bible, The Book of John 15,5.
11. The idyllic image of the "sports event" at any level, and within a professional and spectacular segment of registered sport, cannot be interrupted or terminated by anything. Just to remind the reader of a few drastic examples: the death of viewers at the Heisel stadium during a soccer game, the massacre of athletes in Munich at the Olympic Games, the opening of the Olympic Games in Beijing – the massacre of people in Georgia. In addition, the state cannot infringe upon the rights of certain sports associations, such as soccer associations. It can interfere in other matters, but not matters pertaining to soccer, etc.
12. The Bible, Isaiah. 41,4.; Isaiah. 43,10.
13. Quoted from: Spektorski, E.: (1992) *Hrišćanska etika (Christian Ethics).* St.Simeon Mirotočivi, Vrnjačka Banja. pg. 37.

PHYSICAL CULTURE IN THE SYSTEM OF SCIENCES

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Modern science on physical culture is born by pointing out the experience combined with other sciences and with logical judgment; it gives one possible firm base and reliable claim about things and happenings within itself. One such claim does not give one verbal distance from other sciences. On the contrary, science about physical culture owns its multidisciplinarity, but also its interdisciplinary with other sciences.

At the very beginning of the discussion about physical culture science, no matter how odd it may seem, we can ask questions if this science is one reality and possibility, if it has some special and privileged existence within the human spirit. If it has, is that existence within itself something unique and homogeneous, does that homogeneity come from the philosophy of the physical culture? And vice versa, if it does not have it, does then the inner heterogeneity of what is called a science come from different sciences?

The inseparable question with the above mentioned is, what is actually a science? It is known that the word and the concept of *science have different meaning and different usage in great epochs, in great and developed national cultures and especially with great men and influential scientists and authors.*

In the works of Aristotle, we encounter the concept *Episteme,* which differs from the concept in XVI and XVII century known as *Scinntia.* Later *Wissenschaft* in Germany, *Science* in England and *Science* in France do not have equal meaning and equal usage.

If we *turn* and look the way certain scientists of their age express their attitude towards science, we can notice that: Hume with the term of Science denotes one totality we could call analytical-empirical totality or even better analytical-empirical aggregate, which is in the spirit of Lock's and Newton's tradition. On the contrary, Hegel does not give any specific value to that tradition and for him, as well as for the greater part of tradition being formed in Germany, the English *Science* serves as a stepping stone for *Wissenschaft.* For Bergson, intelligence creates the science.

A lot of imposed problems covering the area of physical culture, greatly come out of the lack of a separate methodology of research work, but uses the findings of natural and social sciences' methodologies in practice. Historically viewed, with crtain ups and downs, we can say that physical culture bravely clears its own path towards its own sciences. We can optimistically expect the moment when the physical culture will build its own methodology, answer many questions, like the purpose of physical education even though the answer is imposed by itself:

The aim of physical culture is to connect the scientific laws with a conceptual device and language into firmer totality, which comes from its own nature as a special activity. In this part, we are particularly interested in special connections of occurences and relations with physical education and the methodics of physical education as the key point of knowledge, but as a part of that deterministic structure where they get their meaning.

Creation of those scientific totalities and the view on factual state, activate multiplied strive of all cognitive areas for autonomy. Each science strives for closing within its own boundaries. According to that, it is not closed within itself. Science is a world produced by a special sight of the human practice.

Physical culture exists in 'human conscience", and that means that it changes the human conscience, from creation of 'ideas that become material strength" to creation of conscience and denoting of paths for its further development.

Noel Mulu ,turning to Huserl in one article, gave some notions that follow the hardship, similar to that already considered, that the concept of science is not determined only in the cogntive relation. „Science exists"– says Noel Mulu – „through the rythm of creation and realisation (efectuation) of the possible structures. In other words, there is one activity in the base of the mind realisation (vasion), which is not only *theory* but also a *praksis*. Connection of these two terms we can borrow from Huserl's phylosophical dictionary of logos and praksis, where he speaks about activity having a certain dimension of time and creation".[1)]

Generally, leaning against the quoted author, and still being in the area of „possible", ie, reality of physical culture, we must be very careful in accepting the radical grounds. Its field of possible is deteremined by unlimited field of human images of structures that are confirmed or rejected with their practical consequences.

Entering the domain of other sciences together with the area of „possible" in physical culture, we should start, like Brenshvig, from other fundamental cathegories. Theoretical base of physical culture consists of histori-

1) Noël Mouloud, *„Lèspirit dessc sciences structurales et la philosophiie de la Raison",* Revue Métaphyigne et de orale, 3/1966, p. 350. Quoted to: Pavlović, B. (2007): Phylosophy of science, Plato, Library „Didaskalos" 8, Belgrade, p. 404.

cal determination of category existence, which are in the deepest connection with the existence of life, society, man and its real creative thought.

The period of history that we often call "modern", has a spiritual physiognomy and a base that differs a lot from physiognomies of previous periods. There are certainly numberless ups and downs in the historical pace of a man, which does not exclude science. The historical development od science is interesting and important, and in that sense we follow the development of physical culture in its tree most expressive shapes: physical education, sport and sport recreation, which capture the attention of a modern man.

In order not to be confused, we will clarify the term of the contemporary, modern world. Everything that separates the modern world from the earlier centuries, we should ascribe to science, which was the most successful in XVII century.[2)]

B. Rasel (1998, 434) points out that XIII rounded a great synthesis, philosophical, theological, political and social. In spiritual-scientific way, the modern world begins in XVII century. We can say that this century marks the beginning of a great, grandeur epoch of science. New terms introduced by science deeply influenced the modern philosophy.

Decart[3)], who is in one way the founder of the modern philosophy, was also one of the creators of the science of XVIII century. There are four great historical people that stand out in constitution of science[4)]: Copernicus, Kapler, Galileo and Isaac Newton.

This period was significant not only in astronomy and dynamics but also in other sciences. XVII is important for its scientific instruments. The complex microscope was invented around 1590. The telescope was invented in 1608 by Lippershey, and Galileo was the first to use it seriously in science. Galileo invented the thermometer, and his student Torricelli invented the barometer. Then there were other great discoveries, Guericke invented the air-pump, Galileo improves the watches. Gilbert published his great book about magnets in 1600. Harvey discovered the circulation of blood and published it in 1628.

What we want to show with these examples is that the result od science was a deep change in understanding of the position of a man in the universe.

Middleages considered the earth as the centre of the sky, and everything had a purpose in connection with a man. There are many questions where the terms from the teoretical physisc differ from the terms of the Newton's system.

2) Pointing out the results of science in XVII century, we do not lessen the importance of science in the previous epochs; on the contrary, we think that that vanished world influenced the following of continuity of science.

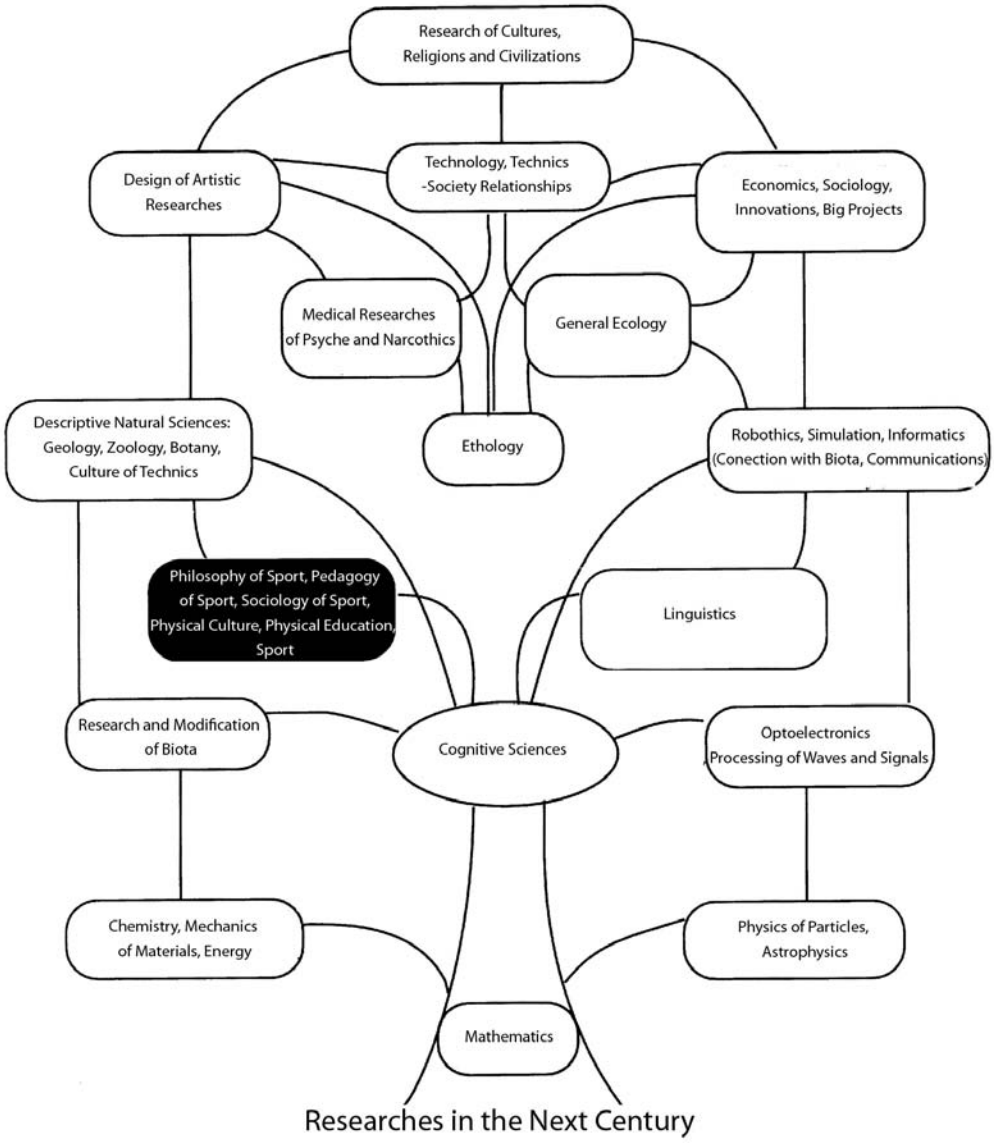
3) Descartes, Renatus Cartesius René was born 1596, died in 1650, founder of the modern philosophy. His philosophical view on the world founded new knowledge in physics and astronomy. He has a tendency of constructing de novo philosophical construction. His most important works are : Discours de la Metodë, the biggest part of his theories he published in the book: Principia Philosophiae,published in 1644, his two most important books are :Discussion on a method (1637) and Meditations (1642).

4) *Copernicus Nikolaus* (1473–1543) was a Polish. Travelling through Italy, he felt the influence of the reinesance. He became a professor of mathematics, religious, but he devoted all his time to astronomy. he confirmed very early that the sun was in the centre of the space and that the earth had a double motion a daily rotation and annual going around the sun. His main work was *De revolutionibus Orbium Colestrium* . It was published the year he died. The preface was written by Andreas Osiander, a german humanist, a professor of theology, dealt with mathematics, astronomy and physics. His followers, osianders, were liquidated several years after his death.

Kapler Johannes (1571–1630) the first great astronomer after Copernicus, acquired heliocentric theory. He was under the influence of Pythagoras, a protestant, and unusually worshiped the sun.his big success was the discovery of three lows of the planets'movement.

Galileo Galilei (1564–1642) maybe the biggest founder of modern science, excluding Newton. He was born on the same day Michelangelo died, and died on the same day when newton was born. He was the first one to discover the importance of acceleration in dynamics, he first set the law on free fall of a body, studied the projectiles, set the law on inertia. He was accused by the inquisition, first in secret, and then in public when he repented and promised not to support the thought that the earth goes around its axis or around the sun.

Newton, Sir Isac (1642–1727) gets the special place in the world of science because he won the battle starting from his three laws on motion, for which the three previously mentioned scientists had set the path. In 1687 he published his work Principia, where he and Haley calculated the circular paths of certain comets and that they also obey the law of gravitation.



Scheme no. 1. Structure of sciences in the next century

Quantum mechanics provoked a big jump in science. The law of gravitation was simple and completetly accurate 200 years after Newton. Einstein corrected it, but it still stayed the law dealing with accelearation. The truth is that the acceleration of energy is the law dealing with speed and not with acceleration.

The scheme presents one of the visions of science development in XXI century. Those are the sciences where the biggest investments will probably occur. They are arranged in levels and they are interconnected so that they symbolically give the image of a human brain. The place of the physical culture and its connection with other sciences is very interesting in the given scheme.

From the very beginning, philosophical and scientific thoughts have been led by the belief that under the variety of things and chaos of occurrences, there is one or several basic principles. Reductionism is studying in which simplicity all separate sciences come to one basic. Openheim and Patnam suggested hierarchical object classification , where the objects of one level consist of the objects from the lower level.each level is the subject of research of a special science that reveals the laws ruling a certain level. The final goal is to derivate the laws of the upper level from the lower level laws. To make this possible, it is necessary to know the principles of connecting that identify the special object structures from the lower level with the objects from the upper level.

Mathematics is the base of everything. It is well known that physics and other natural sciences are deeply mathematised. The basic question is whether mathematics is essential or not, is it necessary for the science? Opinions are divided here. Harty Field thinks that mathematics is heuristically powerful and even psychologically essential, but not ontologically necessary for physics. That practically means that everything shown in mathematical way, can be shown by logical means, without mathematical terms. Realists are on the other side

and they think that mathematics is real, truthful and essential for the science. No matter which opinion prevails in the following years, the importance of mathematics for science will remain huge and immeasurable.

The first level consists of particle physics, astrophysics, chemistry, mechanics of the material, studying of energy and similar scientific disciplines. They study the most basic layer of reality and are the base for understanding of all matters and concepts surrounding us. However, they give one absolutely necessary base on which sciencies studying the higher levels of reality can rely.

The second level consists of optoelectronics, process of waves and signals, cognitive sciences, as well as studying and changing of live matter. On one hand, development of new solutions in electronics should enable new explosion of technological development, on the other hand, discovering of new life basis and genetic engineering should enable fast development of medical sciences. Cognitive sciences, as highly-compatible and interdependable with physical sciences should enable cognition of mind in an objective and independent preceptor's view.

Philosophy of sport (physical culture), pedagogy of sport and linguistics make the third level. Problems in modern sport, sport recreation physical education in schools-ie, of sport within the philosophy itself and pedagogy od sport within the pedagogu itself. Perhaps sociology of sport and psychology of sport have the longest tradition.

The forth level consists of robotics, simulation, informatics, ethiology, as well as descriptive sciences (geology, zoology, botanic, culture of techniques..). Development of robotics and informatics and together with them further development of communications, is the hypothesis of the further industrial development. Also, within the development of these sciences there are unpredictable possibilities through connection with live matter. Descriptive natural sciences will enable better cognition of live and dead nature, and ethiology cognition of secrets of human behavior.

The fifth level consists of general ecology and medical research of soul and drugs. Modern techniques carries one ambivalence in itself-even when used with best intentions, inevitably carries with itself some bad sides. We cannot avoid the usage of modern techniques because it is very integrated in our lives. Larger number of ethical systems based on doing what was good for man. However, development of modern techniques requires leaving of this model. Industrial society wrongly understood that the whole universe is only the life space of a man and so it endangered everything on earth, all living creatures, and a man himself. Mankind should realize that man is not the measure of all things, and that nature is not just our surrounding, but with everything in it it is our mutual world. So the development of ecology as a science studying the relationship among living creatures, but also the relationship between living creatures and their surrounding and this will be crucial for the further survival of civilization.

The sixth level consists of economy, sociology, technology, design of artistic researches and similar disciplines. Further development of the mankind will not be possible without the development of economy and sociology. There is a growing need for more righteous division of the capital and creation of one more justice more humane society. Of course, this will not be possible without better knowledge of social occurrences and processes, as well as the laws which lead them. Even today, the interdependence of techniques and society is huge and we can suppose that it will only grow. This imposes a need for more profound studying of relation between techniques and society. One of the roads to better cognition of human essence could overcome the study of art. Art, as a human activity or the product of human activity for stimulation of human senses, mind and spirit, is something which has followed the mankind from its beginning, so art should not stay out of scientific reach.

The last seventh level consists of studying the culture, religion and civilsations. This highest level of realty represents the synthesis of all the lower structures, so these studies will be possible if supported by knowledge from other sciences.

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WHERE DOES THE PHYSICAL CULTURE GO

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Sport as a cult and a spectacle has deep religious roots. Gods come to human play in way that is effective and influences us. Cult, religion and myth, just like art, all have deep roots in existential phenomena of game."

Sport has Christian-Orthodox-Ethic frame, looking by elementary questions: source in God who appears in movements, waves and games to which every sportsman is striving.

In long correspondence I lead with one of pioneers of sport medicine, Professor Vojin N. Smodlaka we both agreed that physical education, sport, game and recreation are practiced in early childhood as a game with pleasure and laughter. That lasts until they start with competitions and laughter disappears, serious face comes to light and at the end a spasm of winner.

Where and when one emotional state ends and new one begins is hard to say. Question is if they should be differed, split or removed? One of key questions to which we need to provide an answer is: Where is physical culture going?

It is really hard to make a clear definition and answer on when does game becomes a fight and hen it becomes a sport. Our folk poetry is full of examples of game as a fight; Njegoš (through Iguman Stefan) in Gorski Vijenac writes:

This world is tyrant to tyrant,
And to blessed soul as well!
Hi is part of evil discord:
In it soul fights body,
In it sea fights mountains,
In it winter fights warmth,
In it winds fight winds,
In it poultry fights poultry,
In it people fight people,
In it man fights man,
In it days fight nights,
In it spirits fight heavens.
Body cries under force of soul,
Soul shivers in the body,
Sea groans under force of sky,
Sky mourns under power of sea.
Nobody's happy, nobody's sufficient.
Nobody's calm or tranquil,
Men is embarrassed by man
Monkey seas himself in mirror

Sport has a root in paganism. In ancient Greece and Rome they sang songs to gods and semi-gods. Those songs had same meaning as prayers. In that search for God human's striving towards eternity is obvious.

Greeks organized Olympic Games and Romans gladiator fights. Contestants in both worlds were competing until death. Victors were elevated as high as apotheosis.

In 403, in Rome, victory over East Goths was celebrated. In that honor gladiator fight was prepared where enemy soldiers were thrown in front of animals or were forced to fight each others. Priests were always against this behavior and bloody games.

Philosophers, moralists and orators joined them over time. Christian poet Prudence spoke to Honorus with a beautiful song, begging him to stop bloodshed for pleasure but all was for nothing:

Large amphitheater was full of rowdy people. Spectators are jumping of their seats, with wide opened eyes, waving their arms, hitting their chest, screaming and yelling. They threaten and cry, curse and lose consciousness... And on the scene, with loud music, human blood is being shed, wounded are screaming... But suddenly... suddenly something unexpected is happening, something out of the plan and program: poorly dressed man jumps in front of gladiators trying to split them apart.

Audience quiets down, surprised. In such silence a words of wisdom will echo loudly… What followed is not possible to describe. A scream of disallowance was heard and hurricane of animosity and insanity rose. Audience ran towards arena like lava would flow, wild and unstoppable. It is hard to distinguish what happened afterwards. After crowd retracted a body of man was left behind, all in pieces. That was Saint Telemah, priest from East. People froze in fear and despair. Honorius soon declared laws canceling bloodshed and fights."

Two sons of Diagora who won at Olympic Games saw their father carried by audience and yelling: "Die Diagora for you cannot become God and that is all that is left!" Diagora died from joy.

"Game is basis of sport, challenge and cause and unavoidable function of sport. Walking the edge is dear temptation which no sportsman can resist and is thought of every serious explorer."

Modern sport presents organized system of somatic exercises and has a goal of achieving maximal sport results.

During the first Serbian congress of sport science and medicine, in 2003, Father Ilarion Djurica and I said (in our work "Prayer and asceticism"):

"Profanity rules modern sport while covertly is ruled by pagan decadency of religion and magic. Sport is ruined by politics and ideology. Sport is straying into industry and commercialization, libido and alienation.

When game becomes paid and trade for profit, both human and God are extracted from sport. Decadency ruins sportsmen and makes him a commodity."166

During the training body loses substances necessary for performing intellectual and physical activity. That is why is needed that during the phase of recovery sportsmen intakes all that body cannot synthesize on its own.

They are needed for replenishing energy and exchange of protective matter (vitamins and minerals) and nutritious matter (carbs and proteins). Unfortunately, beside these matters sportsmen use hormones as well. Use of them (doping) is not allowed. Stimulants are cause of many injuries and in extreme cases even deaths.

Will for winning and challenges is as old as humanity. Throughout the history, sportsman used special diets and drinks to make their bodies superior. In antic Greece wrestlers ate large quantities of raw meat to enlarge their muscles. Warriors called Wild Hordes from Norway eat hallucinated mushrooms as a preparation for a battle (so they would gain strength and courage).

Lately, there are proofs that police and army were using steroids in order to look and behave stronger and more aggressive while performing their duties."

Use of anabolic without control challenges moral and ethics of sport. Any use of anabolic and steroids (or any other illegal substance) are considered as worst offense.

Sportsmen who use them have advantage over their rivals but they are ignoring rules and foundation of spot in general.

A battle for high results in various sports led to manipulation of great proportions. Aside from hard exercises more then ever sportsman use stimulants with desire to make body work as hard as possible ignoring consequences.

It is a mystery why sportsman would do that ignoring many other, legal and safe substances that strengthen body without implications. For example, for physical endurance sportsmen can take enough of protective substances that improve all functions in body, health and vitality. Honey is one of those substances.

Chemical and pharmaceutical industries want to take their share of pie by creating and offering wide spectra of strong stimulants. They follow athlete's wishes to reach the glory and all financial effects that go along with it.

Athletes, on occasions, several years after winning Gold Olympic Medal or having set a world record, admit using illegal stimulants despite negative doping test results.

Athletes use different substances to become stronger, to become gladiators. World becomes spectator. In sport, in order to defend honor, pride and will to succeed at any cost, once becomes dishonest and evil not choosing the options … anything would work; legal or illegal.

We can freely say that use of stimulants is opposed by Christian norms (love, honor, fair play...).

Using stimulants is abuse and goes deep against man, God's project; ion other words, that leads toward change of purpose and deformations.

Well known is an example of former world record holder (100 meters) Tim Montgomery (currently in prison, serving time for trafficking illegal drugs). In an interview he stated that he did not win gold by using his physical and mental abilities but by using illegal stimulants. He admitted using stimulants before Olympic Games in Sidney 2000 (where he won gold medal in 4x100 meters). He also admitted using testosterone and human growth hormone four times a month.

There is a long list of similar examples; runner Marion Jones and cyclists on Tour De France, just to name few. Without ignoring 'blood stimulants', does it mean that fight against illegal use of stimulants became a game of 'cat and mouse' where active use of chemical and biological agents influences doping control.

"In order to avoid that in sport, top-level sport especially, we have to look at it as passing youth that would make us happy and richer for sport experiences and many friendships. Everything else has to be taken away from sport because goal is to reach sport Olympus that should enrich sportsmen's life not ruin it. Money, being many culprit for problems, is not and should not dominate, meaning there should not be any reason to run after something that can damage these goals."

Largest number and worst evil things that men did to other men originated in firm believing in correctness of wrong beliefs."

Bertrand Russell said this. This is clear warning that wish and ability have to in accord in life of common men and in life of sportsmen.

Medicine, drugs and development of positive science, Saturday's and Sunday's entertainment, TV and video, car and airplane, computer, money and all that makes life externally fulfilled cannot be satisfactory replacement for essence of life that is in God.

Why would modern man defect from religion and falls to life without asking essential questions?

Some managers and trainers see sport as business; enjoying huge profit while for public sport is entertainment and show business. For majority of sportsman sport is still noble competition or at least it should be.

According to M. Oyama, Japanese master of martial arts: "At every practice you have to at least once feel like you are going to die from all the pan, hits and desperation. But you have to feel that you made that one step that parts possible from impossible; step that divides limits of your abilities and pains. That is the only way to the mastership of martial arts."

An effort to have body surrender to soul is one of the important elements, leading toward self control. That is the highest victory man can win. That win is achieved through an effort almost fanaticism, and can be seen as stepping over three stages: work, work and work: spiritual work, physical preparation and synthesis of first two

Unfortunately, modern sport (just like ancient one) takes its tool in blood, ruining the spirit of Olympics, degrading sportsman to a good, making sportsman a gladiator who sacrifices health and life in order to achieve highest results. In the battle for the victory and high achievements all is allowed. Human sacrifice is presented at altar.

Today, abusing human being is present everywhere. Human character is undone.

Orthodox Christian church sees sport as a positive thing; not as undermining of personality or vehicle for achieving results. Man is not a vehicle but free personality whose ideal is unity with God.

" Strict regime of life is primary thesis of advancing in sport. Physical pressure during practice and competition is specific stress for athlete's body. If instead of relaxation and regeneration you chose alcohol, tobacco and wild night life, body could not function properly for a longer period of time and soon there would retraction in sport and then inner organs would start suffering. In extreme cases this way of life would end in death, something we see more often in news."

Top level sport requires strict way of life and dedication, bordering edge of persistence almost to the painful threshold.

Arnold Schwarzenegger once noted: "Muscle is not getting stronger unless you do burden it with everything it can easily handle. It starts to grow only if you keep pushing it to the limit."

Runner Florence Griffith Joiner, Olympic and world record keeper, dies at the top of her carrier, due to unhealthy life and consummation of stimulants. She was 38.

Bicyclist Marco Pontani was one of those unlucky athletes too.

Mohamed Benaziza died during the largest competition in gymnastics. He was 30 years old.

German Andreas Mencel, body builder, suddenly died in his 32 year of life. Later, it was determined that at the time of death his body contained traces of 23 different stimulants. His body literally fell apart.

On March 24, 1962, there was a fight between Emil Griffith and Bennie Paret for world champion title. During 12th bout Griffith hit and killed Paret. He hit him 18 times within few seconds. Paret died on his feet. On his bloodied face there was still a smile as if he was saying "I did not know I was going to die now". He suddenly collapsed and started falling down slower then any other boxer ever before… Doctor jumped in and gave him a shot trying to revive him. He was taken to the hospital and never woke up. He was in coma for seven days and then finally died..."

That said tradition of sacrificing human bodies has been continued until today.

"German gymnast, Ivona Haug, six time champion, refused to go to Olympic Games because "she wanted to live".

She was seventeen at the time, 1,57 m tall and weighing only 44 kilograms. She said she was practicing for herself and all medals in the world are not worth any more.

She joined Herta Levenberg, former gymnast who wrote on the wall of her gymnasium: "Sport is death". She believed that they have it worst because their working day looked like this: "Every day, girls practice six

hours a day under supervision of coach. They have to function like dolls: practice, school, eat, practice, eat, practice … always controlling their body weigh and endurance. They often had to throw up not to gain weight." She wanted to live like her classmates and pick up where she left of before she became an athlete.

During a game in Brazil, between Sao Kaetano and Sao Paulo, player Sergino (30 years old) suddenly died in 59th minute. His heart suddenly stopped beating and he dropped own. This was fourth death on soccer matches in 2004.

We should ask ourselves if anti-sport is a sick, false religion that practices sacrificing humans?

We need to fight against extreme pseudo-religion that adores top-level athletes as if there were gods.

It is a paradox that sport that should be in service of health becomes main factor in ruining health. Cause could be found in distancing from Christian faith and adopting Pagan's idols; greed. Money, ignorance and win at all cost above all...

Sport has its own system of values where win, medal and affirmation are most important. There is a need to establish new system that would promote all that is beneficial in sport and those are health, pleasure, friendship and useful use of time..." (Mithat Blagajac).

Sport, just like a fight, is taking chances and it is possible that sometimes road to money and glory is road to eminent death, but sport most of the time brings happiness.

"It is necessary to revive a liturgy about Christian essence and sport as a game that celebrates God. Christian athletes celebrate and are being celebrated.

They celebrate God, they grow in holly freedom and their main call is resurrection. "Playing in front of Lord" they reach the highest level or moral win. In that game of purgation, "homo ludens" is becoming free life in Christ.

Sport is being blessed, transforming to a holy act, or endless diving into death of Christ and surfacing in resuscitation; athlete becomes one being with Christ (Rim 6, 5).

Sport can elevate to wise contemplation (contemplatio)."

In order to return sport to its original borders, we must find 'shepherds' in sport or spiritual sportsman.

Noble challenge (CITIUS, ALTIUS, FORTIUS) Faster, Higher, Stronger can forget a man and Christina in athlete.

You can view sport in one unusual way through prism of Christianity:

"Sport, as seen by religion, is inseparable from love and is elevated act of faith. In sport, God and holly man are touching and interlace. That is why sport is deep act of holiness or at least act of creating prayer, initially empty but later so rich and human.

With sport one can achieve humanity and holiness. Sport is great victory over physical and spiritual desert and empty culture. It is not true that sport in its pure form is just and empty physical pleasure but it is true that sport is being pushed down that road.

According to Bible, man has to play for only by playing he can develop talents. Saint Apostle Pavle, "people's apostle" is apostle of sport as well and is inspired with games. He compares Christian life with sport's fight; a fight to win glory.

Sport as physical and spiritual festivity is not foreign to Christianity. Apostle Pavle is considered to be a father of theology of sport. From Corinth he wrote to Christians: "Don't you know that your body is a temple of Holly Spirit, given to you by God and is not yours?" (1. Kor 6,19), while he wrote to his student Timotej this about sport's fight: "God war I fought, race I finished, faith defended. Now, wreath of justice waits to be given to me by God, just judge. Wreath does not wait only me; it will be given to all who wait for His return with love." (2. Tim. 4,7-8)."

If we want to live truly and morally, then we have to believe. Right road that leads us there is road of discovery, learning and holiness.

In addressing of apostle Pavle we see many sport terms like arena, stadium, running, competition, fighting, loss, win etc.

Straying and abusing body is against sport rules and is also antichristian.

People often do not see most important ability to be alone (in God) as a prerequisite for deeper introspect of life; authentic self knowledge. Socrates' "Nosce te ipsum" (learn about yourself) is not without basis and reasons.

"Love all God's creations and every bit of it" says Dostoyevsky in Brother Karamazov, continuing: "Every leaf, every sign of God … love. Love animals and flowers, love everything. If you love every thing you will understand the God's secret in it. And you will once realize that you got to know it more and more, time after time. At the end you will fall in love with entire world with heavenly love."

Basis of Christian moral is contained in only one sentence Christ said: "Everything you want others to do to you is what you should be doing to them for that is law and prophecy" (Mt. 7,12). So is essence of Christian education not to ask from them to be what you did not achieved but you should be the same way you want your children or sportsman's to be.

Saint Jovan Zlatousti says: "It is not good father who only ploughs filed to feed his children; it is good father (and coach too, I say) he who ploughs in children's (or sportsmen's) souls as well." It is impossible to plough like that without love and family life in warm home.

"With his spirit man belongs to world that can be comprehended by mind in transcendental world and because of that his imperialistic character is not determined only by external influence but by his spirit too. Kant says that freedom and need, each in its full meaning, can exist together without antagonism in same work. Every act we do is product of causes understood by mind and sensible causes." (Immanuel Kant).

Spirit and physical are linked and live together; they are one person: with Spirit body takes role in world of heavenly value and by act of body spirit materializes in world of reality. Simply put, human spirit is free, Spirit breathes where he wants …, and lowest sense of mind obeys laws of causation."

Between body and spirit there is a permanent link and mutual acting. All that happens in human soul during life is important and needed because all thoughts, feelings and conscious acts are connected with life of spirit. All acts of body and mind are imprinted in spirit.

Basic postulates of sport and faith are similar; in both men strives to feel better and to be better.

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THE INFORMATIONAL HABITS IN PEDAGOGUES OF PHYSICAL CULTURE

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1.0. Introduction

Satisfaction of fundamental biopsychosocial pupils' needs for physical education, developing true understanding, and continuous encouragement to implement physical activities in their daily life, and in culture of living in general, as a purpose of physical instruction[7], place great demands on a physical culture pedagogue.

Management quality of physical instruction teaching and achievement of an intended goal, besides the quality of syllabus and curriculum, mostly depend on quality decisions that a pedagogue makes. To be able to define real goals, choices, optimal resources and methods, as well as techniques of their realization, is what makes the difference between a successful, efficient physical education teacher, from the one who is not.

For efficient decisions during each step in the process of planning and realization of physical education curriculum, one needs in-depth knowledge and information, on the basis of which he or she makes decisions. Thus collecting data and processing, on the basis of which one makes decisions, is the most important aspect of physical education teaching.

The final result, i.e. successful management in the process of physical education teaching, shall depend on the quality of gathered data, quality of collecting information systems, and decisions made by pedagogues.

One of possible models for a collecting information system should contain information gathered:

- during work with pupils
- from professional information of physical culture pedagogues
- in communication with professionals in other fields
- from professional meetings in communication with colleagues in the same field of specialization.

Working efficiency of the model for information gathering system, generally is conditioned by the following factors[1]:

- **Level of information science knowledge** is a limitting factor for meeting information needs. Professional training for applying the system and informational personnel training, is not developed enough, and still is not on the curriculum in schooling and training system, in certain educational, i.e. professional institutions.
- **Language barrier**, i.e. insufficient knowledge of foreign language significantly limits information need satisfaction. Besides those languages which are the most abundant in terms of professional literature (Russian, German, English), the importance of other languages is growing, too, due to sport science development in numerous countries.
- **Computer literacy**. If it is properly used, if we use at least some of myriads of its possibilities, a computer can become a very important link and one of the most essential informational tools on all levels of pedagogues' professional practice.
- **Investing of financial resources** relates to readiness of individuals, institutions and states to invest in information, and realized investment in providing information sources and services, i.e. indoc activity. Professional recognition of the necessity of INDOC activity for efficient work performance, affects the inmvestment more crucially, though financial resources availability depends on, to a great extent, economic power of social community.
- **Existance and access to information sources** is major factor in satisfaction of information needs.
- **Existance and use of INDOC services** have an invaluable importance, because the growing quantity of info sources, as well as more and more difficult resourcefulness in often oposing information, significantly impede finding relevant sources which meet info needs criteria. That is the reason why spesial INDOC service should manage information flows towards users to make possible for tham an access to carefully selected and, according to need, concise information technology.

The first research on information needs in physical culture was carried out in 1971, by conducting a poll of coachers participating at „Coacher Tribune". On the basis of the poll result, a programme of information dissemination, as a form of professional informing and coacher advancing has been designed.[9,10]

In the research on information source use in physical culture[3], they concluded that there was a need for information flows advancement in INDOC service, for development of primary sources selection, for more

detailed learning about users' information needs, for a more adequate information dissemination...

The same author notices[2] physical culture professionals have minimum recognition of information needs and passive attitude to professional informing.

Kebin[6] states physical education teachers' poor knowledge and skills necessary for high quality professional management, and concludes that teachers preparing for their profession, obviously do not acquire adequate knowledge and do not form professional informational habits.

In a study of coachers' informational needs[5] , they pointed to an important functional link between professional success and information productivity, and they presented the need for further insisting on informational education and high quality training for professional informational production, which would possibly have a positive influence on a level of coachers' professional success.

2.0. The Subject and Aim of the Research

The subject of this research is to define informational habits of physical culture pedagogues and their place in the model of information factors. An analysis of gathered data makes possible a rational approach to defining an informational model of physical culture pedagogues, in order to provide an adequate information support necessary for efficient professional management. The aim of this paper is to study and describe informational habits of physical culture pedagogues.

3.0. Research Methodology

For this paper's needs, a pilot research has been conducted; it includes a total sum of 22 variables which define respondents' habits in the model area whose coordinates are selected informational factors. It should be pointed out that the study is based on a random sample, and pilot research should serve the purpose of a more extensive research based on a representative sample, so the collected data are valid just for this sample.

Data collecting is conducted by an anonymous questionnaire which has 25 items of open or closed type. This total sample consists of 69 physical culture pedagogues from the territory of Serbia: Vojvodina (N=20), Belgrade (N=29) and the countryside of Serbia (N=20). The research was conducted during September and October 2008.

In processing data, we used the following statistical procedure: descriptive statistical analysis (As, sd, Frequencies), measures of relevant differences (χ^2), nonparametric correlation.

4.0. Research Results

The research results are given in the following order: according to whole sample, according to a place of residence variable, respondents' gender, institutions they work in, and non-parameter statistic results. Interesting data have been collected, though the sample has not been a representative one.The results of primary importance for the researc subject of this paper, are reported in the paper.

According to a gender variable, there are 55.1% (N=38) male respondents and 44.9% (N=31) female respondents (table 1).

Table1: Structure of Sample according to Respondents' Gender

Male	Female	Total
38	31	69

In view of research sample's structure according to place of residence, where respondents come from, we find out that 29% (N=20) respondents come from Vojvodina, 42% (N=29) respondents come from Belgrade proper, and 29% (N=20) respondents come from the countryside of Serbia (table 2).

In view of research sample's structure in terms of institutions where respondents work, we find out that 49.3% (N=34) respondents work in elementary schools, 46.4% (N=32) respondents work in secondary schools, while 4.3% (N=3) respondents wprk both in elementary and secondary schools (table 2).

According to a respondents' specialist training variable, 2.9% (N=2) have advanced specialist training, 95.7% (N=66) university level specialist's training, and 1.4% (N= 1) M.A. degree (table 2).

Table 2: Sample's Structure according to Place of Residence, Specialist's Training, Institution

Place of Residence	N	**Institution**	N	**Specialist's Training**	N
Vojvodina	20	Elementary School	34	Advanced Specialist's Training	2
Belgrade	29	Secondary School	32	University Level	66
Countryside	20	Elementary and Secondary Schools	3	M.A./Spec/Ph.D.	1

Avarage respondents' age is 40.28 years, minimum 27 years and maximum 63 years. In view of physical culture pedagogues' length of service, an avarage is 13.61 years, minimum 1 year, maximum 35 years of service (table 3).

Table 3: Structure of Sample according to Age and Service

	Min	Max	AV
Age	27	63	40.28
Service	1	35	13.61

The results of the descriptive statistics are shown in Table 4. From a total number of respondents:

- 29 (39.5%) respondents do not use the Internet, 26 respondents (40.7%) sometimes and 14 respodents (19.7%) regularly use the Internet;
- 15 (21.9%) respondents do not use computers, while 54 (78.1%) use computers in their work;
- 45 respondents (64.7%) are not memebrs of any professional association;
- 47 (67.5%) do not read professional literature;
- 52 (74.8%) do not read domestic professional journals;
- only 5 (7.8%) respondents read foreign professional journals;
- 29 (42.6%) respondents do not participate in professional meetings, 37 (53.4%) participate sometimes, and only 3 (4.0%) respondents participare regularly;
- only 9 (14%) physical culture pedagogues presented their professional papers at domestic professional meetings.

Table 4. Descriptive statistic analysis for the whole sample tasted

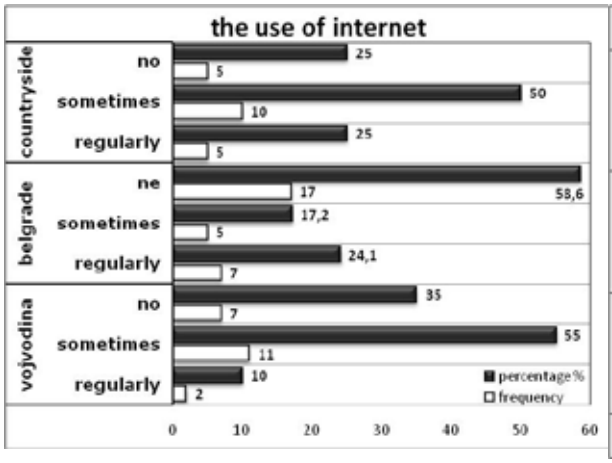
Descriptive statistic analysis for the whole sample tasted N=69 (selected variables)						
The use of Internet	regularly		sometimes		do not use	
	N=14	19,7%	N=26	40,7%	N=29	39,5%
The use of Computer	yes			no		
	N=54	78,1%		N=15	21,9	
Membership	yes			no		
	N=24	35,3%		N=45	64,7%	
Reading professional literature	read			do not read		
	N=22	32,5%		N=47	67,5%	
Reading domestic journals	yes			no		
	N=17	25,2%		N=52	74,8%	
Reading foreign journals	yes			no		
	N=5	7,8%		N=64	92,2%	
Participation at meeting	often		sometimes		do not paricipate	
	N=3	4,0%	N=37	53,4%	N=29	42,6%
Author of paper at domestic meeting	yes			no		
	N=9	14,0%		N=60	86,0%	

4.1. Research Result according to Respondents' Place of Residence

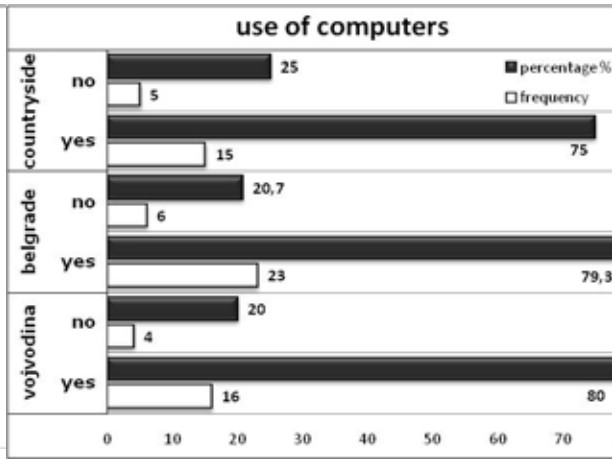
In terms of Place of Residence, we notice an interesting difference in frequency of its use. The largest number of respondents who do not use the Internet come from Belgrade, 58.6%, then from Vojvodina 35%, and then from the countryside of Serbia 25%. Those who sometimes use the Internet, come mostly from Vojvodina 55%, the countryside 50% and Belgrade 17,2%. The largest number of respondents who regularly use the Internet, is from the countryside of Serbia, 25%, Belgrade 24.1%, Vojvodina 10%. The frequency of using the Internet according to the place of residence, is shown in Graph 1.

A study of variables, Place of Residence and The Use of the Internet, points to the statistically important difference (p<.000). It indicates that subsamples of respondents use computer tecnology to a different degree, during their performance of various professional activities.

Computers are most used by respondents from Vojvodina (from a total of 20 respondents) 80%, then from Belgrade (from a total of 29 respondents) 79.3% , and from the countryside (from a total of 20 respondents) 75%. (Graph 2.)



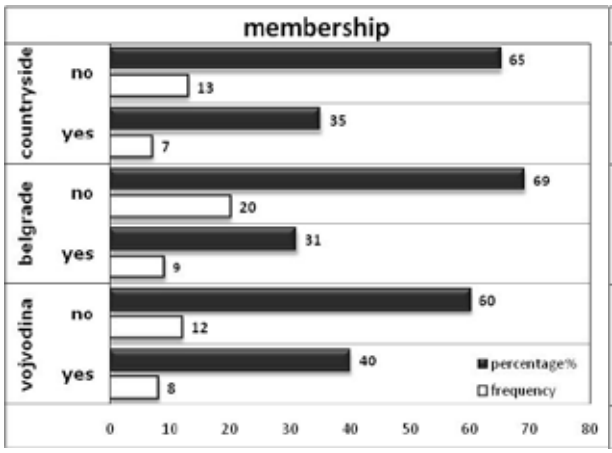
Graph 1. Use of the Internet in terms of Place of Residence



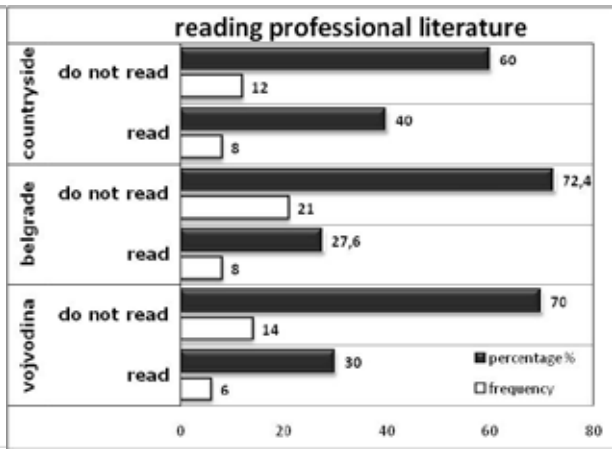
Graph 2. Use of computers in terms of place of residence

From a total number of respondents from Belgrade proper (from a total of 29 respondents) 20 (69%) are not members of any association, from the countryside of Serbia (from a total of 20 respondents) 13 (65%), and from Vojvodina (from a total of 20 respondents) 12 (60%) respondents. (Graph 3.)

The highest percentage of respondents who read professional literature come from the countryside of Serbia (from a total of 20 respondents) 40%, then respondents from Vojvodina (from a total of 20 respondents) 30% , and respondents from Belgrade (from a total of 29 respondents) 27.6%. (Graph 4.)



Graph 3. Membership in terms of Place of Residence

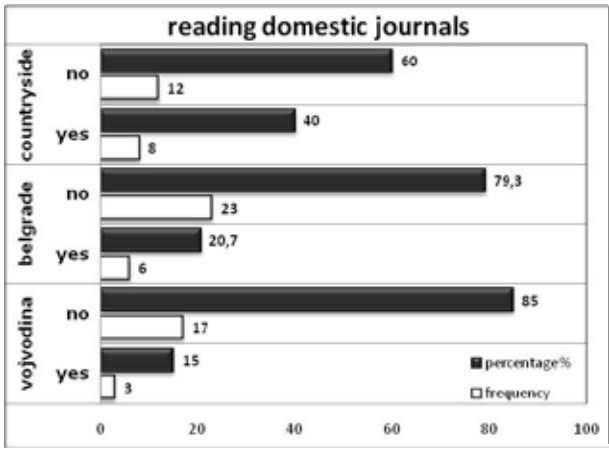


Graph 4. Reading Professional Literature in terms of Place of Residence

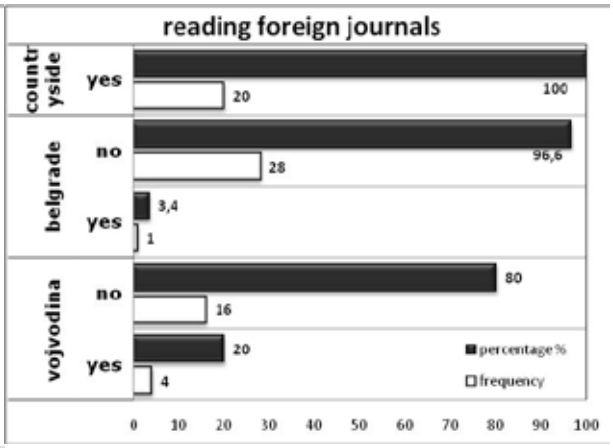
A study of variables Place of Residence and Reading domestic professional journals, points to the statistically significant difference (p=.000), which indicates that some subsamples of respondents, have also statistically significant different approach to providing technical information by reading domestic professional

journals. The largest number of those who read domestic professional journals, come from the provinces of Serbia (from a total of 20 respondents) 8 (40%), then from Belgrade (from a total of 29 respondents) 6 (20.7) and from Vojvodina (from a total of 20 respondents) 3 (15%) respondents. (Graph 5.)

A study of different variables, Place of Residence and Reading Foreign Professional Journals, points to a statistically significant difference (p=.000), which indicates that some subsamples of respondents have also statistically significant different approach to providing technological information by reading foreign professional journals. From this total number of respondents, even 4 come from the territory of Vojvodina (from a total of 20 respondents). (Graph 6.)



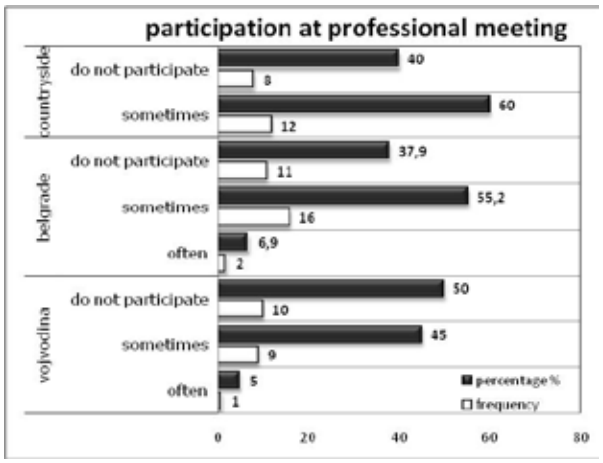
Graph 5. Reading domestic journals in terms of place of residence



Graph 6. Reading foreign journals in terms of place of residence

In terms of the place of residence, the largest number of respondents who attend professional meetings, come from Vojvodina (from a total of 20 respondents) 50%, then from the provinces of Serbia (from a total of 20 respondents) 40%, and from Belgrade (from a total of 29 respondents) 37.9%. The largest number of those who sometimes participate at professional meetings, is from the provinces (from a total of 20 respondents) 60%, then from Belgrade (from a total of 29 respondents) 55.2%, and Vojvodina(from a total of 20 respondents) 45%. From Belgrade (from a total of 29 respondents) 6.9% of respondents often participate at professional meetings, from Vojvodina (from a total of 20 respondents) 5%, and none from the provinces of Serbia (from a total of 20 respondents). (Graph 7.)

A study of variables, Place of Residence and Author of Professional Papers at Domestic Meetings, pointed to the statistically significant difference (p=.000), which indicates that subsamples of respondents have also significantly different approach to publication of professional information gathered during their work with pupils.Most published works come from the territory of Vojvodina (from a total of 20 respondents) 4 (20%), then from the countryside of Serbia (from a total of 20 respondents) 3 (15%), and from Belgrade (from a total of 29 respondents) 2 (6.9%). (Graph 8.)



Graph 7. Participation at professional meetings in term of Place of Residence

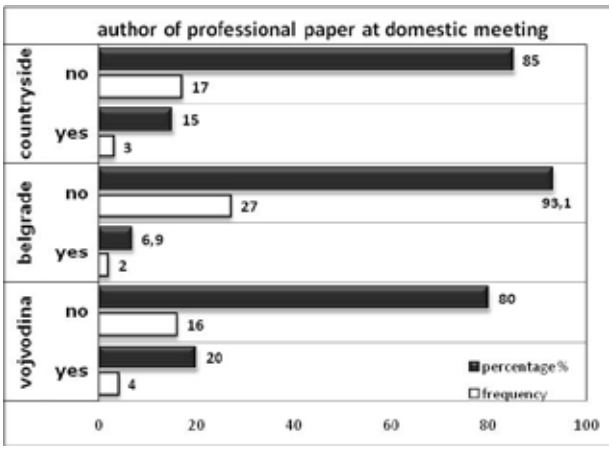
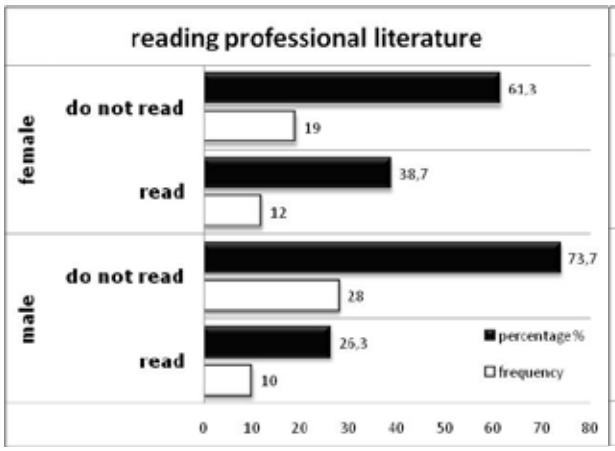


Chart 8. Author of professional papers at domestic meetings in terms of place of residence

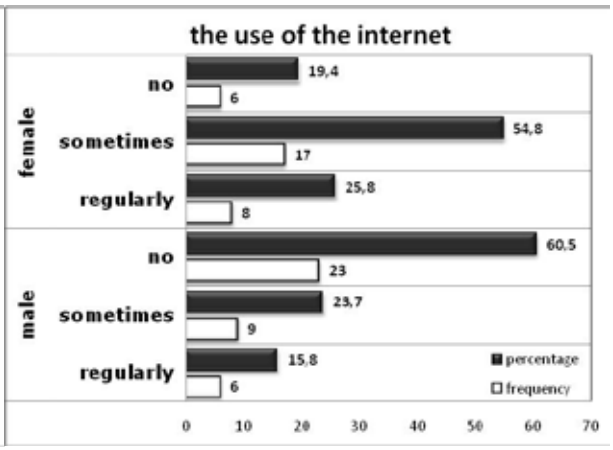
4.2. Research Results according to the Respondents' Gender Variable

A study of variables, Gender of Respondents and Professional Literature, points to the statistically significant difference (p=.003), which indicates that subsamples of respondents read primary static sources to a different degree. From a total number (31) of female respondents , 12 (38.7%) read professional literature, while from a total number (38) of male respondents, 10 (26.3%) read professional literature. (Graph 9.)

A study of different variables, Gender of Respondents and the Use of the Internet, points to the statisticaly significant difference (p=.036), which indicates that respondents' subsamples have also the statistically significant approach to the use of computers technologies and the Internet, as one of the most important tool in all levels of physical culture pedagogues' practice. From a total number (31) of female respondents, 6 (19.4%) do not use the Internet, 17 (54.8%) use it sometimes, 8 (25.8%) use it regularly. From a total number (38) of male respondents, 23 (60.5%) do not use the Internet, 9 (23.7%) use it sometimes, and 6 (15.8%) use it regularly. (Graph 10.)



Graph 9. Reading of professional literature in terms of respondents' gender

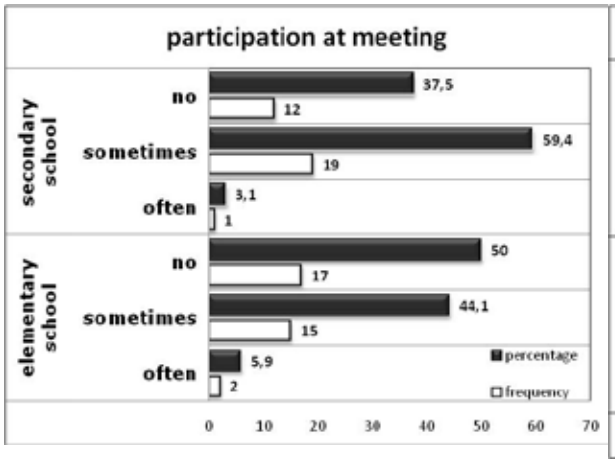


Graph 10. The use of the Internet in terms of respondents' gender

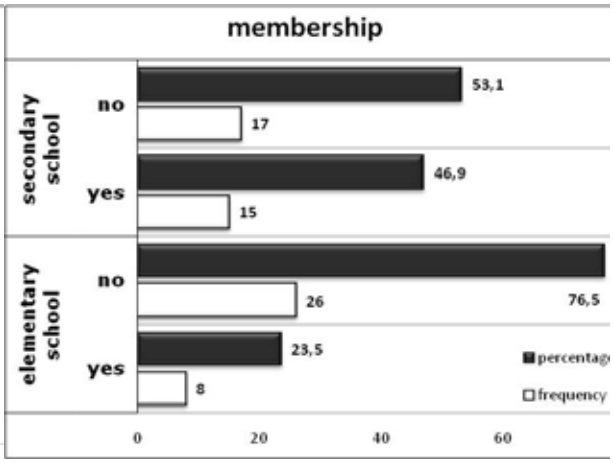
4.3. Research Results in terms of Institution Respondents Work in

From a total number of respondents (N=34) who work in elementary schools, 17 (50%) do not participate at professional meetings, 15 (44.1%) participate sometimes, and 2 (5.9%) participate often. From a total number of respondents (N=32) who work in secondary schools, 12 (37.5%) do not participate at professional meetings, 19 (59.4%) participate sometimes, and 1 (3.1%) participate often. (Graph 11.)

From a total number of respondents (N=34) who work in elementary schools, 26 (76.5%) respondents are not members of any professional association. From a total number of respondents (N=32) who work in secondary schools, 17 (53.1%) respondents are not members of any professional association. (Graph 12.)



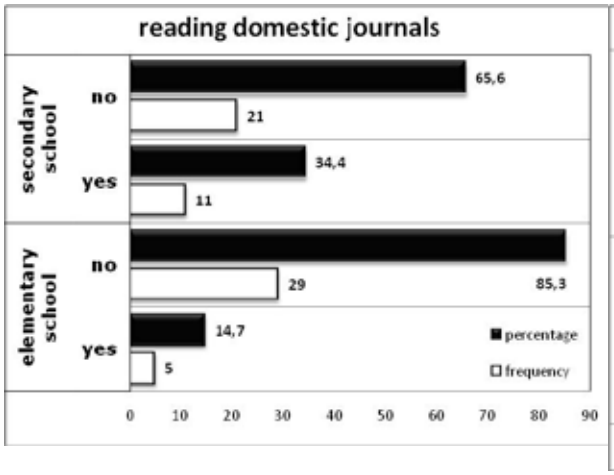
Graph 11. Participating at meetings in terms of institutions in which respondents work



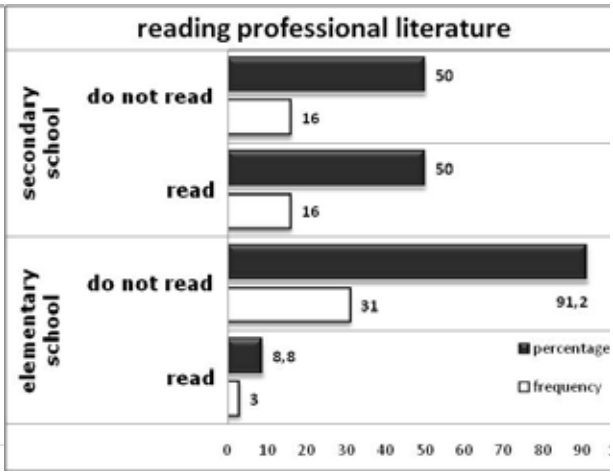
Graph 12. Members of associations in terms of institutions in which respondents work

From a total number of respondents (N=34) who work in elementary schools, 29 (85.3%) respondents do not read any domestic professional journal. From a total number of (N=32) who work in secondary schools, 21 (65.6%) respondents do not read any domestic professional journal. (Graph 13.)

From a total number of respondents (N=34) who work in elementary schools, 31 (91.2%) do not read professional literature. From a total number of respondents (N=32) who work in secondary schools, 16 (50%) respondents do not read professional literature. (Graph 14.)



Graph 13. Domestic journals reading in terms of institutions in which respondents work



Graph 14. Professional literature reading in terms of institutions in which respondents work

4.4. Research Results on the basis of Correlative Analysisis

A study of correlation between variables Domestic Journals Reading and Members of Associations, points to the statistically significant correlation (ρ=.289, p=.016). It indicates that some subsamples of respondents, defined on the basis of membership in professional associations, have also statistically significant different approach to domestic journals reading. (Table 5)

A study of correlations between variables the Way of Procuring Domestic Journals and Institutions where respondents are employed, points to the statistically significant correlation (ρ=.246, p=.041). It indicates that some respondents' subsamples, defined on the basis of Institution they are employed in, also have statistically relevant different approach to the ways of procuring domestic journals. (Table 5)

A study of correlations between variables Foreign Journals Reading and Place of Residence, points to the statistically relevant correlation (ρ=.294, p=.014). It indicates that some respondents' samples, defined on the basis of Place of Residence, have also statistically relevant different approach to foreign professional journals reading. (Table 5)

A study of correlations between variables Gender of Respondents and the Use of the Internet, points to statistically relevant correlation (ρ= .305, p=.011) . It indicates that some respondents' subsamples, defined on the basis of Gender, have also statistically relevant different approach to the use of the Internet. (Table 5)

A study of correlations between variables Age of the Respondents and the Use of Computers, points to the statistically relevant correlation (ρ=.354, p=.003). It indicates that some subsamples of respondents, defined on the basis of their age, also have statistically relevant different approach to the use of computers. (Table 5)

A study of variables Participating at Professional Meetings and Reading Professional Literature, points to the statistically relevant correlation (ρ=.344, p=.003), which indicates that some respondents' subsamples, defined on the basis of participating at professional meetings, also have statistically different approach to reading professional literature. (Table 5)

Table 5. Correlative analysis on the level of the whole sample (selected variables)

		MESTO	STAROST	POL	INSTITU	CLUDRU	CASINO	CASDOM	KORKOM	STRKNJIG	INTERNET	USTSKUP
MESTO	Correlation Coefficient	1	0,181	0,153	0,09	0,04	,294*	-0,221	0,046	-0,082	-0,118	-0,05
	Sig. (2-tailed)	.	0,138	0,209	0,46	0,744	0,014	0,068	0,707	0,505	0,333	0,683
STAROST	Correlation Coefficient	0,181	1	-0,101	0,141	-0,101	,238*	-0,143	,354**	-0,09	,305*	-0,012
	Sig. (2-tailed)	0,138	.	0,41	0,248	0,407	0,049	0,243	0,003	0,461	0,011	0,925
POL	Correlation Coefficient	0,153	-0,101	1	0,114	-0,136	-0,085	-0,024	0,018	-0,132	-,358**	0,01
	Sig. (2-tailed)	0,209	0,41	.	0,35	0,266	0,489	0,842	0,881	0,279	0,003	0,935
INSTITU	Correlation Coefficient	0,09	0,141	0,114	1	-0,217	0,173	-0,222	0,069	-,520**	-0,088	-0,155
	Sig. (2-tailed)	0,46	0,248	0,35	.	0,073	0,155	0,067	0,574	0	0,471	0,204
CLUDRUZ	Correlation Coefficient	0,04	-0,101	-0,136	-0,217	1	0,031	,289*	-0,132	,414**	-0,058	,245*
	Sig. (2-tailed)	0,744	0,407	0,266	0,073	.	0,803	0,016	0,281	0	0,639	0,042
CASINO	Correlation Coefficient	,294*	,238*	-0,085	0,173	0,031	1	,359**	0,147	-0,191	0,234	-0,214
	Sig. (2-tailed)	0,014	0,049	0,489	0,155	0,803	.	0,002	0,227	0,115	0,053	0,077
CASDOM	Correlation Coefficient	-0,221	-0,143	-0,024	-0,222	,289*	,359**	1	-0,106	0,186	-0,009	0,185
	Sig. (2-tailed)	0,068	0,243	0,842	0,067	0,016	0,002	.	0,384	0,126	0,941	0,129
KORKOMP	Correlation Coefficient	0,046	,354**	0,018	0,069	-0,132	0,147	-0,106	1	-0,092	0,218	0,072
	Sig. (2-tailed)	0,707	0,003	0,881	0,574	0,281	0,227	0,384	.	0,453	0,072	0,555
STRKNJIG	Correlation Coefficient	-0,082	-0,09	-0,132	-,520**	,414**	-0,191	0,186	-0,092	1	0,063	,345**
	Sig. (2-tailed)	0,505	0,461	0,279	0	0	0,115	0,126	0,453	.	0,607	0,004
INTERNET	Correlation Coefficient	-0,118	,305*	-,358**	-0,088	-0,058	0,234	-0,009	0,218	0,063	1	0,071
	Sig. (2-tailed)	0,333	0,011	0,003	0,471	0,639	0,053	0,941	0,072	0,607	.	0,564
USTSKUP	Correlation Coefficient	-0,05	-0,012	0,01	-0,155	,245*	-0,214	0,185	0,072	,345**	0,071	1
	Sig. (2-tailed)	0,683	0,925	0,935	0,204	0,042	0,077	0,129	0,555	0,004	0,564	.

5.0. Summary

On the basis of a set model system for gathering information and factors by which it is conditioned on the one hand, and data about physical culture pedagogues' informational habits, collected by this research on the other hand, we may conclude that the basic link of professional informing of studied physical culture pedagogues' sample, is missing in relation to:

- the use of the Internet and computers as most relevant informational tools – 39.5% of the respondents do not use the Internet, and only 19.7% of the respondents regularly use the Internet;
- professional informing evaluated on the basis of participating at professional meetings – 42.6% of the respondents do not participate at professional meetings, and only 4% of them regularly participate;
- professional informing evaluated on the basis of primary dynamic information sources – 74.8% of the respondents do not read domestic journals, and only 7.8% of the respondents read foreign journals;
- professional interaction evaluated on the basis of membership in professional associations – 64.7% of the respondents are not members of any association;
- knowledge reviews needed for performing concrete professional tasks, evaluated on the basis of primary static information sources' access – 67.5% of the respondents do not read professional literature;
- publication of professional information collected by pedagogues during their work with children – 14% of the respondents presented their professional works at domestic professional meetings.

In addition to these facts, relevant differences in physical culture pedagogues' informational habits in terms of respondents' place of residence, have been noticed – the least number of respondents from Belgrade use the Internet, the largest number of respondents from the countryside read domestic journals; in terms of respondents' gender – female respondents read professional literature and use the Internet proportionally more than male respondents; in terms of institutions where respondents work – respondents working in secondary schools participate at professional meetings more than those employsd in elementary schools, also read more professional domestic journals, but less of them are members in professional associations.

These results point to the need for a more careful approach to syllabuses and curriculums' structuring, both basic education of physical culture pedagogues, and an active professional advancement. Obviously, the most important role should be insisting on active and productive attitude to both fundamental professional activity which reflects in planning, programming and realization of physical education teaching, and to systematic gathering, processing, and analysing information, and their publication in the form of professional papers. Besides, it is necessary to adjust those syllabuses and curriculums in terms of the development of

personal needs of a pedagogue, for high quality and efficient professional information acquisition: Professional institutions - INDOC services should profile, according to the results obtained from this and similar studies, their activities in terms of information sources selection, as well as sellection of the most efficient methods of dissemination.

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GENDER RELATED DIFFERENCES IN PHYSICAL DEVELOPMENT AND MOTOR PERFORMANCE INDICES OF YOUNGER SCHOOLCHILDREN

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1. INTRODUCTION

The recent researches of school population in our country and worldwide indicate a disproportion in physical development and development of anthropomotoric performances of children and youth. This phenomenon is especially characteristic for urban environment. The principal reason is the decrease of possibilities and needs of children to move and get involved more intensely in physical activities. Reduction of energy consumption, on one side, and better life conditions (housing, nutrition conditions, communication, hygienic – sanitary conditions etc.) on the other side, resulted in growth intensification but also in violation of morphological structure and proportions, which cannot follow the development of anthropomotoric performances. One of the most efficient solutions in prevention of these negative phenomena is to intensify physical education instruction in schools. The results of the researches so far, confirmed in practice, indicate that physical education of appropriate contents and intensity can have simulating effect on development of organic, functional and anthropomotoric performances. However, ever more frequent assertions appear claiming that conditions, contents, volume and intensity of work in school physical education, especially with the youngest grades are not at the level of needs of a developing body.

In order to make a new one, or modify the existing syllabuses of educational or training activity, it is necessary to previously determine the level and dynamicity of changes and establish accordingly measurement and follow-up system of development tendencies. With all that in mind, we must also consider gender related characteristics and motor performances of boys and girls over a period of early school age, namely between the ages of 7 and 11. Levels, dynamics of development, sensitive periods and procedures and methods of work are different for boys and girls respectively.

Growth is a very complex process, defined by uninterrupted changes of body mass, forms and proportions as well as of physiological functions in the course of ontogenesis. In medical terms the distinction is made between the terms of ***growth*** and ***development***.

Physical, somatic growth is the consequence of cells hypertrophy and enlargement of intercellular substance. Quality changes in the course of biological maturation – change of cellular function, tissues and organs, reorganization of regulatory mechanisms are denoted as **development**.

Growth is not uniform throughout entire childhood period. There are irregular fluctuations with successions of period of accelerated and slowed growth. The first period of accelerated growth is from conception until the end of the first year of life, and the second one is before puberty and after puberty (from the age of 10 to 18 in females and from the age of 12 to 20 in males). The period of growth can be divided according to chronological age (in pedagogic, school or sports practice), or according to biological age. Due to gender related differences, the separate periodizations are usually made for boys and girls. The limits of the periods are characterized by change of rate and intensity of growth and development of organism.

From their birth boys get in length insignificantly more than girls. From the age of 1 to 9 growth of boys and girls is approximately the same. Boys experience a puberty growth acceleration and the greatest increase of height around 2 years later than girls. The boys grow slightly faster than girls, so before puberty they are taller for approximately 1,5 cm. Until the age of 11 girls lag a little behind the boys in growth, at the age of 12 they reach the boys and at the age of 13 the growth lines of boys and girls cross (*first intersection*) because girls become taller (due to earlier puberty growth acceleration). After the age of 13 boys grow faster and at the age of 15, boys growth line crosses girls growth line (*second intersection).* The greatest increase of body height in girls is at the age of 12 (9 cm), and in boys at 14 (10,3 cm). The growth in boys stops at the age of 18, and in girls at 17 . Upon cessation of intensive puberty growth boys are taller for around 10 cm on average. The increase of body height of 1,1 cm continues until the age of 21 because of the spinal column. Between the ages of 35 – 40 body height reduces so that a person of 45 to 55 is for 1,5 cm shorter and a person over 55 is for 3 cm shorter than his/her height at the age of 21.

Between pre-puberty and puberty period, there are significant differences in annual increase of body height. In boys those differences rank from 1,9 to 7,1 cm, and in girls from 0,7 to 5,6 cm over a year period. At puberty there is a significant acceleration of growth and increase of body mass, as well as change of form, proportion and morphological body composition. From the beginning of accelerated growth of height, during puberty, until the cessation of growth body height of boys increases on average for 28 cm, and of girls for 25 cm (Bojovic, 1981).

2. SUBJECT, AIM AND METHODS OF THE RESEARCH

The topic of this study was to explore the gender related differences in physical development and motor performance indices of younger schoolchildren, over the last 2 decades. The aim of the study was to determine gender related differences in physical development and motor performance indices of three generations of the 4th grade schoolchildren. Measurements were taken in 1984, 1995 and 2006.

2.1. Sample of subjects

The sample of subjects consisted of the 4th grade schoolchildren of the following elementary schools in Belgrade: „Sveti Sava"; „Milica Pavlovic" and „Filip Kljajic -Fica", included in measurement in 1984 and in 1995 and the schoolchildren of elementary school „Djordje Krstic" tested in 2006.

Due to dropping out of subjects during measurement, as well as in order to comply with the conditions that all the subjects must have all data, for final statistic elaboration, the following subsamples were formed: 146 boys and 155 girls enrolled in the 4th grade in academic 1983/84 **;** 138 boys and 172 girls enrolled in the 4th grade in 1994/95; and 47 boys and 42 girls enrolled in the 4th grade in school 2005/06. The samples were of the same chronological age (plus – minus 6 months).

2.2. Sample of variables

For assessment of level of ***physical development*** in this research, **height** (AVIS) **and body mass** (AMAS) were measured. For assessment of certain segments of ***anthropomotoric*** space the following 10 tests were used:

1. For **dynamic balance –** Standing on a reversed balance bench (MSKOK),
2. For **precision of object throwing at target –** Aiming at horizontal target with a ball (MGLC),
3. For **coordination of movements** – Coordination with a stick (MKOP),
4. For **segmetnary speed** - Hand tapping (MTAP),
5. For **explosive power of leg extensors–** Standing long jump (MSDM),
6. For **static power of arm and shoulder girdle muscles –** Hang with elbows bent (MVIS),
7. For **agility** - Running 4 x 10 м (M4x10),
8. For **repetitive muscle power of flexors in hip joint** – Body lifting on a bench (MPTK),
9. For **flexibility in hip joint and loins of spinal column** – Deep bending forward on a small bench (MDPK)
10. For **speed power - "starting acceleration " –** 20-meter running with high start (M20V).

2.3. Conditions and measurement technique

Anthropometric and athropomotoric variables were mostly measured in regular P.E. classes. Anthropometric measurements were carried out following the recommendations of the International biological program (J. Weiner, J. Lourije, 1969). The anthropometric tests were carried out according to the description and instructions in the monograph of Kurelic et al. – *Structure and development of morphological and motor dimensions of the youth*, Belgrade, 1975.

2.4. Statistic data elaboration

For statistic data elaboration, standard procedures of transformation and condensation of information from the space of descriptive and comparative statistics were applied. From descriptive statistic parameters for each variable, an arithmetic mean (M), standard deviation (SD), variation coefficient (V%), variation width (VS), minimal and maximal result (Min-max) and frequency distribution (DF) were calculated. Asymmetry of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - kurtosis (KS) and level of inclination – skewness (SK). Statistical significance of arithmetic means of relative variables between boys and girls of the 4th grade was assessed based on the Student's T-test for great independent samples.

The full statistical data elaboration was carried out at the Faculty of Sport and Physical education, University of Belgrade. Apple PC, type "Macintoch LC" was used for elaboration together with the use of application statistic program "Stat-View 512 tm".

3. ANALYSIS OF THE RESULTS OF THE RESEARCH WITH DISCUSSION

The results of the research are displayed in tables **1 - 9.** Based on the presented results of the research it can be concluded that gender characteristics in indices of physical development and motor performances differ with regard to three generations of schoolchildren of the 4th grade of elementary schools in Belgrade, with the time distance of 22 years. Namely, the **girls of** generation **1984** were statistically significantly taller (1,5 cm) when compared to age-matched boys, while the difference in body mass (1,1 kg in favour of the girls) was not statistically significant. Moreover they achieved significantly better results in the test for assessment of segmentary speed (MTAP) and flexibility (MDPK), while the **boys** scored better results in variables for assessment of precision of throwing of objects at target (MGLC), explosive power (MSDM), static (MVIS) and speed power (M20B) and agility (M4x10).

There were no significant differences in body height (AVIS) and mass (AMAS) of schoolchildren of generation **1995. Girls** were statistically significantly better only in flexibility tests (MDPK), while **boys**, as in the previous generation, scored better results in variables for assessment of precision (MGLC) explosive (MSDM), static (MVIS) and speed power (M20B) and agility (M4x10).

Girls of generation **2006** also obtained significantly better results in flexibility tests (MDPK), while boys were statistically significantly better in variables for assessment of agility (M4x10), explosive (MSDM), repetitive (MTPK) and speed power (M4x10). No statistically significant difference was obtained in body height and mass.

Table 1. Arithmetic mean (M), standard deviation (SD), variation coefficient (CV%), minimal and maximal result (Min - Max), variation width (VS), standard error arithmetic mean (SX), asymmetry of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - *kurtosis* (KS) and level of inclination - *sewness* (SK) of sample of schoolchildren 4th grade - BOYS of generation 1984. (N = 146)

No.	VARIABLES	M	SD	KV %	Min - Max	VS	SX	KS	SK
1.	AVIS,cm	145,5	6,8	4,7	129 – 162,6	33,6	0,6	- 0,3	- 0,4
2.	AMAS, kg	37,2	6,9	18,7	23 – 62,5	39,5	0,6	1,1	0,9
3.	MSOK, sec	4,8	2,3	47,9	2 – 18,1	16,1	0,2	7,4	2,1
4.	MGLC, point	15,7	6,6	42,3	0 - 32	32	0,5	- 0,6	0,00
5.	MKOP, sec	11,6	2,5	21,2	7 - 20	13	0,2	0,6	0,9
6.	MTAP, no.of rep	34,1	3,9	11,3	22 - 44	22	0,3	0,2	- 0,1
7.	MSDM, cm	158,2	18,6	11,8	110 – 204	94	1,5	- 0,00	- 0,2
8.	MVIS, sec	37,7	25	66,3	2 - 118	116	2,1	0,4	0,8
9.	M4x10, sec	13,0	0,9	7,0	10,4 – 15,6	5,2	0,1	0,2	0,2
10.	MPTK, no.of rep	4,6	5,2	113,1	0 - 30	30	0,4	5.8	2,1
11.	MDPK, cm	20,5	6,3	30,5	3 - 35	32	0,5	- 0,3	- 0,1
12.	M20V, sec	4,2	0,3	7,3	3,5 – 5,5	2	0,00	2,3	1,1

Table 2. Arithmetic mean (M), standard deviation (SD), variation coefficient (CV%), minimal and maximal result (Min - Max), variation width (VS), standard error arithmetic mean (SX), asymmetry of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - *kurtosis* (KS) and level of inclination - *sewness* (SK) of sample of schoolchildren 4th grade - GIRLS of generation 1984. (N = 155)

No.	VARIABLES	M	SD	KV %	Min - Max	VS	SX	KS	SK
1.	AVIS,cm	147,1	7,0	4,7	128,3 - 165	36,7	0,6	- 0,4	- 0,00
2.	AMAS, kg	38,3	7,4	19,4	24,5 – 75	50,5	0,6	2,8	1,1
3.	MSOK, sec	4,3	2,3	52	1 – 13,6	12,6	0,2	4,0	1,8

4.	MGLC, point	10,7	5,5	50,8	1 - 28	27	0,4	- 0,3	0,4
5.	MKOP, sec	11,8	2,6	22,2	6,7 – 21,1	14,4	0,2	0,2	0,7
6.	MTAP, no.of rep	35	3,3	9,4	27 - 44	17	0,3	0,00	0,2
7.	MSDM, cm	148,5	20	13,4	98 - 190	92	1,6	- 0,6	- 0,00
8.	MVIS, sec	21,7	16,5	76	1 - 104	103	1,3	3,5	1,5
9.	M4x10, sec	13,5	1,0	7,1	11,5 – 17,0	5,5	0,1	0,3	0,6
10.	MPTK, no.of rep	4,9	4,9	100,3	0 - 22	22	0,4	0,9	1,2
11.	MDPK, cm	27,6	5,9	21,3	12 - 41	29	0,5	- 0,4	- 0,00
12.	M20V, sec	4,3	0,3	8,0	3,5 – 5,5	2	0,00	0,6	0,5

Table 3. Arithmetic mean (M), standard deviation (SD), variation coefficient (CV%), minimal and maximal result (Min - Max), variation width (VS), standard error arithmetic mean (SX), asymmetry of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - *kurtosis* (KS) and level of inclination - *sewness* (SK) of sample of schoolchildren 4th grade - BOYS of generation 1995. (N = 138)

No.	**VARIJABLE**	**M**	**SD**	**KV %**	**Min - Max**	**VЉ**	**SX**	**KS**	**SK**
1.	AVIS,cm	145,9	6,6	4,5	130 - 164	34	0,6	0,2	0,2
2.	AMAS, kg	37,3	8,2	22,1	23 - 63	40	0,7	1,1	1,1
3.	MSOK, sec	7,0	4,7	67,0	1,4 - 28,2	26,8	0,4	4,6	1,9
4.	MGLC, point	15,2	6,7	43,6	0 - 32	32	0,6	- 0,6	0,1
5.	MKOP, sec	12,2	2,5	20,3	8 - 21,9	13,9	0,2	0,8	0,8
6.	MTAP, no.of rep	32,6	3,3	10,3	24 - 42	18	0,3	0,2	0,2
7.	MSDM, cm	164,6	17,8	10,8	110 - 210	100	1,5	0,6	- 0,3
8.	MVIS, sec	34,6	24,2	69,9	0 - 107	107	2,1	0,2	0,9
9.	M4x10, sec	12,7	1,1	8,4	10,9 - 16,5	5,6	0,1	1,2	0,9
10.	MPTK, no.of rep	2,4	3,2	131,8	0 - 13	13	0,3	1,3	1,4
11.	MDPK, cm	16,9	5,2	30,6	5 - 29	24	0,4	- 0,5	0,1
12.	M20V, sec	4,2	0,3	7,1	3,5 - 4,9	1,4	0,00	- 0,5	0,1

Tabela 4. Arithmetic mean (M), standard deviation (SD), variation coefficient (CV%), minimal and maximal result (Min - Max), variation width (VS), standard error arithmetic mean (SX), asymmetry of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - *kurtosis* (KS) and level of inclination - *sewness* (SK) of sample of schoolchildren 4th grade - GIRLS of generation 1995. (N = 172

No.	**VARIJABLE**	**M**	**STD**	**KV %**	**Min - Max**	**VЉ**	**SX**	**KS**	**SK**
1.	AVIS,cm	147,2	6,8	4,6	132 - 164	32	0,5	- 0,3	0,1
2.	AMAS, kg	37,3	6,9	18,4	32 - 58,5	55,3	0,5	3,5	- 0,1
3.	MSOK, sec	6,4	3,5	55,0	1,3 - 20,4	19,1	0,3	2,7	1,4
4.	MGLC, point	11,2	5,8	52,1	0 - 29	29	0,4	- 0,4	0,3
5.	MKOP, sec	11,9	2,3	19,4	7,4 - 20,2	12,8	0,2	0,7	0,7
6.	MTAP, no.of rep	32,5	3,6	11,0	22 - 43	21	0,3	0,5	- 0,1
7.	MSDM, cm	160,6	16,7	10,4	113 - 208	95	1,3	0,3	0,00
8.	MVIS, sec	23	17,2	74,7	0 - 82	82	1,3	1,4	1,3
9.	M4x10, sec	13,1	1,2	8,9	11 - 19	8	0,1	3,4	1,2
10.	MPTK, no.of rep	2,3	3,8	165,3	0 - 26	26	0,3	10,4	2,8

11.	MDPK, cm	22,1	6,3	28,4	7 - 35	28	0,5	- 0,7	- 0,1
12.	M20V, sec	4,3	0,3	8,1	3,4 - 5,2	1,8	0,00	0,00	0,4

Tabela 5. Arithmetic mean (M), standard deviation (SD), variation coefficient (CV%), minimal and maximal result (Min - Max), variation width (VS), standard error arithmetic mean (SX), asymmetry of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - *kurtosis* (KS) and level of inclination - *sewness* (SK) of sample of schoolchildren 4th grade - BOYS of generation 2006. (N = 47)

No.	VARIJABLE	M	SD	KV %	Min - Max	VЉ	SX	KS	SK
1.	AVIS,cm	148,6	7,6	5,1	132 - 165	33	1,1	- 0,7	0,00
2.	AMAS, kg	40,8	10,2	24,9	25 - 68	43	1,5	0,5	1,0
3.	MSOK, sec	5,3	2,5	47,5	2,2 - 17	14,8	0,4	8,5	2,4
4.	MGLC, point	10,1	7,3	71,9	0 - 31	31	1,1	1,2	1,2
5.	MKOP, sec	11,7	2,0	16,9	8,8 - 17,5	8,7	0,3	0,5	0,9
6.	MTAP, no.of rep	33,1	4,8	14,4	24 - 44	20	0,7	- 0,6	0,1
7.	MSDM, cm	141,5	20,2	14,2	106 - 188	82	2,9	- 0,4	0,3
8.	MVIS, sec	18	13,1	73,1	0 - 56	56	1,9	0,7	0,9
9.	M4x10, sec	13,5	1,2	8,9	11,2 - 16	4,8	0,2	- 0,9	0,00
10.	MPTK, no.of rep	4,2	4,1	98,3	0 - 24	24	0,6	9,9	2,6
11.	MDPK, cm	19,7	5,8	29,7	9 - 31	22	0,9	- 1,0	0,2
12.	M20V, sec	4,3	0,4	9,6	3,1 - 5,3	2,2	0,1	0,9	- 0,2

Tabela 6. Aritmetik mean (M), standard deviation (SD), variation coefficient (CV%), minimal and maximal result (Min - Max), variation width (VS), standard eror aritmetik mean (SX), asymmetri of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - *kurtosis* (KS) and level of inclination - *sewness* (SK) of sample of schoolchildren 4th grade - GIRLS of generation 2006. (N = 42)

No.	VARIJABLE	M	SD	KV %	Min - Max	VS	SX	KS	SK
1.	AVIS,cm	148,8	7,7	5,2	131 - 168	37	1,2	- 0,1	0,2
2.	AMAS, kg	39,9	8,9	22,2	26 - 69	43	1,4	1,2	1,0
3.	MSOK, sec	5,1	2,1	41,2	1,9 - 12,8	10,9	0,3	2,4	1,2
4.	MGLC, point	8,5	5,2	61,1	0 - 21	21	0,8	- 0,4	0,4
5.	MKOP, sec	11,4	1,9	17,0	7,7 - 16,5	8,8	0,3	0,2	0,5
6.	MTAP, no.of rep	32,6	4,4	13,6	24 - 41	17	0,7	- 0,8	0,2
7.	MSDM, cm	133,2	16,9	12,7	103 - 178	75	2,6	- 0,3	0,4
8.	MVIS, sec	13,2	11,4	86,4	0 - 45	45	1,8	1,2	1,4
9.	M4x10, sec	14,5	0,9	6,2	12,9 - 17	4,1	0,1	0,3	0,5
10.	MPTK, no.of rep	2	2,4	119,6	0 - 10	10	0,4	1,0	1,6
11.	MDPK, cm	24,4	5,9	24,3	7 - 38	31	0,9	1,1	- 0,6
12.	M20V, sec	4,6	0,3	7,5	3,6 - 5,4	1,8	0,1	0,8	0,00

Table 7. Significance of differences of arithmetic means (t-test for great independent samples) of anthropometric and motor variables of sample of schoolchildren of 4th grade of generation 1984. (N=301)

No.	VARIABLE	BOYS	1984	GIRLS	1984			
		M	SD 1	M	SD 2	Difference	t	p
1.	AVIS,cm	145,5	6,8	147,1	7,0	1,6 **F**	- 2,1	0,0385
2.	AMAS, kg	37,2	6,9	38,3	7,4	1,1 **F**	- 1,4	0,0895

3.	MSOK, sec	4,8	2,3	4,3	2,3	0,5 M	1,8	0,0769
4.	MGLC, point	15,7	6,6	10,7	5,5	5,0 **M**	7,1	0,0001
5.	MKOP, sec	11,6	2,5	11,8	2,6	0,2 M	- 0,6	0,5166
6.	MTAP, no.of rep	34,1	3,9	35,0	3,3	0,9 **F**	- 2,2	0,0322
7.	MSDM, cm	158,2	18,6	148,5	20,0	9,7 **M**	4,4	0,0001
8.	MVIS, sec	37,7	25,0	21,7	16,5	16,0 **M**	6,6	0,0001
9.	M4x10, sec	13,0	0,9	13,5	1,0	0,5 **M**	- 4,6	0,0001
10.	MPTK, no.of rep	4,6	5,2	4,9	4,9	0,3 **F**	- 0,5	0,5966
11.	MDPK, cm	20,5	6,3	27,6	5,9	7,1 **F**	- 10,2	0,0001
12.	M20V, sec	4,2	0,3	4,3	0,3	0,1 **M**	- 3,0	0,0025

Table 8. Significance of differences of arithmetic means (t-test for great independent samples) of anthropometric and motor variables of sample of schoolchildren of 4th grade of generation 1995 (N=310)

No.	**VARIABLE**	**BOYS**	**1995.g**	**GIRLS**	**1995.g**			
		M	**SD 1**	**M**	**SD 2**	**Difference**	**t**	**p**
1.	AVIS,cm	145,9	6,6	147,2	6,8	1,3 **F**	- 1,7	0,091
2.	AMAS, kg	37,3	8,2	37,3	6,9	0,0	- 0,1	0,922
3.	MSOK, sec	7,0	4,7	6,4	3,5	0,6 M	1,3	0,208
4.	MGLC, point	15,2	6,7	11,2	5,8	4,0 **M**	5,7	0,0001
5.	MKOP, sec	12,2	2,5	11,9	2,3	0,3 **F**	1,1	0,253
6.	MTAP, no.of rep	32,6	3,3	32,5	3,6	0,1 M	0,2	0,866
7.	MSDM, cm	164,6	17,8	160,6	16,7	4,0 **M**	2,0	0,043
8.	MVIS, sec	34,6	24,2	23,0	17,2	11,6 **M**	4,9	0,0001
9.	M4x10, sec	12,7	1,1	13,1	1,2	0,4 **M**	- 3,1	0,002
10.	MPTK, no.of rep	2,4	3,2	2,3	3,8	0,1 M	0,2	0,834
11.	MDPK, cm	16,9	5,2	22,1	6,3	5,2 **F**	- 7,8	0,0001
12.	M20V, sec	4,2	0,3	4,3	0,3	0,1 **M**	- 3,6	0,0004

Table 9. Significance of differences of arithmetic means (t-test for great independent samples) of anthropometric and motor variables of sample of schoolchildren of 4th grade of generation 2006 (N=89)

No.	**VARIABLE**	**BOYS**	**2006**	**GIRLS**	**2006**			
		M	**SD 1**	**M**	**SD 2**	**Difference**	**t**	**p**
1.	AVIS,cm	148,6	7,6	148,8	7,7	0,2 **F**	- 0,1	0,906
2.	AMAS, kg	40,8	10,2	39,9	8,9	0,9 M	0,5	0,650
3.	MSOK, sec	5,3	2,5	5,1	2,1	0,2 M	0,3	0,783
4.	MGLC, point	10,1	7,3	8,5	5,2	1,6 M	1,3	0,214
5.	MKOP, sec	11,7	2,0	11,4	1,9	0,3 Ž	0,7	0,504
6.	MTAP, no.of rep	33,1	4,8	32,6	4,4	0,5 M	0,5	0,605
7.	MSDM, cm	141,5	20,2	133,2	16,9	8,3 **M**	2,1	0,038
8.	MVIS, sec	18	13,1	13,2	11,4	4,8 **M**	1,8	0,074
9.	M4x10, sec	13,5	1,2	14,5	0,9	1,0 **M**	- 4,0	0,0001
10.	MPTK, no.of rep	4,2	4,1	2	2,4	2,2 **M**	3,1	0,002
11.	MDPK, cm	19,7	5,8	24,4	5,9	4,7 **Ž**	- 3,8	0,0003
12.	M20V, sec	4,3	0,4	4,6	0,3	0,3 **M**	- 4,2	0,0001

Note: Statistically significant differences are shaded.
Sign **M – F** indicates who scored greater –better result value.

6. CONCLUSIONS

The following conclusions can be made based on the presented results of the research:

- - gender related characteristics in indices of physical development and motor performances vary with regard to three generations of schoolchildren of the 4th grade of elementary schools in Belgrade, with the time distance of 22 years.
- - **Girls** of generation **1984** are statistically significantly taller (1,5 cm) when compared to age-matched boys, while the difference in body mass (1,1 kg in favour of the girls) was not statistically different. With the indices of motor development they were significantly better in the test for assessment of segmentary speed and flexibility while the **boys** were better in variables for assessment of precision of throwing an object at target, explosive, static, speed power and agility.
- - In generation **1995** there were no significant differences in body height and mass although the girls were numerically taller for 1,3 cm. In the indices of motor development **girls** were statistically significantly better only in flexibility tests, while **boys**, as in the previous generation, in variables for assessment of precision, explosive, static, speed power and agility.
- - **Girls** of generation **2006** also had significantly better results in flexibility test, while boys were statistically significantly better in variables for assessment of agility, explosive, repetitive and speed power. In body height and mass no statistically significant difference was obtained although the boys were heavier for 0,9 kg.

Until the last century pedagogues and psychologists used to state in their professional and scientific papers that up to pre-puberty growth acceleration (11-12 of age) there were no significant differences between boys and girls in indices of physical development and motor performances, and therefore syllabus contents and teaching tasks in the field of physical education should not be separated. Ever prevailing opinion of the experts in physical culture is that in the process of instruction, training and recreational activities, the groups should not be separated according to gender, in order to avoid "gender antagonism", but teaching methods, system of assistance and care, choice of apparatuses and equipment, as well as the level of loading should be adapted to specificities of female body. The level of motor performances, their development dynamicity, structure as well as gender related sensitive periods of children at early school age are different. (Jovanović, 1998).

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CANONICAL RELATIONS OF LATENT MORPHOLOGICAL-MOTORIC VARIABLES OF ELEMENTARY SCHOOL 5th GRADERS

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INTRODUCTION

Integral children development knowledge system (Ismail and Gruber, 1971) sets complex structure of morphological-motor space of a pupil. Thus, it is necessary to identify latent structure and significant relations between anthropometric characteristics and motor abilities in order to apply methods for selection in sport, planning, control and programming of training processes, as well as to effectively assess development of important anthropological characteristics. (Kurelic, Momirovic, Stojanovic, Sturm, Radojevic and Viskic-Stalec, 1975; Viskic-Stalec and Mejovsek, 1975; Metikos, Gredelj and Momirovic, 1979; Mrakovic, 1994; Katic and Viskic-Stalec, 1996; Blasković; 1997; Findak, 1999; Tokic and Prskalo, 1999). At the beginning of the XXI century few researchers paid attention to the problem of canonical relations between morphological and motor variables. (Malacko, 2002; Malacko and Popović, 2005; Malacko, 2007; Bala, 2007; Grbavac, 2007; Krstulović, Sekulić and Sentić, 2007; Babin, Bavcevic and Moretti, 2007; Blazevic, Bilic, Z. Bonacin, Siric, Bonacin, V, 2007; Siric, Manic and Bonacin, 2008; Ivanovic, 2008)

Defining of relevant canonical relations between linear combinations of anthropometric (predictor) variables and linear combinations of motor (criterion) variables at different age and sex of examinees becomes especially important if you take rare research results into account, which explain that at certain motor task body shape directly disables realization of movement activities on one hand, whereas it positively influences the ability of different motor task fullfillment on the other hand. (Kurelic and assoc., 1975; Viskic-Stalec and assoc., 1975; Malacko and Radjo, 2004). Thus, it is very important to get further information on significant cross-canonical pressures between manifest morphological-motor variables and newly created canonical variables at schoolage population in the following period. In this way actual parametres of greater number of anthropological characteristics and prominent characteristics of students would be more exactly defined, controlled, maintained and reshaped, kynesiology diagnostics would be better understood, and physical education classes would be better planned and realized.

Based upon clearly set researh problem this paper states and defines two basic goals: 1) defining of canonical correlations (direction and intensity), between anthropometric variables system and motor canonical variables system; (2) defining of canonical pressure between manifest morphological-motor variables and newly created linear combinations of canonical variables.

Having these goals precisely stated in this empiric research we have defined hypothesis H: Canonical structure and statistically significant relations between the set of linear combinations of anthropometric variables and set of linear combinations of motor variables of pupils of the fifth grade of primary school are expected to be identified.

METHODS

At the random specimen of (N=197) female pupils aged 12 from Valjevo, we have applied the system of 30 variables – 12 anthropometric measures and 18 tests of motor abilities.

We have come to the applied anthropometric variables specimen appling standard method of International biological programme – IBP (Misigoj-Durakovic, 1995), based upon 12 anthropometric measures: 1. body height (ABH), 2. arm span (AAS) 3. foot lenght (AFL), 4. shoulder span - biacromial span (ASS), 5. pelvic span- bicrystal span (APS) 6. knee diameter (AKD), 7.body weight (ABW), 8.upper-leg circumference (AUC), 9.chest circumference (AACC)) 10 upper-arm skinfold thickness (AUAT) 11. back skinfold thickness(ABST) 12. abdominal skinfold thickness(AAST).

Motor abilities were assesed applying the set of 18 manifest criterion variables: 1. leg tapping (MLT) 2.hand tapping (MHT) 3. both hands clapping (MHC) 4.polygon backwards (MPB) 5. jumping in a quadrangle (MJQ) 6. crawling through and jumping over (MCJ)7. 20 m run from the standing start (MR20) 8. long jump from the standing point (MLJ) 9. throwing the medicine ball from supine position (MMBT) 10. strech stick exercise (MSS) 11. forward bend on a bench (MFBB) 12.plantar flexion (MPF) 13. backword trunk lead (MBL) 14. pull-ups on the bar (MPB) 15. sit-ups (MSS) 16. arm and leg drumming (MALD) 17. horizontal plate tapping (MHPT) 18. three dimensional tapping (M3DIMT).

Defined representative specimen of motor tests was obtained applying hypothetic model of primary, secondary and motor factors of Gredelj, Metikos, Hosekova and Momirovic (1975). Each motor task was done three times in adequate indicator of composite tests.

Relations between linear combinations of motor (criterion) variables and linear combinations of morphological (predictor) variables, were set applying standard mathematic-statistical method of Hotteling's linear canonical correlation analysis. Coefficient of canonic correlation and cross-canonical pressures were set as standards of simple linear correlation between manifest variables and newly created canonical variables. Statistic importance of canonical correlation was tested using Barlett hi-square test (X2), wheras correlations between linear combination of motor and linear combinations of anthropometric variables was considered with allowed error of 1%. The results were processed applying *Statistica for Windows, ver.* 6.0.

RESULTS AND DISCUSSION

While analyzing the results of anthropometric characteristics and motor tests of examinees, table results from matrices with the most representative items that structure canonical factor were applied.

Table 1. Descriptive-statistical parametres of distribution of anthropometric variables

variable code	$\overline{X}$	σ	MIN.	MAX.	SKEW.	KURT.
ABH	1519.23	79.01	1370.13	170.22	**-0.23**	2.27
AAS	1541.44	90.14	130.17	169.30	-0.04	2.41
AFL	228.16	15.03	159.77	269.32	0.02	2.62
ASS	321.43	17.98	235.69	364.88	-0.01	2.39
APS	187.05	22.00	149.26	259.01	0.01	2.36
AKD	85.06	5.01	72.59	98.24	0.05	2.97
ABW	430.04	72.16	268.09	600.18	0.03	2.55
AUC	450.17	43.24	370.06	577.00	**-1.87**	2.38
AACC	731.02	44.05	630.33	836.11	**-1.89**	5.25
AUAT	64.92	18.06	33.95	115.07	**1.76**	0.51
ABST	75.91	21.44	41.94	169.00	**1.27**	6.24
AAST	76.01	24.99	37.96	161.88	**2.61**	7.22

Considering measures of distribution of source variables in Table 1, we have realized that the organization of most manifest anthrpometric variables does not statistically significantly differ from standard Gauss theoretic distribution. That means that the type of empiric distribution of frequencies is symetric. i.e. that most average values -50% of the data are at one side of theoretic curve, whereas the rest 50% is at its other side. Significant asymetry at the right side in relation to normal distiribution is manifested by positive signs of asymetry coefficient – Skewness – of three variables: foot lenght (Sk = 1.98), pelvic span (Sk = .32) and back skinfold thickness (Sk = 1.27). Other positive values of asymetry coefficient point at small and middle right asymetry, whereas negative values point at small and middle asymetry of the leg of the curve in the left side.

The proof that obtained curve has normal (mesocurtic) distribution of frequencies of the results at most manifest anthropometric variables pays our attention to the obtained values of the second coefficient of flatness. However, obtained coefficients at three variables: abdominal skinfold thickness (Ku = 7.22), back skinfold thickness (Ku = 6.24) and average chest circumference (Ku = 5.25) stress small number of minimum and maximum values. i. e. leptocurtic distribution, whereas Gauss curve is pointed at its top and it is more narrow than normal distribution graph. This fact stresses great number of arithmetic values and high homogeneity of examinees in these predictor variables.

Comparison of obtained measures of asymmetry with similar kynesiology research is limited, because we could not find similar research on identic sample and gender of examinees in the available references. Thus, we can say that obtained values of anthropometric parametres do not exceed critical value at most predictor variables, which implies that obtained curve statistically does not differ from theoretically normal distribution of probability. This is the proof of the slightest deviance from arithmetic mean as well as of the homogeneity of the sample of manifest variables which causes qualitative representativity of arithmetic mean as well as minimum variability that would represent limitation in deducing statistical conclusion.

Table 2 Descriptive-statistical parametres of distribution of motor variables

VarIable CODE	$\overline{X}$	σ	MIN.	MAX.	SKEW.	KURT.
MLT	21.09	2.22	15.99	26.88	0.01	0.21.
MHT	27.01	3.28	21.59	35.98	0.05	0.16
MHC	32.03	2.58	22.76	38.82	-0.01	0.12
MPB	1429.96	271.04	1031.00	2528.11	**1.59**	-0.17
MJQ	235.94	26.05	194.09	301.22	0.03	0.29
MCJ	166.17	21.12	101.30	220.02	-0.02	0 24
MR20	379.31	22.06	329.17	412.14	-0.05	0.22
MLJ	170.23	14.04	130.15	199.10	-0.04	0.43
MMBT	223.25	45.92	139.77	381.08	**1.36**	0.37
MSS	68.02	8.95	39.86	90.79	-0.01	0.30
MFBB	45.96	5.01	34.83	57.94	-0.03	0.41
MPF	6.93	1.13	4.91	13.80	**1.55**	0.28
MBTL	25.24	7.92	9.89	55.14	0.01	0.44
MPB	2	1.02	.0	5.0	**2.15**	**-2.67**
MSS	18.04	6.76	5.93	39.02	0.03	**-2.31**
MALD	5.96	2.14	.0	14.33	0.05	0.25
MHPT	57.03	15.00	10.00	67.00	**2.11**	0.30
M3DIMT	529.14	69.15	398.08	752.19	0.04	0.27

Considering measures of distribution of manifest variables in the Table 2 it can be seen that most motor variables do not statistically significantly differ from Gauss type of curve. Therefore, there is no asymetry, because there is minimum number of extreme values in both directions and the same number of maximum and minimum measures. However, five obtained positive signs of asymetry coefficient – Skewwness – point at strong asymetric distribution at right side, from middle values that are equally distributed namely: polygon backwards (Sk = 1.59), throwing the medicine ball from supine position (Sk = 1.36), pull-ups on the bar (Sk = 2.15), horizontal plate tapping (Sk = 2.11).The rest of obtained positive values of asymetry coefficient, point at minimum and middle right side asymetry. Distribution of results has tendency to lower values. On the other hand negative values of coefficient of asymetry (Skewwness) pont at minimum and middle leftside asymetry of the leg of theoretic curve. The distribution of results has tendency to higher values.

Obtained values and measures for the evaluation of the form of distribution of the coefficient of flatness stress the fact that Gauss curve has mesocurtic dstribution. But, obtained measures of exposure at two variables: pull-ups on the bar (-2.67) and sit-ups (-2.31), signalize very small number of minimum and maximum values, i.e. that the graph of the curve is extended –leptocurtic, whereas Gauss curve is pointed at the top. That stresses the fact that there is great number of middle values and standardization of examinees at these criterion variables.

The comparison of obtained measures for the estimation of the distribution of frequencies with similar empiric research is limited, because in the available scientific papers we could not find the same research. Thus, we can state that obtained values of the parametres do not exceed critical values at most criterion variables, which signalizes that empirical curve does not significantly differ from normal distribution of frequencies. This is the sign of minimum dispersion of middle values, of validity of homogeneity of the sample of manifest variables, as well as the lowest variability, that would represent the limit in statistical conclusion.

Table 3. Statistical importance of canonical functions

	CANONICAL R	CANONICAL R^2	χ^2	DF	P
1	0.82	0.71	398.29	55.10	0.01

Legend : CANONICAL R – canonical corelation coefficient, CANONICAL R^2 –canonical determination coefficient or the square of canonical corelation, ; χ^2 –Bartlett's hi-square test of the significance of canonical corelations, **df** – number of degrees of freedom, **p** –statistical significance of canonical functions

In the Table 3 we have defined only one statistically significant and high canonical function. It is significant because its standardized canonical corelation coeficient has positive direction and relatively high intensity (R = .82) at the level of statistical significance (p < .01). Thus, its structure has reduced maximum number of single linear relations – different from zero at linear statistic coherence of two canonical structures from both analyzed sets, with 99% certainty. Obtained value of the numeric paremetre pays attention to intensive positive correspondence of two structures of analyzed canonical factors, which means that prediction will be more exact, because the results at the diagram of dispersion are less dispersed around the direction of the line of regression.

Obtained value of canonical determination coefficient or square of canonic corelation (R^2 = 0.71) explains maximum amount of 71% of proportion of standardized variance in comparison to the total variability between the sets of manifest variables. That means that obtained index of redundancy defined relatively high percent of analyzed information, that means more than ½ items of totally explained squares of standard deviation. That confirms significant informative value of the first canonical function. The rest of 29% of the sum of sqare of deviance from arithmetic mean pays attention to the presence of unexplained variance, i.e. other unexplored covariables in linear functions between the variables of morphological and motor space.

Table 4. Canonical structure of latent morphological factors

VARIABLES	cAN-1
1. ABH	-0.36
2 AAS	0.34
3. AFL	0.38
4. ASS	0.35
5. APS	0.60
6 . AKD	0.46
7. ABW	0.33
8. AUS	0-.38
9. AACS	-0.32
10. AUAT	0.37
11. ABST	0.31
12. AAST	0.23

The significance of the relations between linear combinations of anthropometric variables can be analysed using the first pair of canonical functions. (Table 4). It is obvious that isolated canonical linear bipolar combination is saturated by low and middle values of canonical pressures-weight, of positive and negative direction, in the scope from r = .21 to r = .60

Considering anthropometric variables (differently metrically directed) and their canonical coefficients as predictors, it is noticeable that canonical factor is structured by examinees of an averege body shape, lower body height and lower values of body scope (chest circumference and upper-leg circumference)

Taking relative involvence of certain manifest variables and suitable linear combinations in the complex composite of the first canonical function into account, skeletal-muscle structure of examinees who are twelve years old can be hypothetically defined as mutual canonical morphological factor.

Table 5. Canonical structure of latent motor factors

VARIABLES	cAN-1
MLT	0.42
MHT	0.37
MHC	-0.09
MPB	-0.82
MJQ	-0.79
MCJ	-0.75
MR20	0.07
MLJ	0.76
MMBT	-0.11
MSS	-0.31
MFBB	0.17
MPF	-0.09
MBTL	-0.27
MPB	-0.12
MSS	-0.20
MALD	-0.42
MHPT	-0.38
M3DIMT	0.04

Considering the domain of motoric abilities (Table 5) statistically significant corelations between linear combination of criterion variables can be identified with the first pair of canonical functions. Closer look into the table can lead us to the conclusion that projections of motor tests are significantly lower in comparison to canonic pressures of morphological variables. Difference between the lowest and the highest amount of canonical coefficients is in the scope from r = .04 to r = .76. Prevailing canonical coefficients for criterion (with postive sign) at unique set of resulting vector have following manifest variables in comaprison to the values of statistically significant correlations: long jump from the standing start (0.76), leg tapping (0.42) and hand tapping (0.37). On the other hand, predominant canonical weight at negative pole has following variables: horizintal plate tapping (-.037), arm and leg drumming (-0.41) and backward trunk lead (-.26), which means that these tests are too difficult and that they should be excluded from the total sample of variables.

However, positive values of standardized coefficient for criterion (at inner conditioning) in the matrix of canonical coefficients with negative signs have following variables: jumping in a quadrangle (-0.68), polygon backwards (-0.41) and stretch with a stick (-0.21). In order to be able to grasp the meaning of obtained canonical weight (with negative signs), basic coefficients of these motor tests change their signs because of the structure of the task and the way of introducing the obtained results into the register. Quantitative data in these tasks are written in time measures, which means that more effective result was realized in the test if lower numeric value was obtained., i.e. shorter time interval was needed to complete the task. So, negative sign of canonical coefficient at motor tests shows that its real place is at the positive pole of isolated canonial factor.

Considering canonical factor of polarized structure (differently metrically directed), it is noticeable that it is defined with the relation between linear combinations of source criterion variables and newly created variables of primary latent motor dimensions such as: *alternative movements speed, realization of rhytmic structure, coordination of movement, repetetive strength, explosive strenght and flexibility.* Taking relative influence of each criterion variable in the complex composite of the first canonical function as well as values of linear correlations into acoount, this integrated latent structure of movement can be defined (at hypothetic level) as mutual canonical motor factor. Its linear function between single canonical predictor and criterion variables (according to Kurtelic and his associates, 1975), is conditioned with secondary latent functional mechanisms of central nerve system, which are responsible for variability *of movement structuring, sinergetic regulation and tonus regulation, regulation of the intensity of excitation and regulation of excitation duration*. Therefore, hypothetic mechanism for movement structuring, i.e. variables for the evaluation of primary latent dimension of movement coordination (polygon backwards, crawling through and jumping over,

jumping in a quadrangle) as well as mechanism for the regulation of the intensity of excitation, i.e. variable of long jump from the standing point are predominant in mutual canonical factor at higher secondary level. It is responsible for the variance of primary motoric factor of explosive strenght.

Comprehensive research of the matrix of canonical structures and the matrix of cross canonical pressures in two multidimensional systems of variables, i.e. research of mutual relations between the vectors of the first pair of canonical factors, has set the existence of two latent morphological-motor dimensions which are hypothetically analysed as MUTUAL CANONICAL MORPHOLOGICAL AND MOTOR FACTOR.

The analysis of canonical variables in the matrix of canonical structures obtained from the results of anthropometric measures and motor tests leads up to the assumption that in the basis of canonical function, which is formed by **variables of cross canonical pressures** in analysed anthropological domains, there is influence of source variables on canonical function. Therefore, statistically imporatant linear cross correlations between source and newly created variables point at the following cause and result relation: if the examinees of an average body shape have lower values in the set of manifest variables (body height, upper-leg circimference, middle chest circumference), they will achieve weaker results in motor tests, and vice versa, if the examinees have lower measures of skinfold and body volume, they will have better results in motor tests with the existence of suitable muscular mass.

In accordance to the applied numeric algorithm of canonical corelation analysis, obtained results have confirmed tested hypothesis (H), at the level of probability $p < .01$).

CONCLUSION

In the representative sample (N=197) subjects aged 12, clinically healthy, selected among school population from the territory of the municipality of Valjevo, a system of an overall 30 manifest variables and 12 anthropometric measurements (as predictor set) were used as well as 18 tests of motor abilities (as criterion set). In compliance with the set aim of the research, the interpretation of significant quantity of data was carried out with multivariant method of Hoteling linear canonic correlation analysis .

We have made the following conclusion based upon the analysed results in morphological-motor space, applying the probability criterion ($p < .01$):

(1) Dispersive analysis of measures of central tendency and measures of variability stresses the fact that most descriptive parametres of manifestation anthropometric and motor variables do not statisticlly significantly differ from Gauss law of symetric distribution of probability.

(2) The first canonical function has been set, i.e. positive value of standardized canonical corelation coefficient ($R = .82$), as well as canonical determination coeficient ($R^2 = .71$), which implies that 71% of the proportion of standardized variance has been analysed in comparison to total variability between sets of manifest variables. Residual segment of 29% points at unexplained variance of unexplored covariables in linear functions between variables of morphological and motor space.

(3) Analysing correlations between linear combinations of anthropometric and motor variables in the matrix of canonical structures MUTUAL CANONICAL MORPHOLOGICAL AND MOTOR FACTOR has been defined (at hypopthetic level). It is structured as two-dimensional model, or to be more precise a) mutual canonical morphological factor which was formed by examinees with average body shape, lower height and lower values of body circumference (chest and upper-leg circumferences); b) mutual canonical motor factor which is predominantly defined with mechanism for movement structuring – variables for the evaluation of primary latent dimension of movement coordination (polygon backwards, crawling through and jumping over, jumping in a quadrangle) and mechanism for the regulation of the intensity of excitation – variable long jump from the standing point, which generates the variance of primary motor factor of explosive strength.

(4). Significant linear cross corelations between source and newly created canonical variables stress the following causality in the obtained matrix of canonical structures: if pupils with average body shape have lower values in body height, upper-leg circumference and chest circumference, they are not succseful in motoric tests, and vice versa, if pupils have lower values at anthropometric measures of skinfold thickness and body volume, they achieve better results in motor tests.

This research has made, with high percent of ceratinty, hypothetic model of understanding of complex canonical structure and statistic relations between morphological-motor characteristics and abilities of examinees. The results of this work can be used as basis for successful diagnostic, planning and programming of Physical Education curriciulum of female pupils of the fifth grade of primary school.

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THE EFFECTS OF EXPERIMENTAL PROGRAM OF PHYSICAL EDUCATION ON MOTOR ABILITIES OF SCHOOLBOYS

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1. INTRODUCTION

Younger school age is meant to be an adequate period for the development of motor abilities and if this development fails to occur in this period it is difficult to catch up later on. In order to provide for the correct development of particular abilities it is neccesary to induce optimal overload because without adequate overload one can not expect positive changes to take place. Thus, it is a prerequisite to provide for certain activities and the quality of the exercise that will make sure the occurance, first of all development of physical abilities and sports- technical education. In expertise publications it is claimed that physical education curriculum in younger school age is underrepresented and is thus inefficient, and great body of research has shown that physical education classes are not intensive enough and therefore do not leave any trace on the organism.

2. RESEARCH PROBLEM AND AIM

Research problem is to investigate the effect of the experimental programme of physical education curriculum spanning one school year, applying contents of athletics, sports games, apparatus exercises and floor exercises, rhythmics and dance, and some supplement exercises, on first grade elementary schoolboys motor abilities. The effects of the experimental programme were monitored on the basis of the comparison of the initial and final measurement results and the measurement of the status of individual indicators of motor abilities. Basic research aim was to deternine if by means of the application of the recommended experimental programme of physical education curriculum one can achieve positive effecs on the changes in motor abilities of the elementary schoolboys. Basic research aim was also to deternine the influence of the current curriculum of physical education on the changes in motor abilities of the control group subjects.

3. SAMPLE OF THE SUBJECTS

Sample of the subjects is defined as a population of the first grade male pupils of the elementary schools from Leposavic and Zvecan. The respective schoolboys attend regular physical education classes administered according to the adopted curriculum of the Republic of Serbia. Number of pupils -subjects comprised by this research is 88. The sample is divided into two groups: experimental group 50 and control one 38 schoolboys.

4. SAMPLE OF THE VARIABLES

When selecting tests for the estimation of motor abilities it was accounted for balanced coverage of all areas of latent motor abilities, that is mechanisms responsible for the solution of certain motor tasks.

On the basis of the hierarchical structure of the motor area the following tests were applied:

a. for the estimation of the mechanism for the movement structuring
   - hand tapping (**MTAP**) number of correct trials;
   - backwards field (**MPOL**) in sec;
   - slalom with two medicine balls (2 kg) (**MS2M**) in sec;

b. for the estimation of the mechanism for the tonus regulation and sinergy regulation
   - low bend on the bench (**MDPR**) in cm;
   - standing on one leg (**MBAS**) in sec;
   - coordination with the baton (**MKOP**) in sec;

c. for the estimation of the mechanism for the excitation intensity regulation
   - standing long jump (**MSDM**) in cm;
   - running 30 m high start (**M30V**) in sec;
   - medicine ball throwing (of 1 kg) (**MBMD**) in cm;

d. for the estimation of the mechanism for the excitation duration regulation
   - hanging squirt (**MVIS**) in sec;
   - leg lifting while lying on back (**MDNO**) number of correct trials
   - trunk lifting while lying on back (**MDTR**) number of correct trials

Testing of motor abilities was administered at the beginning and at the end of school year in a gym and in sporting facilities of the school as well.

5. RESEARCH METHOD AND DATA PROCESSING

This research has a longitudinal character. Experimental programme was realized in the experimental group during regular physical education classes, in the course of one school year lasting 36 weeks with 3 classes a week. Teaching process in control group was realized in the same period according to the regular curriculum for the physical education of the Republic of Serbia by the pre-school teachers.

For the data processing a statistical method was used.

6. RESEARCH RESULTS AND DISSCUSION

Due to an abridged volume of the paper there will not be shown tabels with the results of the basic statistical parametars but only a short analysis of the obtained results in the initial and the final measurements of the pupils of the experimental and control group.

On the basis of the average values in the final measurements, it can be stated that there was an improvement in the obtained results in all investigated motor abilities in relation to the initial measurements. Results show that the experimental group pupils have gained greatest improvement in the test of the segmentary speed, hand tapping (MTAP) and standing long jump (MSDM). On tests of strength (MDTR, MDNO and MVIS), results show that the pupils in the experimental group have doubled the result after the administration of the experimental treatment and for this value achieved better results compared to the pupils in the control group.

On the basis of the average values it can be remarked that the pupils in the control group have improved their results in the final measurement and have improved the results in all investigated motor abilities in relation to the initial measurement, except for the repetitive power.

Average values show that the improvement of motor abilities was reached in much lesser degree in the pupils of control group when compared to the values obtained in the pupils of the experimental group.

Results obtained by the pupils in the experimental and control group during the final measurements are completely in agreement with the obtained results reported in the previous resea rch conducted on the same population (Krsmanović, 1985; Ivanić, 1996; Babin at all, 1999; Zrnzević, 2003 and Ivanović, 2005).

6.1. Differences between the groups in the motor abilities in the initial measurement

In order to evaluate the effecs of the experimental programme on motor abilities of the pupils it is necessary to determine if there are possible differences between the abilities of the pupils of the experimental and control groups in the initial measurement, therefore a multivariate analysis of variance (MANOVA) was applied, and to obtain the data in which variables possible differences occur a univariate analysis of variance (ANOVA) was applied.

On the basis of the results of the multivarite analysis of the variance for the motor abilites between the pupils of the experimental and control groups in the initial measurements (table 1.), it can be stated that there is statistically significant intergroup difference (p = .046) and that groups before the experiment were not homogenized which entails in later mathematical-statistical procedures a compulsory partialisation and neutralisation of the differences between the groups which had occured in the initial measurement.

Table 1. *Multivariate differences of the motor abilities between the pupils of the experimental and control groups in the initial measurement (MANOVA)*

Wilk's Lambda	F	Effect df	Error df	p
.766	1.91	12	75	**.046**

Table 2 shows the results of the univariate analysis of the variance in the applied variables of the motor abilities of the pupils in the initial measurement. It can be noticed that the occurance of the difference at the multivariate level can be attributed to the difference ocurring in the variable for the estimation of the mechanism for the tonus and sinergy regulation, standing on one leg (MBAS). Better results on this test were

achieved by the pupils of the experimental group, whose mean value reads 19.93, and control group reads 11.67

Table 2. *Univariate differences in motor abilities between the pupils of the experimental and control group in the initial measurement (ANOVA)*

Test	Mean E	Mean K	F (1,86)	p
MTAP	10.06	9.66	1.51	.223
MPOL	25.65	25.30	.09	.769
MS2M	36.19	34.63	1.25	.266
MDPR	31.06	31.53	.70	.404
MBAS	19.93	11.67	10.74	.002
MKOP	5.55	5.75	.76	.387
MSDM	116.00	113.84	.40	.528
M30V	6.98	7.05	.31	.578
MBMD	325.00	308.95	1.68	.198
MVIS	12.63	9.91	2.31	.133
MDNO	11.78	12.00	.04	.844
MDTR	9.02	8.42	.24	.628

In all the other variables there were not registered statistically significant differences but the pupils of the experimental group had achieved numerically better results in all measured variables when compared to the pupils of the control group, except for the variable for the estimation of the movement structuring mechanism: backwards field (MPOL) and two medicine ball slalom (MS2M), in variable for the estimation of tonus and sinergy regulation mechanism, low bending (MDPR) and variable for the estimation of the mechanism for the excitation duration regulation, leg lifting from back lying position (MDNO), where the numerically better results were achieved by the pupils of the control group.

It can be concluded that the pupils in experimental and control group differ in their motor abilities in the initial measurement.

6.2. Differences between initial and final measurements of motor abilities

In view of determining how much each group has made progress during the experimental treatment in all applied variables in motor area, we have used multivariate analysis of variance for the repeated measures (MANOVA-repeated measure), which tests differences between the initial and final states on a multivariate level and univariate analysis for the repeated measures (ANOVA-repeated measure), which in turn tests differences between the initial and final status on an univarite level for each variable separately.

Table 3. shows the results of the multivarite analysis for the repeated measures of the variance of the motor abilities of the experimental group pupils. After the administration of the experimental programme there have occured statistically significant changes on a multivariate level (p = .000).

Table 3. *Multivariate differences between the initial and final measurements (MANOVA-repeated measure) of motor abilities in experimental group pupils*

Wilk's Lambda	F	Effect df	Error df	p
.006	485.11	12	38	.000

Table 4 shows the results of the univariate analysis for the repeated measures of motor abilities in experimental group.

Table 4. *Univariate differences between the initial and final measurements (ANOVA-repeated measure) of motor abilities of the experimental group pupils*

Test	Mean Initial	Mean Finalno	F (1,49)	p
MTAP	10.06	15.66	1670.26	.000
MPOL	25.65	18.83	147.53	.000

MS2M	36.19	26.73	187.73	.000
MDPR	31.06	33.42	116.11	.000
MBAS	19.93	31.47	60.51	.000
MKOP	5.55	4.39	59.77	.000
MSDM	116.00	133.90	417.00	.000
M30V	6.98	6.17	140.99	.000
MBMD	325.00	372.00	117.91	.000
MVIS	12.63	26.77	212.37	.000
MDNO	11.78	21.74	251.62	.000
MDTR	9.02	18.04	266.14	.000

On the basis of the obtained results it can be stated that after the application of the experimental programme there have occured statistically significant changes in all variables in a positive sense, on the level of the significance ($p < .000$), because all abilities were improved in the course of the experimental period.

The most remarkable changes after the administration of the experimental programme were registered in a variable for the estimation of the movement structuring mechanism, hand tapping (MTAP), the mechanism for the excitation intensity regulation, standing long jump (MSDM) and in the mechanism for the excitation duration regulation: trunk lifting while lying on back (MDTR), leg lifting while lying on back (MDNO) and hanging squirt (MVIS). In all other variables these values are somewhat lower but are statistically significant.

Table 5 shows the results of the multivarite analysis of variance for the repeated measures of the motor abilities of the control group pupils. It can be concluded that after the experimental period there have occurred statistically significant changes on a multivariate level ($p = .000$).

Table 5. *Multivariate differences between the initial and final measurements (MANOVA-repeated measure) of the motor abilities in control group pupils*

Wilk's Lambda	F	Effect df	Error df	p
.083	23.89	12	26	**.000**

Table 6 shows the resuls of the univariate analysis of the variance for the repeated measures of the motor abilities in the control group pupils. On the basis of the obtained results it can be stated that after the experimental period there have occured statistically significant changes in all variables in a positive sense, on the level of the significance ($p < .05$), except for the variable: leg lifting while lying on back (MDNO), trunk lifting while lying on back (MDTR) and coordination with the baton (MKOP).

Table 6. *Univariate differences between the initial and final measurements (ANOVA-repeated measure) of motor abilities of the control group pupils*

Test	Mean Inicijalno	Mean Finalno	F (1,37)	p
MTAP	9.66	12.84	162.53	.000
MPOL	25.30	23.30	10.43	.003
MS2M	34.63	31.56	10.08	.003
MDPR	31.53	31.92	7.05	.012
MBAS	11.67	15.50	8.35	.006
MKOP	5.75	5.53	2.14	.152
MSDM	113.84	120.71	30.25	.000
M30V	7.05	6.76	18.79	.000
MBMD	308.95	325.79	13.51	.001
MVIS	9.91	15.55	14.29	.001
MDNO	12.00	13.58	3.44	.072
MDTR	8.42	7.97	.27	.606

The most remarkable changes after the experimental period were registered in a variable for the estimation of the movement structuring mechanism, hand tapping (MTAP), in the mechanism for the excitation intensity regulation, standing long jump (MSDM) and in 30m high start running (M30V). In all other variables where the difference in final measurement was identified values of F-test are somewhat lower but are statistically significant.

Changes induced and registered in motor abilities of the control group pupils are of a smaller intensity when compared to the changes brought about in the experimental group pupils which is evident from the values of the F-test.

6.3. Effects of the experimental programme

On the basis of the identified intergroup differences on the initial measurement between the experimental and control groups, and pursuing the research aim to determine the effect of the applied experimental programme, we have analysed possible intergroup differences in a final mesurement by means of the multivariate analysis of covariance (MANCOVA), while the differences between the groups in individual variables were determined by means of the univariate analysis of the covariance (ANCOVA). These analyses are meant to neutralise registered differences in the initial measurement between the groups, and determination of the differences is conducted by partialised adjusted mean values (Adj. Means) in a final measurement.

Table 7. *Multivariate differences in motor abilities between the experimental and control groups of pupils in final measurement with the neutralistion of differences in the initial measurement (MANCOVA)*

Wilk's Lambda	F	Effect df	Error df	p
.147	30.38	12	63	**.000**

Table 7 shows the results of the multivarite analysis of co-variance of the applied variables for the motor abilities between the experimental and control group of pupils in a final measurement. It can be concluded that there have occurred statistically significant intergroup differences on a level p = .000.

Table 8 shows the results of the univariate analysis of co-variance of the applied variables for the motor abilities between the experimental and control groups of pupils in a final measurement. There have been registered statistically significant differences in all 12 variables of motor abilities to the advantage of the experimental group pupils on a level p = .000.

Table 8. *Univariate differences in motor abilities between the experimental and control groups of pupils in the final measurement with the neutralisation of differences in the initial measurement (ANCOVA)*

Test	Adj. Mean E (50)	Adj. Mean K (38)	F (1,74)	p
MTAP	15.47	13.04	69.16	.000
MPOL	18.94	23.19	29.85	.000
MS2M	26.49	31.80	33.64	.000
MDPR	33.73	31.61	43.78	.000
MBAS	27.84	19.13	13.16	.001
MKOP	4.40	5.51	38.25	.000
MSDM	132.85	121.76	59.63	.000
M30V	6.20	6.73	44.31	.000
MBMD	362.90	334.89	14.64	.000
MVIS	24.70	17.62	13.83	.000
MDNO	21.19	14.13	44.38	.000
MDTR	17.16	8.85	74.59	.000

The most remarkable differences were noted in the variables: trunk lifting while lying on back (MDTR), hand tapping (MTAP) and standing long jump (MSDM, leg lifting while lying on back (MDNO), 30m high start running (M30V), low bending (MDPR), coordination with the baton (MKOP), and backwards field (MPOL).

The biggest difference was registered in the variable trunk lifting while lying on back (MDTR), whose value of F test is 74.59, and this points to the fact that the experimental group pupils have significantly improved the result in repetitive power after the experimental treatment.

Very high values of F test (69.16), in the test for the estimation of the segmentary speed hand tapping speed (MTAP), indicate that the experimental group pupils are much better in segmentary speed in comparison to the control group pupils. Regardless of the fact that in the development of speed the most important factor is a genetic factor, well selected exercises performed with the greater speed, with greater number of repetitions and corraborated with supplementary exercises can improve significantly the speed of movements.

On a test for the estimation of speed, 30m high start running (M30V), the experimental group pupils have statistically significantly improved running speed when compared to the control group pupils.

Developing speed influences development of other abilities, foremost power (power of the lower limbs), agility, flexibility and endurance. Speed is in correlation with other abilities, thus by developing speed and coordination one can improve speed to a great extent. According to the previous research (Krsmanović, 1985), it was found that in short sprints power is represented three times more than the speed.

On the tests of coordination with baton (MKOP), two medicine balls slalom (MS2M) and backwards field (MPOL) the experimental group pupils have statistically significantly improved their results on a final measurement when compared to the control group pupils. This of course, shows that the experimental programme had an immense impact on the coordination improvement. The up-to-now body of research has indicated the fact that coordination is genetically conditioned with over 80%. Development of coordination depends mainly on the previous experience and the richer the skills fund the easier it is to master new movements. Process of learning new skills and habits should be a continuous one and each exercise must be mastered to a certain level, so as to present a stimulus for the formation of new coordination abilities. Children of this age are prone to develop great ability for a quick adoption of new complex movements.

The least but yet statistically significant effect of the experimental treatment is realised in balance test, standing on one leg (MBAS). Having in mind that balance reaching and keeping is of great importance process of developing balance should be starded as early as possible because balance development is sequential and mostly genetically conditioned but environment plays its role as well. The most optimal way to improve it is to implement it through the curriculum implementation using the following: apparatus and floor exercises, walking in different ways on a narrow surface, field exercises, elementary games that trigger imbalance. Children actually do not possess great ability of balance keeping in static position, which has brought about the achievement of bad results on the initial and smaller effect on a final measurement.

When checking out the effects of the two programmes it was determined that both programmes have induced statistically significant changes in motor abilities of both groups subjects, apart from the control group, in the repetitive power test – leg lifting while lying on back (MDNO) and coordination with baton (MKOP), where no statistically significant difference was identified. In repetitive power test – trunk lifting while lying on back (MDTR), there was a decrease in mean values on the final measurement in relation to the initial one, but it was not statistically significant. Exercises of static and repetitive power are rarely realized in everyday spontaneous activities so they should be programmed and included into a process of physical exercising. Time extensions when performing these exercises can cause respiratory disorders, inhibited supply of oxygen to the body, which in turn brings about serious consequences. However, one should not go to the other extreme, namely, one should occasionally use these forms of exercises to develop this type of power and children should be taught to breath in a proper manner. Taking into account that these exercises are strenuous we should make them interesting so children would be motivated to perform them.

7. CONCLUSION

Generally speaking after performed analyses one can conclude from the obtained research results that the experimental programme of physical exercises focusing on contents from: athletics, apparatus and floor exercises, rhythmics and dance and sports games, and using the supplementary exercises in the main part of the class has statistically significantly influenced the changes in motor abilities of the experimental group pupils.

When checking out the effects of the two programmes between the initial and final measurements it was determined that both programmes have induced statistically significant changes in motor abilities of the both groups subjects, apart from the control group, in the repetitive power test – leg lifting while lying on back (MDNO) and coordination with baton (MKOP), where no statistically significant difference was identified.

In repetitive power test – trunk lifting while lying on back (MDTR), there was a decrease in mean values on the final measurement in relation to the initial one, but it was not statistically significant. It was however enough to obtain the information that the applied programme of school physical education did not contain enough exercise to develop these abilities or that the realisation of this programme was not adequate in these segments.

This has caused the presence of difference in the effects of the two programmes in a repetitive power of the trunk and coordination bearing in mind that the experimental programme of the physical education had

almost the same effects on all measured abilities. This in turn points to the fact that its conception has encompassed wide range of exercises for the balanced development of motor abilities. Improvement of the results is partly a consequence of the natural increase in motor abilities but to a greater extent it is a consequence of the bigger influence of the experimental programme.

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APPLICATION OF SEASHORE'S TEST IN PREDICTION OF STUDENTS' ACHIEVEMENT IN PRACTICAL EXAMINATION OF RHYTHMIC GYMNASTICS AND DANCE

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INTRODUCTION

According to the Plan and Program of the Faculty of Sport and Physical Education, Novi Sad, students at the first year, have lectures from the subject called Rhythmical Gymnastics and Dances (practical and theoretical part). Practical tuition from this subject is followed by music. One of the conditions for the efficiency when both listening to the lectures, and taking of the practical examination are concerned is compatibility of the technique of movements and moving with the sounds of a specific music. Most students, unfortunately, realize their first contact with the movements and music, at these classes of Rhythmical Gymnastics and Dances. Program for Rhythmical Gymnastics includes a preparation of students for the methodical basic steps of the esthetic shaping of moving and movements, with or without the requisites, as the elementary foundation of Metrics. In the part of the program called Dancing, students become familiar and skilled for the realization of the folk and social dances, which is, as the previous part of the program, followed by music. As that period coincides with their biological maturation and stabilization of their psychomotorical abilities, the question can be made whether the program of Rhythmical Gymnastic and Dances, designed in a way that should meet the requests of the Plan and Program of the Physical Education for Elementary and High Schools, can have a significant influence on the changes connected to their musical abilities, at this age.

A universal definition of musical abilities does not exist. Most of the authors do not agree with the fact that it is a complex ability and that a various aspects of musical abilities are integrated in the same.

All candidates that intend to enter the Faculty of Sport and Physical Education have to pass the selection that is done through several levels. At the exam of the psychomotorical abilities, students pass through the program of the entrance examination, which consists of: Swimming, Polygon Versatility, Polygon of Sports Games (handball, volleyball, basketball and football), Device Exercises, Athletics and the Seashore's Test.

Precisely from the above-stated reasons and requests for the realization of lectures from Rhythmical Gymnastics and Dances, a psychological test of the musicality called by its author Karl Emil Seashore, was included in the program of the entrance examination. He is held as the founder of the psychological testing of musicality. A book „Psychology of Musicality", written by him is even today, after so many years, included at the list of the elementary literature for the Studies of Psychology of Musicality in the USA.

Having in mind application of the Seashore's Test in the process of the selection of candidates enrolling the faculty, it was interested to check if this test had a success indicator's value in regard to the assessment of success at the specific rhythmical structures' performance, when male students of the Faculty of Sport and Physical Education were concerned, which was performed upon the overmastering of the practical lectures within the subject Rhythmical Gymnastics and Dances.

METHOD

A sample of examinees in the research is defined as the intentional stratification sample, which included male students of the first year, age from 19-20 that attended lectures from the Rhythmical Gymnastics and Dances, and successfully passed a practical exam from that subject. The sample consisted of 104 students of the first year of the Faculty of Sport and Physical Education.

A sample of variables for this research included two groups of variables. System of indicators for success, consisted of variables generated by the Seashore's Test: Altitude of Tone, Volume of Tone, Sense of Rhythm, Length of Tone, Color of Tone and Memory (memorizing a melody). As variables for criteria were determined grades for the assessment of the success in the performance of the specific motorical assignments, such as Moravac, Keleruj, English Walcer, Obligatory Exercise without requisites, which students performed at the practical exam from the subject Rhythmical Gymnastics and Dances.

The Seashore's Test consists of six separated scales:

1. *Scale for distinction of the altitude of tone*: this scale tests ability for distinction of tones having different altitude. It includes 5 units with 10 assignments each, where each assignment has two successive tones of different altitude. A candidate has an assignment to determine if the second tone is higher or lower in regard to the first one.
2. *Scale for distinction of the volume of tone*: this scale tests ability for distinction of tones' volume. An examinee has 50 assignments in which s/he has to recognize if the second tone has higher/lower volume than the first one.
3. *Scale for rhythmical structures' distinction*: this scale tests ability of candidates to make distinction between different rhythmical structures. It consists of 30 assignments, where each of them, has two different structures. Candidates' assignment is to determine whether these structures are equal or not.
4. *Scale for distinction of length of tone*: this scale tests ability for distinction of tones' length. It consists of 50 assignments, where each of them has two successive tones of different length. A candidate has to determine whether the second tone has longer or shorter length than the first one, at all 50 assignments.
5. *Scale for distinction of color of tone*: this scale tests ability for distinction of different color of tone. Scale has 50 assignments, where each of them consists of two successive tones, which are different by their color. A candidate has to recognize whether both tones sound the same or not.
6. *Scale for memorizing a melody*: this scale tests ability for distinction of a melody. It consists of 30 assignments, where the first 10 differ at the second performance in one of the three offered tones. In the next 10 assignments, among four of the offered tones, one differs in the second repetition, and in the next 10 assignments with five tones offered, one differs at the second repetition. A candidate has to determine whether it was the first, second, third or fifth tone of the second performance.

A result was registered at the specific form, while each answer was being scored. A right answer was evaluated with 1 point, and a final result represented a sum of all points made at the test. An author of the test, himself, considered that these abilities were inborn and independent. According to the accessible literature that deals with the problems of a musical ability and selection comparing to them, three tests are currently in use, and one of them is the Seashore's Test, as well. As per Radoš-Mirković K, Vingov's and Bentlijev's tests of musicality are also used, but they request a certain level of a musical precognition. An advantage of the Seashore's Test is that it can be used with children, as well. A pedagogical practice needs tests that are relatively easily realized, with adequate metrical characteristics and reliable results.

An assessment of the success of motorical assignments' performance within the practical exam from the subject Rhythmical Gymnastics and Dances, was done by a classic method of the assessment, i.e. grading from 6-10, where all grades were agreed between two examiners that watched assignments' performance.

A processing of data was done by an application of the Linear Regression Analysis, with the usage of the Stepwise technique of significant success indicators' distinguishment. As a criterion for distinguishment of the significant success indicators, a level of the significance F from $p < 0,05$, and a level for the removal of the success indicators from further analysis $p > 0,10$, were determined. In this way, we determined for each variable criterion, the most important success indicator's variables and analyzed their contribution to the defining of the variable criteria.

RESULTS

An analysis of the significance of the Seashore's Test elements in the success' indication of the criterion variable **MORAVAC** (Table 1 and 2), showed that only the variable ***Length of Tone*** has statistically significant influence on the indication of the success in the performance of this specific rhythmical structure. Correlation of this variable with a criterion is significant at the level of the assessment from $p < 0,05$ and explains 4,9% variability of the criterion variable. The rest of the success indicators' variables have statistically insignificant influence on the criterion variable, which is confirmed by low values of Beta coefficient and a partial correlation with criterion.

Table1. Indicators' variables with a significant level of the variable Moravac's success indicator

Variable	R	R^2	F	p
Length of tone	0,222	0,049	5,251	0,024

R – multiple correlation; R^2 – coefficient of determination; F– test of the significance;
p – level of the significance

Table 2. Indicators' variables excluded from the analysis with a lower level of the success indicators

Variables	Beta	t	p	R_p
Altitude of tone	-0,048	-0,481	0,631	-0,048
Volume of tone	0,055	0,544	0,588	0,054
Sense of rhythm	0,123	1,186	0,239	0,118
Color of tone	0,048	0,493	0,623	0,049
Memory	0,022	0,221	0,825	0,022

Beta-regression coefficient; t-test of the significance; p- level of the significance; R_p-partial correlation

Regression Analysis for variable **KELERUJ** (Table 3 and 4), showed that statistically significant success' indicative value has also only a variable ***Length of Tone***. At this specific rhythmical structure, an influence of this success' indicative variable is something bigger and it explains 5,7% variability of the criterion variable. A contribution of the rest of the indicators to the explanation of the variability of the criterion is statistically insignificant.

Table 3. Indicator's variables with a significant level of the variable Keleruj's success indicator

Variable	R	R^2	F	p
Length of tone	0,239	0,057	6,120	,015

Table 4. Indicator's variables excluded from the analysis with a lower level of the success indicators

Variable	Beta	t	p	R_p
Altitude of tone	0,019	0,189	0,850	0,019
Volume of tone	0,094	0,929	0,355	0,092
Sense of rhythm	0,068	0,654	0,515	0,065
Color of tone	0,000	0,003	0,998	0,000
Memory	-0,015	-0,151	0,880	-0,015

As to the criterion variable **ENGLISH WALCER,** the Enter technique of the Regression Analysis was applied, due to the fact that the Stepwise procedure was performing not even one success indicators' variable, as statistically significant. A system of the success indicators did not show statistically significant value in the indication of the criteria (Table 5).

Table 5. Regression Analysis for the variable English Walcer

Variable	Beta	t	p	R_p
Altitude of tone	0,125	1,245	0,216	0,160
Volume of tone	0,105	1,018	0,311	0,156
Sense of rhythm	0,058	0,520	0,604	0,117
Length of tone	0,109	0,986	0,326	0,182
Color of tone	-0,076	-0,762	0,448	-0,070
Memory	0,023	0,217	0,829	0,078
	$R = 0,265$	$R^2 = 0,070$	$F = 1,205$	$p = 0,311$

As to the criterion variable **OBLIGATORY EXERCISE** (Table 6 and 7), ***Sense of Rhythm*** was, by Regression Analysis, only distinguished as the statistically significant success indicator, which showed a high level of the significance from $p < 0,01$ with 10,8% of the common variability with a criterion variable. The rest of the variables do not have statistically significant success' indicative value.

Table 6. Indicator's variables with a significant level of the variable Obligatory Exercise's success indicator

Variable	R	R^2	F	p
Sense of Rhythm	0,329	0,108	12,232	0,001

Table 7. Indicator's variables excluded from the analysis with a lower level of the success indicators

Variable	Beta	t	p	R_p
Altitude of tone	0,148	1,583	0,117	0,156
Volume of tone	0,116	1,237	0,219	0,123
Sense of rhythm	0,131	1,305	0,195	0,129
Color of tone	0,112	1,188	0,238	0,118
Memory	-0,060	-0,605	0,547	-0,060

Apart from the analysis of the success' indicative value of the certain segments of the Seashore's Test, based on the success of the specific rhythmical structures' performance, the Pearson's correlation between the cumulative grade of the students' exam and a total result made in solving of the Seashore's Test was also calculated. As a consequence, a positive correlation of r = 0,252 was gained, which together with the N=104, is statistically significant at the level of the assessment from $p < 0,01$. This linear relation indicates to the fact that students with a higher cumulative grade at the exam were exactly those ones that also had a higher total result at the solving of the Seashore's Test at the Faculty entrance examination.

DISCUSSION AND CONCLUSIONS

The exposed analysis of the results indicates to the fact that there is statistically significant correlation between the total grade of the exam and the success achieved at the Seashore's Test, concerning the students of the Faculty of Sport and Physical Education. This correlation was expected, considering the fact that the sample of examinees was made by the students of the Faculty that were, by one part, selected for the entering at the Faculty, according to their success in solving of the Seashore's Test.

In some of the subscales' relations of the Seashore's Test and elements of the exam, a subscale ***Length of Tone*** showed a significant success' indicative value in regard to the folk dances Moravac and Keleruj. When Obligatory Exercises without requisites, was concerned (from the program of the Rhythmical Gymnastics), an indicative value was showed by a subscale of the Seashore's Test used for the assessment of the rhythmical structures' distinction – ***Sense of Rhythm***. An essence of both of the sub samples of Seashore's variables, that showed success' indicative value is RHYTHM, as it is actually a relation between the tones of different duration - disposition of tones by their length.

As the sample of the examinees was selected by a mere Faculty entrance examination, it was not possible to compare gained results with the results of the authors that gained similar ones by applying the Seashore's Test: Boli (1995), Kocić (1999), with the samples of boys and girls at the age of 11-13. Based on the research of the musical abilities done by Karlin (1942 according to Popović R., 1986), a rhythm is kinesthetic and not auditive factor. Having that in mind, gained results of the analysis of the Seashore's Test success' indicative values have been justified as they were gained in the motorical space, i.e. in relation with the performance of the specific motorical assignments followed by music.

Results of the research at the sample of the male examinees showed that the Seashore's Test has good success' indicative value in regard to the assessment of the success at the performance of the specific motorical structures present at the studies from the subject Rhythmical Gymnastics and Dances. Considering the fact that the most success' indicative values were showed by variables Length of Tone and Sense of Rhythm at the appropriate subscales of the Seashore's Tests, application of the modified Seashore's Test which would include only these two subscales of test, can be recommended for the assessment of candidates' competence at the entering of the Faculty of Sport and Physical Education.

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STIMULATION OF STUDENTS TO PHYSICAL ACTIVITY

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Introduction

In order to find ways to make physical education appealing to students, we dealt with the issue of sports-recreational competitions (in the follow-up SPRET) in primary schools. SPRET is organized as an extracurricular activity, and is based on students' self-organization so as to raise awareness of the importance of physical education and constant physical activity. Making connection between physical education and everyday life is a necessity in modern teaching.

SPRET model is a way for students to find suitable activity in which they are able to show results. Although all students attend classes of physical education, very few schools organise additional sporting events at schools. School competitions are attended by proven sportsmen – those who have already competed in their clubs. However, SPRET is aimed at all students regardless of gender, ability or weight. In our SPRET model students are encouraged to participate and be creative. In the range of sports-recreational activities on offer, they choose which activity they will take part in and to what extent. Through grading system which awards every initiative and creativity, students are challenged to organize competitions by themselves which serves as an educational factor since they need to obtain different types of knowledge and skills to do that successfully.

The teacher of physical education is put in the role of a counselor who guides students in the right direction, helps them with self-organization and channels their energy towards obtaining new discoveries and skills, since their success will reinforce their activity.

Constant physical activity gives grounds for a healthy nation. Today, students do not take enough exercise which results in numerous health problems. The question is: how to motivate students to sit and lie less and become more active in their free time? Nowadays, students have only three classes of P.E per week which we consider to be insufficient. Only one percent of the population are registered sportsmen within the system of competition. There is some free time which should be spent on RECREATION. We have already pointed out that it is in their free time that students are least active. By means of this project we want to prove that students can take interest in some form of physical activity and recreation should become a regular free time activity in the future.

The subject of the project is to do with an extent to which students participate in sports-recreational activities in extra-curricular time. Are students willing to recreate? Is it through SPRET that students become more active? Can we effect the extent to which students participate through the system of competition that we offer? After four weeks of implementation of SPRET project, can we expect students to accept physical activity permanently, i.e what is the echo effect?

Thus, the system of competition and grading which we offer is of a great importance. The course of activities as well as the outcome depend on it. Thanks to the pilot project carried out in 1997 at "Aleksa Santic" primary school in Kaludjerica (Mitic, D. 1997), we have a positive feedback on the system of SPRET competitions, hence we are optimistic in terms of the outcome of our project. Hopefully, the implementation of the project will result in the increased interest that students take in exercise as well as greater involvment of students in the P.E classes and extracurricular activities through self-organization.

Aims of the project are:

1. To encourage students to be physically active, so that exercise becomes a part of their lifestyle.
2. To cultivate the exercise routine so that it exists in the long run, for at least threee months after our project.
3. To present students with various forms of activity, which enable students to find the most suitable activity to do even in their FREE TIME.
4. To help students find new forms of activity to practice and adopt in order to improve their mobility and thus accept tasks imposed on them in regular classes of P.E. more easily.
5. To help students' self-initiative through self-organization.
6. To help students understand how important it is to possess sports-recreational kit.
7. To challenge students to take part in the organization of their own recreation.

8. To raise students' awareness of the importance of individual participation to the successs of the class, as well as good interpersonal relation among students with clearly defined team roles and common goal.

Hypotheses are:

1. Engagement of students in physical activity in extracurricular time will improve.
2. Improved engagement of students in extracurricular activities will last at least three months after the project.
3. There is a notable statistic difference in the interest students take in sport and recreation before and after the project.
4. Number of free time activities that students participate in will increase.
5. We expect self-initiative to develop among students, that will lead to sports-recreational competitions.
6. We expect students to have more items of sports-recreational kit after the project.
7. There is a notable statistic difference in students' initiative to organize and perform recreation, before and after the project.
8. Top three classes will be more successsful than other classes because they will act as a unanimous team in which self-initiative affects group success.

Basic **method of the project** is an experiment. To process data, a two-way T-test has been used.

To collect data in the research, a survey technique has been used, immediately before and after the project, i.e three weeks before and threee months after the project. The technique of scaling has been used.

As a basic **instrument** we used a **questionnaire** which is the same before and after the project. We used a questionnaire in Belgrade in a survey which includes 506 students in five primary and five secondary schools in December 1988. (Mitic, D. 2001, p 163-169). We compared our data with this research and some others which were carried out in degree essays. The questionnaire has been modified in several questions and adapted to our project and it consists of 26 questions.

Participation sheet was used in the research and proves any activity at school. It was possible to discern how many students participated and to what extent. We know the range of different activities students took part in. On coming to school, students would put their participation sheet into a box. We accepted only those sheets which were dutily filled in and verified by students' board. Every day we collected old sheets and distributed new ones. On the basis of it, we updated the information in the chart which was put up at some noticeable place at school. Every student could see the points they won and the current position that their class held. On the basis of these results, students were yet again challenged to collect new points i.e they increasingly practised and participated.

The project includes students of 5^{th}, 6^{th}, 7^{th} and 8^{th} grades (11 classes and approximately 170 students), of primary school "Gligorije Popov" from Rusko Selo, district of Kikinda.

Completion

Many activities are offered through the system of SPRET and students chose which activities they wanted to participate in. If they wanted, they were allowed to take part in more than one activity in a day. The more active they were, the more points they were assigned individually and as a class. In order to prevent misuse, excessive practice and exhaustion, competitive activities were limited to one hour and a half per day. We decided to do so because not all students were able to be active for more than one hour and a half, otherwise more capable students would be favoured. Another reason to limit the duration of activities is the fact that we did not want students to neglect other subjects. Finally, we did not set too many activities as our goal, we want to cultivate regular physical activity.

Activities we offered at the initial phase are as follows:

sports	**games**	
Athletics **Gymnastics** **Cycling**	**Basketball** (classical, basket, 2:2, 3:3, penalty, three points, tackle, boys, girls, mix **Volleyball** (6:6, 3:3, "fingers", boys, girls, mix) **Handball** (boys, girls, mix, 2-4 dodgeball, jagent) tennis **Football** (6:6 to 2:2 boys, girl, mix) **Tennis** (individual, couple, boys, girls, mix) **Badminton** (individual, couple, boys, girls, mix) **Bowling** (individual, couple, four, boys, girls, mix) **Tennis football** (individual, couple, boys, girls, mix) **Dance** (standard, Latin-American, kolo) **Rope** (skipping, pulling)	**Precision** (darts) **Courses** (individual, couple, group, class, skill, versatility) **Traditional folk competitions** (throwing, jumps, courses) Flying disc (couples, small groups, individual, juggling) **Aerobics** **Work out** **Active break** **Cheering songs** **New sport**

Participation in any of these activities for at least 15 minutes brings 1 point. Another 15 minutes brings another point. They are allowed up to 90 minutes in a day, which is up to 6 points for participation, plus points assigned for a victory if a standard competitive activity is in question.

Point system opperates according to this principle:

- Any participation brings 1 point for minimum 15- minute practice
- Victory brings yet another point for each contestant
- The score of a class is a total of points they have made
- Since classes differ in number of students, average mark has been introduced
- Each contestant's participation has been monitored
- All students are allowed to participate
- Three points were assigned for acquiring a new, creative activity such as juggling, serve at tennis, etc
- Individual or group that shows creativity and effort at conceiving and performing activities or competitions are awarded with extra 3 points.
- Paricipation in sport clubs at school also brings points according to the described principle.
- Paricipation in sport clubs also brings points according to the described principle.
- Participation in a sports competition brings 6 points, giving extra 2 points to the top three positions
- Participation in cross-country, orienteering, swimming, any type of race brings points according to the principle set in advance, the first third was assigned extra point.

Every participant who collected 80 points in 3 weeks was awarded a diploma, certificate. For the first 50 students, the ones who collected 80 points, apart from diploma, stimulating prizes were awarded: t-shirts, balls, hats…

Every participant was given a **participation sheet**. Participation sheet enables monitoring of each student, so that we got the most active participant, i.e the most active class, in other words class which had the best result, thus becoming the winner of SPRET. Participation sheets were filled in one day in advance. In order to be valid, participation sheets should be dutily filled in and verified by students' board.

To better monitoring of the results, we conceived a special notice board where all results were shown. All the information was updated on a daily basis so that new records at certain disciplines were always available and they were meant to provoke and challenge those students who were reserved. Additionally, we announced who had the best ranking at that moment as well as the most active class, but also the results of other classes and the score ratio. In this way, anybody can make a difference next day, i.e make it better for each individual as well as the entire class.

Following facilities were available to students:

- Gym
- Room for table tennis with three tables
- Outdoor football, handball, basketball, volleyball, tennis, football tennis courts, football pitch and field
- Possibility to have a half-day or one-day outing to a pond or forest,...

Pupils were allowed to use any other facility outside school, if they were able to provide any. This implies that participation does not have to be restricted to school only, but participation has to be verified by students' board which is established to do that.

Students' board of SPRET is conceived to confirm participation. It is elected every week. Every class has its representative in the board. Commission is informed about the place and date of activities in advance, so that they are able to attend the event and verify it. Each board member was awarded with 3 points a day for active engagement in a commission, and they were able to take part in other activities during their mandate.

Apart from the fact that students themselves choose sports-recreational activities, they are allowed to come up with their own activities in which they will take part. They could suggest some games which do not exist in Serbia but which in fact have a long tradition in some countries: croquet, indiaka, diagram, *"klis"* and *"mask"...*

Discussion

In the implementation of our project we encountered a number of issues and surprises. We needed to make a lot of effort to explain students what it is all about and to surpass the usual way of sports competitions and grading. In SPRET it is the participation that leads to a victory, and the victory itself in some actual competition is not as important. Participation matters, any engagement wins a point, regardless of ranking. Thus, from this perspective everybody has an equal chance to win.

The interesting thing was to monitor how students organized in order to collect as many points as possible. Some went hiking in groups, some cycled to the nearby village, others went fishing together, etc. The teacher of P.E met a group of students who cycled on their way to the village, which was really amusing. Nobody was missing. Namely, stakes were high and everybody wanted to be there. We are interested in interpersonal communication within the class at those moments, but that remains a mystery with which only students are familiar.

Self-initiative reached high level. They organized tournaments by themselves where the teacher served as an adviser. There were students who initiated running around their streets or walking around the village with their best friends. They were all winners, because they managed to show their individual traits through collective identity and they spent several hours in fresh air, in nature with their friends.

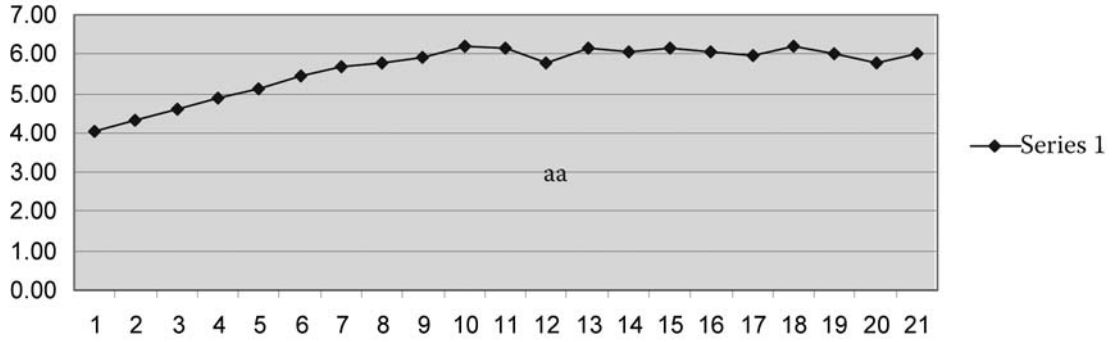
Every new day was a challenge since students were presented with score lists for each individual and every class. In this way the results of their efforts in SPRET became noticeable and strength of each individual obvious. It was interesting to see the commotion they created in front of the notice board. What matters is the conversation among student-contestants, the arrangements and plans they elaborated, further steps they were to take in order to beat the class which did well and earned a lot of points the previous day.

We noticed that students started taking more interest in regular classes of P.E. Physical activity became a daily routine which they like and enjoy. Apart from compulsory cullicular activities which are to be done in class, students initiated exercises they liked- you are more willing to take part in something that you suggested.

In three-week period of activities students were so devoted to sports-recreational activities that they seriously neglected other responsibilities at school. For that reason we reduced the competition from four to three weeks. Last week was especially interesting because five classes stood equal chances to win. Their free time was aimed at organization and participation in SPRET. We limited the duration of activities to 90 minutes which was not planned, for the reasons we have already stated, but we could not limit the amount of time students spent in order to think of new ways to win points.

Processing of obtained results of the research is in progress, but we can proudly present some encouraging results. In the first week of the competition, students participated from 45 to 60 minutes on aerage. For 15 minute practice they won a point. In the second week participation time amounted to 90 minutes on average. Some participants spent 2 to 3 hours. In the third week time spent on physical activity stopped at 90 minutes. Students won extra points for victories, new creative skills, engagement in a students' board, etc. Towards the end of the second week of the competition we encountered the problem of cheating with the actual results. We solved the issue successfully by awarding clasees for fairplay with extra points.

Chart number 1 Average engagement of students in SPRET



Through SPRET system a teacher of P.E, in the role of initiator and facilitator, becomes a prominent person at school. His or her work is in the spotlight, everybody comments on various activities that take place on a daily basis. This benefits both our line of work and students.

The question is how to win other teachers over. One way would be to introduce the system of grading and achieved results into other subjects as well. For example: any given mark in maths or chemistry wins points for individuals and classes. The greater the mark, the more points it wins.

Regulatory rules on finance of schools and teachers did not deal with the finance of additional engagement of teachers, so that you cannot expect teachers to carry out any additional work. In our project, teacher is not strained, he is the initiator and students take over from there and perform the tasks. Teachers should channel students' initiative, solve some issues and arrange the use of courts. Therefore, a teacher has a minimum of additional engagement, and he gains a lot as a result- both for students, himself or herself and the total atmosphere at school.

There is only one question unresolved- a prize fund. We managed to raise enough money through donation. Schools can provide for prizes from their own sources, but very few schools can afford that. In the end, the most convenient solution is to cover expenses by giving one euro for the entry per person. Thus, we additionally stimulate the engagement of students and help create more serious atmosphere. Nevertheless, we decided not to use this model as school board warned us that this type of finance in a small community (such as Rusko Selo) could provoke resentment of parents who may suspect that the whole idea is a manipulation aimed at extortion of money. We opted for donations. It is up to people involved in this project to choose the most suitable way to raise money.

Conclusion

We managed to urge students to additional, voluntary activity. System of grading and awards motivated students to participate and understand physical activity not only from the perspective of participant but from the perspective of initiator.

Physical activity became a part of a daily routine and students chose activities which they liked. Whether they are going to work out is no longer a question, but with who and where they are going to do that.

We believe that we have come up with a great idea which needs to be elaborated and adapted to serve specific needs of different schools. The question is how to make SPRET available to other teachers of P.E in Serbia. We are encouraged by the fact that Regional Ministry for Sport approved funds for the pilot project in two schools, which is about to be carried out.

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THE ROLE OF LEGAL REGULATION IN AFFIRMING THE PHYSICAL EDUCATION IN SERBIA

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1. Introduction

The term 'physical education' belongs to educational categories (educational system). Physical Education is, in fact, a regular and obligatory subject in pre-school, primary and secondary education. However, the term of 'physical culture' is much wider and it can be studied in the context of all the social fields, including education. In that sense, the concepts of sport and sport recreation differ from the concept of physical education, since these types of physical activities are not legally proscribed.

Physical Education in the curriculum is prescribed by the Laws on Fundamentals of the System of Education of the Republic of Serbia (*Official Gazette of the Republic of Serbia*, no. 62/2003, 64/2003, 58/2004 and 62/2004). In accordance with law, educational work in the field of Physical Education is performed by: teachers, primary school teachers, kindergarten teachers, assistant teachers or another responsible person. The responsibility of these persons is to contribute, by their work and overall behavior, to realization of the proscribed tasks of Physical Education: encouraging and developing physical and health-related abilities of children and students. Without participation of the state (legal regulation in this field), significant results would be hard to achieve. Therefore, this study has as its aim to bring closer attention of general expert public to this matter in order to involve it into further discussion of this topic. Furthermore, the authors would like to emphasize the need of greater state involvement in this field through different forms of legal regulation and relocating greater financial means for these purposes.

The System of Education offers quality Physical Education, which, in addition, guarantees that children will gain the bases of 'health-literacy', necessary for someone who lives in the complex modern society. The final aim is to achieve the best possible physical and health state of the nation. Until the end of secondary school everyone is offered the possibility to get to know the basic postulates of the importance of physical activities in everyday life. After they finish secondary school, young people are to decide for themselves whether they want to pursue some form of physical activity or not. Positive legal regulation is currently like this. It does not mean, however, that the state cannot and should not create conditions for making Physical Education obligatory even later (students at the universities, employees in companies, etc.). In general, the authors hold that the competence and responsibilities of the state should be made more significant when it comes to this field.

Referring to the relevant Provisions of the Constitution of the Republic of Serbia, Laws on Fundamentals of the System of Education, the Law on General Administrative Procedure, the Law on Public Offices, the Law on University Education, the Law on Sports, as well as the competences of the National Education Council of the Republic of Serbia, the Office for Affirming the Education, the relevant Ministry and other authorities and bodies competent within the field of Physical Education, the authors underline the necessity of a detailed research and practical application of this field. Furthermore, this work indicates the rights, obligations and responsibilities of all participants (both legal entities and natural persons) in the process of physical education in Serbia. In addition, they emphasize the authentic prominence of physical education seen as integral part of the general process of education, and in the context of international, particularly European, education, scientific and artistic space. The said research primarily focuses on the physical education related activities within the system of the following educational institutions in Serbia: kindergartens, primary schools, secondary schools and universities.

2. Physical Education in Kindergartens

Within the nine-year obligatory education system, preparatory pre-school program in the field of Physical Education plays an important role. Its role is regulated by the Law on Fundamentals of the System of Education of 2003, in which it is stipulated that children ages five-and-a-half to six-and-a-half are to be involved into the program of obligatory Physical Education. At the moment, in Serbia, this number amounts to round 70.000 children. They are subjects of the Book of Regulations on Fundamentals of Pre-school Program, published by the National Education Council of the Republic of Serbia (currently the Book of Regulations of 2006 is in power). General Fundamentals of the pre-school program go with the Book of Regulations and are an integral part of it. The pre-school program is realized by teachers, who, according to new regulations, need a university degree, received at Teacher Training Faculties.

Kindergarten is an institution, which performs activities of education of the pre-school age children. Management of a kindergarten adopts Pre-school Program, in accordance with General Fundamentals of the Pre-school Program. In the Pre-school Program the following provisions are stipulated: aims, sorts, range, forms and duration of educational work. In accordance with these regulations the following are defined more precisely: aims, activities and content, which all contribute to physical development of children of this age (so called models A and B).

Aims: motor skills, senses, health, hygiene. Activities: corporal, perceptive, health-hygienic. Content: experience gained thanks to movements, enabling corporal functions, using senses, medicine, and sport. Kindergartens, among other things, have an obligation to make sure that a child is physically prepared, which means a certain level of development and health. The task of the kindergarten teacher is to contribute to optimization of a child's development by careful selection of activities, appropriate forms, quantity and variety.

The aim of Physical Education with children of pre-school age (between five-and-a-half and six-and-a-half years old) is to, by developing various and systematic motor skills in connection to other educational fields, contribute to integral development of a child (cognitive, affective, motor), development of motor skills, acquiring, improving and use of motor skills, habits and necessary theoretical knowledge in everyday and specific life and work conditions. The aims of Physical Education for pre-school children are: motivating growth and development, influencing the right body position, acquisition of motor skills, getting theoretical knowledge needed for their acquisition in order for them to be able to understand the importance of Physical Education, creating moral qualities and will strength, enabling children to use acquired skills, knowledge and habits in everyday life, creating and developing awareness of the need to be healthy, protect one's health and protect the nature and environment.

We should perhaps add here that persons working with children in kindergartens are skilled professionals, kindergarten teachers, who must strictly stick to aims and tasks of children's Physical Education, proscribed by the Book of Regulations on Fundamentals of Pre-school Program and by Pre-school Program, adopted by the management of a kindergarten. Kindergarten teachers get their qualifications at Teacher Faculties, Department for educating kindergarten teachers, where they have Methodology of Physical Education as an obligatory course.

Pre-school program is, in fact, a preparatory program designed to prepare children for elementary school. During this program children get general and specific readiness for school. One sort of readiness is also their physical preparedness for school, which includes a certain level of corporal development and health, development of physical abilities in children to accept and respond to obligations awaiting them during school life. In that sense, in kindergartens children get support in their development (balance, strength, coordination), they are taught movements which include main large muscle groups, they learn motor games with rules and structure. Kindergarten teachers carefully observe abilities of children and choose adequate activities.

3. Physical Education in Primary Schools

When considering the legal aspects of Physical Education as an obligatory subject in all grades of primary education and character training, the first references are, by all means, the Rulebooks of educational syllabus of Physical Education, as the basic sub-Act which determines the goals and assignments of Physical Education, as the obligatory educational subject, the program of the curriculum and the way how to implement the curriculum. School boards of primary schools make plans and programs according to these Rulebooks. The next reference is the Rulebook of school space standards, equipment and instructional aides for primary school, as a legal basis which regulates the space, equipment and instructional aides for teaching Physical Edu-

cation. This is the essential condition for achieving the goals, assignments and educational syllabus. It is clear that these three legal acts represent the basis of the complex process of teaching Physical Education in primary school, which pervade among themselves and interact with the situations that arise in the working process. All these issues are primarily decreed by the Law of basic educational and character forming system and the Law of primary schooling.

The basic goal of Physical Education in primary school is to contribute through diverse and systematic motor activities to a complete development of character and motor abilities in students, and the achievement and application of motor skills, habits, and theoretical knowledge in everyday and specific conditions in life and work. This is important for the encouragement of growth and development, and its effect on the good posture, the formation of moral and character-building characteristics in a person, and the acquisition and development of an awareness of the need to be healthy, to keep and protect the nature, health and the environment. The educational syllabus of Physical Education assumes that through the development of physical abilities and the acquisition of many diverse skills and knowledge, the students are being prepared for the fulfilment of individual needs and interests in everyday life. For this reason, the educational syllabi contain precisely defined tasks in accordance with the sex and age of students. There are several stages set in order to accomplish the educational syllabus as successfully as possible: assessment of the state, allocation of assignments for individuals and groups of students according to the assessed abilities, evaluation of the means and methods for the accomplishment of the assignments, educational tasks, the survey and appraisal of the effects and the grading of students.

Educational syllabi for I, II, III and IV grades of primary education and character training are published in the Official Gazette RS- Educational Gazette no. 10/2004, 20/2004, 1/2005, 3/2006, 15/2006, and 2/2008 and for V and VI grades in the Official Gazette RS- Educational Gazette no. 6/2007, 8/2008. For students who attend VII and VIII grade in the school year 2008/09, the Rulebook of changes and supplements of the Rulebook of educational syllabus for the primary education and character training, is published in the Official Gazette RS- Educational Gazette no. 9/2006. We should point out that the generations of students who attend I, II, III, IV, V and VI grades in the school year 2008/09 of primary education and character training, cover the teaching curriculum according to the new reformed programme. The programme conception of physical education in primary school is based on the unity of the curricular, extracurricular and extramural organizational forms of work, and it is realized in class, and through extracurricular and extramural forms of work, such as cross-country, camping, winter holidays, different courses, free activities, competitions, corrective and pedagogical work, sport days, shows and public appearances. The integral part of a physical education curriculum is the compulsory programme – optional sports, realized as one class per week according to the students' choice, and depending on the school capabilities. The sport is chosen in the beginning of the school year, and the classes are compulsory for every student and it is a part of the regular school curriculum. These classes are organized in accordance with the school capabilities, within the school building or outside of it, or in a sports hall, on a pool, on an open court, ski slopes, an icing rink. The content of this compulsory programme is put forward by the physical education teachers, in accordance with the interests of the students, the capabilities of the school, the age characteristics of the students, and the existing professional qualifications of the teachers. The teaching of physical education as a subject may be organized in the third and fourth grade of the primary school. Compulsory is also the professional and instructive work on a series of exercises on the ground, on the apparatuses, the swimming, the teaching of a chosen sport, different courses, and the corrective and pedagogical work with students of lesser physical abilities, weakened health, or those with bodily deformities and bad posture.

The Rulebooks of educational syllabus of Physical Education allow a large margin for the schools to adjust, depending on the material conditions of work and staff. The contents of the syllabus for the first two grades had been dealt with in a detailed manner, and for the other grades only the key parts of the syllabus were listed. It was done so that the physical education teacher could have a freedom to creatively find efficient solutions and choose the exercises in the process of physical education suitable to the specific abilities of the students and the spatial and material conditions of the school. This approach is supposed to minimize the number of students excused from the classes of physical education. A corrective and pedagogical work is organized for the students with lesser physical abilities, weakened health, bodily deformities and bad posture, in cooperation with a medical specialist or a physical therapist. They do their exercises in regular classes and in classes of corrective and pedagogical work, and the programme of the exercises is adjusted to their health condition and their physical abilities.

The important legal basis in the work of teachers of physical education are also the regulations in the Rulebook on the grading of students of primary schools (Official Gazette RS no. 93/2004, 92/2005) according

to the Rulebook of educational syllabus of Physical Education. The evaluation and grading of the achieved results and accomplishments of the students is done throughout the whole year, based on a unique methodology for four thematic parts, i.e. grading and evaluation of the state of motor abilities, health and hygiene habits, the achieved level of the covered motor knowledge, skills and habits, and the attitude towards the class. During this, the basic reference for the teacher is the pedagogical approach to the evaluation of a student's accomplishments, so that the grade works as a stimulus, especially because of the great interest for games and movement characteristic of the students on the primary school level. Respecting the article 7 of the Rulebook on the grading of students of primary schools, when grading students with lack of abilities for the subject, the commitment of a student is taken into special consideration. Adherence to the pedagogical approach in the evaluation of a student's achievement should result so that not a single student has a failing grade (1). This is especially important when we bear in mind the obligation to adjust the contents of the programme and forms of work to the spatial conditions, the number of students, the quantity of apparatuses and equipment, the age and physical development, sex and physical abilities of students.

The indispensable condition for the accomplishment of the goals, tasks and the curriculum of the physical education syllabus is certainly the procurement of the necessary teaching equipment and the adequate school space and furniture. This area is regulated in the articles of the Rulebook on normative on school space, equipment and teaching equipment for primary school (Official Gazette RS – Educational Gazette no. 4/90). It should be pointed out that this legal act originates from 1990, and that many of its regulations have become obsolete or discordant with the contents of the new syllabus, particularly in the part that deals with the normative for teaching equipment. On the other hand, when it comes to the prescribed conditions for the size and shape of courts and gyms, a large number of schools in Serbia fails to satisfy these prescribed conditions. It is precisely in this domain that we find the biggest discrepancy between the legal base, that is, the legal acts and sub-Acts which regulate this domain and the actual situations in the field.

It is necessary to balance the provisions of the normative with the contemporary demands of teaching Physical Education, and on the other hand, to improve the technical conditions in schools in terms of having the adequate space for teaching Physical Education. There is a small number of schools in Serbia that have an outdoor gymnasium and a sport field of 9.250 m^2 (4.050 m^2 for undeveloped primary schools), with an asphalted volleyball, baseball and handball courts; a sandpit, a putting circle, a grass field of size 30 x 50 m and four running tracks at least 80 m long. There is also a small number of schools that satisfy the criteria of having the adequate gymnasium. Schools with 8 to 16 classes should have, by the normative, one gymnasium of size 24 x 12m. Schools with more than 16 classes should have one gymnasium of size 26 x 15 m, or two gymnasiums with all the accompanying rooms: for the gym apparatuses of size 30 m^2 and 50 m^2 respectively; a room for teachers with a coatroom, a shower and a toilet of size 16 m^2, with two changing rooms and two bathrooms (shower, washtub and toilet) of size 16 m^2. The level of adherence of this sub-Act, that is, the incidence and furnishing by the criteria and the parameters from the normative depends above all on the factors that school and teachers can hardly have any influence upon. By these factors we refer to, above all, the financial and material possibilities of the local government which the school belongs to. The current budget orientation of the funds assigned to education target the great majority of funds (around 97%) to the earnings of the employed! The authors find this state of affairs completely untenable.

4. Physical Education in Secondary School

There are approximately 500.000 secondary-school pupils in the Republic of Serbia at the moment. The law does not oblige pupils to enroll in secondary school. However, if they decide to enroll, all subjects, including physical education, become compulsory for them. According to the school curricula, number of PE classes is two plus one per week (two classes of regular teaching and one class for the chosen sport). These rules apply both on the four-year secondary schools and three-year secondary schools. PE classes in secondary schools are taught by a teacher with university degree who graduated from Faculty of Sports and Physical Education. The teacher's work is based on license issued by the Ministry of Education.

Bylaw on physical education curriculum, as the sub-legal act, determines the objective and task of PE in secondary school as of the compulsory class. In accordance with this Bylaw, secondary school committee enacts the school curriculum which elaborates contents and activities of PE in all grades. In secondary schools there is also a pupils' parliament who can decide if the school competitions in some of the optional sports are required. All pupils' rights, obligations and responsibilities in implementation of PE in secondary school are regulated by The Law on Education and Pedagogical bases and Secondary school Law.

In order to effectuate PE objectives in secondary schools in Serbia, in accordance to the actual curriculum, it is necessary to synchronize the required standards of school space with the situation on the spot. Presently, there are few secondary schools in Serbia which have the appropriate open and closed space necessary for PE class realization. Authors consider alarming the fact that some secondary schools, especially in urban surroundings, do not have their own premises for PE class realization. In such cases, PE classes take place in the rented premises. Physical education in secondary school (as well as in primary school) is assessable. The PE mark in secondary school is numeric exclusively, from 1 to 5, and it is a part of an average mark.

5. Physical Education at the University

The actual Law on University Education does not oblige faculties and other university institutions to have PE among the other compulsory subjects. Such obligation is neither required by The Law on Public Services. From the late 60s to the 2000, all students at the Serbian universities were obliged to have PE during their first year of studies. PE was realized during two semesters and it was conditional for the second year registration, although it was not assessed. PE classes at, so called, 'non-parent' universities were realized by the PE professors who were the members of the University Chair at The Faculty of Sports and Physical Education. These classes were supported by the funds of a departmental ministry. The authors of this work were not dealing with reasons that led to the suspension in PE class realization at the Serbian universities; however they believe that its reactivation would be very useful. In addition, based on direct experience from the period when the PE classes were realized at the universities, we suggest introduction of this classes as compulsory, during the whole period of studies. In order to provide opportunity for the above mentioned, the Republic of Serbia should enact certain laws.

Bringing to an end, the authors remind that the problem of physical education influences the other regions of public life and work, such as employees, people with special needs, army, police, etc., but we are not dealing with that topic in this work.

6. Conclusion

- Every year, in the Republic of Serbia, approximately 70.000 pupils enroll the first class of primary schools. It means that approximately 70.000 children aged from five and a half to six and a half enrolled the kindergartens during the previous year. There are approximately 830.000 children aged from five to fourteen and approximately 350.000 teenagers aged from fifteen to nineteen in the Republic of Serbia. Therefore, in the Republic of Serbia, preschool, primary and secondary education comprise approximately 1.000.000 children and pupils per year, which means that they are all comprised by compulsory physical education.
- According to the data of Ministry for education, it is alarming that 50% of schools in the Republic of Serbia do not have a gym; therefore the total PE curricula are only partially realized. This situation will remain the same for the next 10-20 years at least. Actual state is the following: all those who have right and, at the same time, obligation to engage themselves in physical activities, do not have necessary conditions for the fulfillment of those rights and obligations. Spatial conditions for PE curriculum realization are unsatisfactory. The premises for PE classes should enable every pupil to fulfill their right and obligation of being active in PE classes. .
- Positive-legal regulation related to the physical education is generally good, but its practical realization is rather weak, which is usually explained by the financial shortcomings (for example: Bylaw on standards related to the school premises, equipment and teaching materials for primary schools specifies that the school with more than 16 classes should have two gyms or a hall, and, as we know, it is not the situation on the spot).
- Taking this into account, we may conclude that the future of PE in the Republic of Serbia depends on both state financial possibilities and legal regulation improvement, which does not comprise state allocations in accordance with the Law on Sport and Law on the Local Self-Government.
- National health directly depends on the amount of funds set aside from the state budget for PE activities, that is, by improving PE, state has preventive influence on the level of national health.
- Taking into account the provisions of The Law on Education and Pedagogical bases, Ministry of Education in the Republic of Serbia controls its implementation; therefore it is directly responsible for its application. Proceeding from this that substantial number of schools in the Republic of Serbia does not have adequate or any gym, the question poses itself: How did those school get the work permit, i.e. who is responsible for the failure of curriculum fulfillment?

- Authors claim that one of the greatest omissions is not having PE as compulsory subject during the whole period of schooling, not considering possible forms of compulsory physical education on the work-place (which is a practice in certain countries), as well as not taking into account attitudes of relevant people, belonging to this field, in above-stated issues during the adoption of the law.
- At the end, the important conclusion poses itself: the Republic of Serbia, as a signer of basic European documents on sport, should follow their experience, and by improving legal regulations, especially on the local community level, should expand the circle of users who will be able to fulfill their needs in the field of physical culture.

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SOME ASPECTS OF SEARCHING THE BEGINNINGS OF THE FACULTY OF PHYSICAL EDUCATION AND SPORT OR WHERE OUR ROOTS ARE

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INTRODUCTION

It is of vital importance to identify exactly the origin of each institution. In such searching some institutions reach their first appearances and choose them for their roots.

There are many examples in contemporary cultural history of our country that many institutions returned to their beginnings and roots, liberated from any political influences and restraints, perceiving the speech of the facts and their significance in determination of the origin and beginnings.

If we observe the cultural past of Serbia in the last two centuries, it can be noticed that in political and cultural history of the 19th century, from the time of the first liberation from Turkish slavery (1804), during the time until the independence was gained (1878), in the newly liberated Serbia, the first state political and cultural institutions were founded. They present the roots of the most important institutions in field of culture, education, health care, judiciary and other state institutions.

With the change of the ruling dynasty of Karadjordjevic, and succession to the throne of the Obrenovics, in the 19-century Serbia and at the beginning of the 20th century, the relation towards those institutions also changed, which influenced their position, i.e. development or stagnation, so their significance and role was also underestimated if they had been founded under another dynasty.

However, in the course of the 20th century, by political changes of the state regimes of Yugoslavia, from the Kingdom of Serbia and the Kingdom of Yugoslavia to the Socialist Yugoslavia, there were some even more drastic changes, even the denials of the role, significance, resulting sometimes in changing of the historically determined beginning of many cultural heritage.

We witnessed similar events after the October changes in 2000, when everything that had occurred in the previous periods, which also did harm to these institutions.

Of course, that "reduced" periods of continuity of certain forms of cultural and other achievements, which was interrupted with force, on the pretext of cleaning "the ostracized past and a necessity for new starts" Usually, these "new starts" were linked to the new socio-political system of the governmental structure, but most often far from historical truths and irrefutable confirmed facts.

It certainly contributed to bad image of cultural past of Serbia, which was returned to such "new starts" a few times. Conscious of the caused damage, in recent years we have been witnesses of the more expressed return to real starts, proving the real beginnings, existence and development of these institutions in the course of those two centuries.

Such events did not spare even the University of Belgrade, which as such was established in 1905 and used to mark that year as its beginning until 1988. It was only then that 1838 was declared as the beginning of the work of the University, being the year when a 2-year lycee had been opened in Kragujevac. Thus the University marked 150-year anniversary in 1988.

It is necessary to note that the Lycee of Kragujevac was created from two separated classes of the 6-year secondary school in Kragujevac. This fact is particularly significant if we keep in mind the choice of the University of Belgrade, which found its roots in the beginning of high education of the Principality of Serbia, in two classes of the Lycee opened in Kragujevac in 1838.

However, this year the University of Belgrade has reached even farther past of high education, by searching and finding its origin in Great school, established in Karadjordje's Serbia in 1808, marking thus the 200 years of existence. It is important to know that Great school was "the first school higher than elementary school", according to the explanation of that time.

BEGINNING OF THE WORK OF THE FACULTY OF SPORT AND PHYSICAL EDUCATION

Similar events did not spare our Faculty, and regarding the determination of its beginnings and searching of its roots, in the period after the Second World War we passed several phases, with different choices of its beginnings:

- In 1948 and 1958 we chose 1938 as the year of the Faculty's beginning.
- In 1976 we chose 1946 as the year of the Faculty's beginning.
- In 1984, 1988. and in 1996 again we opted for the year of 1938 as its beginning.
- In 2006 we chose 1946 as the year of the Faculty's beginning.

We did this as if we were not aware that we deny our past without reasons, doing injustice to all those generations of students and professors who had studied and worked in the institutions preceding our today's Faculty.

Respecting and accepting historical facts, ***the indisputable year of the beginning of work of our Faculty is 1938***, when doctor Bujic, the Minister of the Ministry for physical education of the peoples of the Kingdom of Yugoslavia, approved by the minister of education Margasevic, made the decision on 18 July 1938 about ***"One year course for preparation of physical education teachers in schools".*** The school had a Curriculum consisting of 25 subjects and 20 teachers, 9 of which continued to teach in that School even after the Second World War.

The important fact is that on the invitation to opening on 15th September 1938 it was written: ***Formal opening of School for physical education,*** which was opened after many years of efforts of the Sokol members to open one high school for education of teachers of gymnastics in elementary and high schools.

After one year of work, this School evolved into a two-year ***School for physical training (1939)***, which had 30 courses and 27 teachers. That School worked until the beginning of the April war in 1941. i.e. attack and occupation of the Kingdom of Yugoslavia, when teaching process ceased, but the School continued to exist and work administratively.

School for physical training restarted its work 20 days after the liberation of Belgrade, while the Second World War was still lasting, by organization of ***"phys-cultural courses"*** for future physical culture leaders.

The Ministry of Education of the Democratic Federation of Yugoslavia made the decision on foundation one-year ***Higher course (18.07.1945)*** for the purpose of faster preparation of necessary professional staff in the field of physical culture. Majority of teachers of ***School for physical training*** continued to work in this one-year school which enrolled 75 students.

In order to educate as professional as possible personnel, the Government of the Federative People's Republic of Yugoslavia, made the Regualtion on ***State Institute for phys-culture (16.07.1946)***, canceling thus School for physical training and establishing the State institute for phys-culture, lasting three years. However, in 1948. the studies at the State institute are prolonged to four years.

At the beginning of academic 1951/52 the name of the State institute was changed into ***Institute for Physical culture,*** in compliance with socio-political changes and the initiated process of withering away of the state. Except this change of the name, the aims tasks, organization and function of the School remained the same.

The National Assembly of the Republic of Serbia passed the Law on ***High school for physical education (12/10/1956),*** which equalized the position of the students of this school with the status of students of other faculties of the University of Belgrade, by its position: ***"The Diplomas issued by the High school have equal value as the diplomas issued by the faculties of the University".***

High school for physical education ***was accepted by the University of Belgrade on January 6th 1963***. which was a reward for the school for overall achievements in the field of education of physical education staff and it was put in equal position as other faculties of the University of Belgrade.

The Assembly of the Socialist Republic of Serbia passed the Law on the ***Faculty of physical education (11/12/1968)***, so the highest level of university educational-scientific institution was reached. Starting from 1985, this day is marked as the ***Faculty day.***

The Faculty then changed name in ***Faculty for physical culture (1987),*** and a little later in ***Faculty of physical culture (1990).*** Today's name ***Faculty of Sport and Physical Education*** was adopted in 2000.[1)]

Therefore, based on the aforesaid facts, it can be concluded that **our Faculty was founded in 1938 and has been working continuously for 80 years.** Any exception to these facts can only be the result of underestimate, serving to daily political necessities or subjective linking to certain period or institution. The historical facts and scientific proofs can be evaded, but never erased.

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ROOTS OF THE FACULTY OF SPORT AND PHYSICAL EDUCATION

We are sometimes shy when we talk about the ***roots of*** our Faculty, and we rarely write or mark them, as if the facts regarding that do not talk about real beginnings of education of teaching or initiation of physical exercises in school. It is time to talk about it with more readiness to accept it and observe them as origins of our institution, as it was done by the University of Belgrade.

Although the year of 1938 was an undisputed year of the beginning of work of our Faculty, we could choose, analogously to the choice of the University of Belgrade, for one of the possible historical appearing of physical culture:

1. In Belgrade, the Ministry of Education opened ***School of Gymnastics (1908)*** aimed at education of gymnastics teachers for secondary schools. The Ministry approved a curriculum with 16 subjects and appointed 8 teachers. Theoretical and practical instruction was compulsory, and it could be attended by Serbian citizens, who were not younger than 18 or older than 25 years of age, and who had completed at least six grades of secondary school, teacher's school, commercial academy, fine arts or music school. Additionally, they all had to have a medical check-up, to have health and physical abilities and personal characteristic necessary for a teacher in secondary and vocational schools.
   The School of Gymnastics started working on May 1st 1908 and 20 participants were enrolled, two of whom were female. Although it was predicted that the school lasted one year, the lectures were finished on 29.10.1908 and the exams took place form 1st to 5th November 1908. Out of 20 enrolled candidates, 10 candidates completed the studies, two females included, and they were placed in secondary schools of the Kingdom of Serbia.
   Although the School of Gymnastics lasted only 6 months and was attended by only 20 participants, it was a significant and serious attempt in creation of one high educational institution for education of gymnastics teachers (today: PE teachers), and the experience from that work was used in the after War attempt to open such a school, which was only achieved some thirty years later. [2)]
2. The second important historical fact was ***organization of trainings (in 1872 and 1873)*** in Kragujevac for professional qualification of elementary school teachers for teaching gymnastics as well. Those trainings were held by Petar Predragovic, graduate gymnastics teacher from the Lycee and Teacher's School of Kragujevac. The first training was attended by 75 teachers and P.Predragovic prepared "Syllabus for teaching gymnastics to elementary school teachers" distributed in 18 lessons.
   Based on this Syllabus and the held lectures P.Predragovic wrote the manual entitled ***"Short instructions for teaching gymnastics in elementary schools"***, whose printing in 1.000 copies was approved by the Ministry of Education in 1873. This manual displays historical development of gymnastics, teaching method of gymnastics with more exercise described textually and with drawings and for a few years afterwards, that was the only professional manual for gymnastics instruction and played vital role in improvement of professional level of teaching process.[3)]
3. The third significant event for perceiving our roots was ***introduction of PE classes (1868)*** and therefore existence of gymnastics teachers able to perform such classes, when the Minister of Education Dimitrije Matic, by his announcement of 10th December 1868 recommended to teachers *"to fix every week 3-4 classes out of school hours for gymnastics..."* to which the attached *"Instruction for physical exercising"*, divided into 17 topic units, which was the basic elementary PE syllabus.[4)]
4. By taking an exam of ***Practical gymnastics*** in the School of Artillery in Belgrade and by obtaining the ***Certificate – Diploma (1862)*** Petar Predragovic became entitled to carry out gymnastics instruction and became the ***first graduated gymnastics teacher in*** the Principality of Serbia.
   The fact that in 1862 Petar Predragovic was appointed gymnastics teacher gives us right to consider this year the beginning and root of education of physical culture teachers in schools.
5. Finally, by following fully the choice of the University of Belgrade we could also find our origins in ***Great school (1808)*** because captain Petar Djurkovic taught military exercises, which consisted of physical exercises.
   If the University accepted that Great school (1808) as beginning and root of university education of Serbia, then we can also accept that physical and military exercise of captain P. Djurkovic were the beginnings of physical education instruction in Serbia.

2) S. Ilic, *S.* Mijatovic. *(1994). History of Physical Culture of Principality and Kingdom of Serbia, FFC, Belgrade.*

3) Ibid.

4) Ibid.

CONCLUSION

1. It is undisputable that the beginning of our Faculty can be found in 1938 when a 1- year course for preparation of PE teachers in schools started working for continuous 80 years.
2. ***The roots of our Faculty*** can be searched and found:
   - in the ***School of Gymnastics (1908),***
   - as well as in ***organized trainings*** of Petar Predragovic for ***gymnastics teaching in elementary schools, (1872 and 1873)***
   - and in ***introduction of PE classes (1868)*** in elementary schools,
   - or acquiring of certificate of ***graduated gymnastics teacher (1862)*** by Petar Predragovic
   - and finally in ***Great school*** in which Petar Djurkovic carried out instruction of military and physical exercises ***(1808)***.
   -
3. As an institution we have to know when we started, where our roots are and to mark that with pride and dignity.

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HOMONYMY AND POLYSEMY IN THE TERMINOLOGY OF SPORT

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1. INTRODUCTION

Problems of contemporary terminology in physical education as practice, science, teaching process and publishing are manifold: ambiguity, adjustment of the international terms to the grammatical system of the recipient language, orthographic correctness…

To reach standardization one should give a description of the existing usage of the term, its study (from the usage and language aspect) and through competent arrguing on possible suggestion that could ideally point to the so called official terminology (in science, in teaching process and partly in publishing industry). Some aspects of the current problems of modern terminology in physical education will be dealt with in further sections of the paper based on the research conducted with the aim to define some basic characteristics of the physical education terminology.

Research material comprised simple and complex terminlogocial entries (general, intergenre, content domains) derived by the sistematic selection method from corressponding genre books dedicated to certain sports games (basketball, volleyball, handball, football). The researched material comprises 887 single words and 3458 sintagmes from the mentioned sports literature corpus.

This research was aimed at considering the existing terms used in analysed material. As a special material to investigate were terms taken from the expert books and textbooks used as the exam literature in respective sports games at the Faculty of sport and physical education in Nis (Joksimovic, 1997); (Markovic 1997); (Jovanovic-Golubovic and Jovanovic, I. 2003); (Tomic, D. and Nejic, 2004). Their meanings can help the users to determine some concepts in the representative terminological field. The object of analysis were the terms made up of one, two or more components.

Corporate volume of the researched material comprises over 1000 pages of the text. As the source of information for the insights in terminology of the respective area of "sports games" different scientific expert literature was used.

When considering relation of a word and term from the aspect of determining termino-system then a special attention was paid to the phenomenon characteristic for each language– one and multi meaning realtions and relations of the sign and signified in such system in the language such as: homonimy, polisemy, synonymy, antonymy. While in spoken language these attributes of the sign (word) are seen as granted values in terminology systems these are estimated as drawbacks since the sign system of terminology should produce a system of subject-logical relations between concepts. Connection between the sign and signified in such a system should be mutually one-meaning: one signified concept – one sign and one sign – one signified concept. However, each terminosystem is a subsystem of the literary language so terms and the general words in language are attributed asymmetry of language signs manifested in homonimy, polysemy, synonymy.

2. HOMONYMY OF THE TERMS

When terms in their meanings differ to such an extent that they become members of different terminologies of the same language a homonymy occurs. This is so called interscientific terminolgy homonimy and is characterised by the fact that terms in different terminology subsystems have different definitions. For example:

Term morphology (Gr.. morfe – form, shape and logos - word, speaking) is a bearer of the different meanings in linguistics, medicine, ang botanics. In linguistics that is a part of grammar studying forms of words (cases, tenses, and the like). In medicine it designates science studying surface and inner structure of human body connected to his development and life. We associate with it anatomy, histology and embriology. In botanics this is a science dealing with the study of shapes and composition of the mineral matter.

Term reduction is used in different sciences – in phonetics it designates weakenning of sound (for example in nonstressed syllables in some languages). In chemistry it designates reaction in which oxygen is separated from the compund it is contained with.

In biology – weaken, decrease in proportion, and simplification in the organ composition in relation to the loss of earlier significance for the body.

In technics it denotes general name for the processes, actions and reactions that lead to a decrease of proportion of some parts of simplification of their structure– composition.

A noun party is also used in several terminological subsystems and in general language as well.

In social-political terminology it denotes political organisation which protecs interests of their class and wages war with other classes. In musical terminology party is used to denote parts of the multisound musical party defined for one instrument or voice.

In sports terminology subsystem it denotes the whole game from the very start to the end (for example a tennis party, a chess party...). Besides term noung party is used in general language as a word nonterm and denotes different finished games (card party).

A noun party is used in general language and has a metaphoric meaning spoken meaning of persons connected with similar attitudes, interests and the like, and can be used also with the meaning of finding a good match to marry.

A noun party is one of the many examples that show that the same noun cam become a term in several terminology subsystems and be at the same time a general language word that is out of terminology use.

A noun start denotes a term in sports terminology subsystem, and in cosmonautics and in general language it is non term used in metaphoric meaning such as : It was a good start of our folklore ensamble at the beginning of a big tour in our country. In this sense a noun start is used in the sense of beginning, good start performance.

Basic causes of homonimy encompase the following: 1) separation of meanings of polysemic word in the process of its semantic development; 2) phonetic overlapping of words formed from the same constituent elements but in different periods; 3) overlapping in sound of the wourd, mother and foreign ones; 4) overlapping of two borrowed words from different languages.

On the basis of all stated it is evident that for the terminology homonymy between the terms from different terminological subsystems is characteristic and the words from the everyday speech.

This aspect of homonymy is a result of the intermittent exchange of words of general language on the one hand and terms on the other hand. So terms for example drama, theater, physics, chemistry and many others have been transferred from the genre terminology into a general language and people have stopped considering them as terms.Vice versa many general language words gain expert meanings and become terms.

Note that homonymy in terminology is inter-systemic appearance. It exists either in terms of different terminological subsystems or between terms and common useful words. In the framework of one terminological subsystem homonymy as language appearance does not exist any more.

Some examples of homonimy are:

OUT [1] (Engl. out); (vollyb.); (handb.); (footb.);

Sport . an area outside of the border line the course (in football and other sports);

Sport . throwing the ball outside the border line of the course

OUT [2] which is not current, in fashion, not any longer popular; (hom.)

PENALTY (Lat. poenalis – punishable); (volleyb.); = PENALTY KICK;

Amount of money paid if contract is breached or violated

Sport. Jargon penalty kick due to the foul committed in the goalkeeper line;in football a penalty, in handball seven meter shot; б) violation in basketball; в) in voleyball strong smash throw performed immediately above the net, and earlier then the usual smash

PENALTY [2] obsolite, pencase ; (hom.)

RACKET[1]; (engl. racket)(basketb.);

Sport . piece of equipment used in tennis and table tennis to throw the ball;

Sport . the one playing table tennis;

Sport . in basketb. Marked area beneath the basket

RACKET [2]

1. illegal forceful money exortion from someone, racketing,

2. money given to a racket collector under force

HALL[1] (Germ . Saal); (volleyb.);

Spatious hall for dances, receptions and concerts and the like

Sport. Sports hall meant to entertain different sporting activites within the sports manisfestation or physical education curriculum

HALL [2]

1. lament of muslim priest to announce the death of somebody; (hom.)

TOURNAMENT [1] (Germ.Turnier); (volleyb.); (footb.);

a) hist. Knights competitions in medieval era with the spear and the shield, usually on horse; organized at sovereign palaces and during festive times and they were strictly ruled by codes (the right to take place was reserved just for the noble);

б) sport . sports or chesse competition between more competitiors on more occasions

TOURNAMENT_[2] (Fr. tournure);

obsol. Cushion fashionable in the first half of the 19. centery put under the upper part of the skirt to emphasise the female curves

SHOOT[1]; (Engl. Shoot); (handb.); (basketb.);

1. sport. Shoot, ball throwing (with leg or head in football, by hand in handball and waterpolo);

SHOOT [2]; (Germ. Schutt);

debris after demolition of the house, all construction debris

As for the homonymy it can be said that in our research material a small number of homonymy examples were found (7), thus confirming that homonymy is an intersystem phenomenon because homonymous meanings of the pairs of terms are found within different terminological systems.

3. MORE MEANING WORDS (POLYSEMY) OF TERMS

One meaning words are words having one lexical meaning, for example: amblem– a recognizable simbol of the state or the town which is represented on flags, coins, stamps.

In contemporary Serbian there is a great number of words having one meaning (for example names of chemical elements (ptassium, sodium, sulphur), names of plants (service tree, oak, plane tree), names of some cloth (sateen, cotton), sports names (basketball, handball, athletics, judo) etc. These words have strong subject reference. In lexicology these words are called one meaning or monosemic words. One of the most important feature of the term is a tendency to become one meaning word. However, many terms do not show this feature.

One meaning aspect is confronted to poly meaningness or polysemy. Polysemy presents one aspect of paradigm relations in lexis. Polysemy (more meaningness implies feature of words to have more meanings (Klajn, I, and Sipka, M. 2007), i.e. to designates different objects and phenomena. In certain meanings of polisemic words there is a link, i.e. each meaning of polysemic word has one common component with other meanings of that word although that relation is not always evident. Mostly meanings are connected mutually on the grounds of similarity between designated phenomena. Word satellite has several meanings linked to each other: 1) escort, body guard, assistant, partner (in bad sense); 2) astrol. Name for orbiting bodies around the planets according to the same laws as those orbiting around the Sun, for example the Moon is a satellite accompanying the Earth; 3) cosmic apparatus transported into the orbit by means of rocket devices; 4) fig. Yes man, for example satellite state. (Vujaklija , M. 1954).

The phenomenon of polysemyis characteristic for any language and with development words gain new meanings and nuances. However, in terminology this phenomenon is considered ill because within one terminological system a term should meet the demand a criterium of one meaningness. In its own right the phenomenon of polysemy presents not only manifestation of rational limit of the terminology resources but also the objective consequence of the cognitive process of getting to know the world around us. Some scientists claim that polysemy phenomenon is a lawful phenomenon. This is the area where the influence of the principle of sign economy is manifested where minimal number of lexical units is able to convey maximal quantity of information whith the minimal loss of language sources. This phenomenon does not manifest rational restriction of terminology potential but it characterizes semantic possibilites of the term as the element of this system. Also polysemy of the term is not a parameter of its incorrectness.The more developed polysemy in terminology the more the subject in focus is studied (thoughts), and the more precise the connection between the general science concepts and network of the conceptual apparatus is (Tatarinov, 1988: 16)

World around us contains immense number of subjects and phenomena. Their nomination does not mirror plastic concepts by rule „the number of concepts– the number of words ", that is „one object (phenomenon, concept) – one word". This is not possible because of the abundance of all objects that are to be designated and due to restricted possibilities of the language.

When in reality there were a million of objects a language would be composed of a million of words and thus it would become an enormous sign system not adjusted for communication.

Development and evolution of human language took different course – the course of more functional overload of language means which in turn created polysemy. By using one word to designate more concepts language has become flexible means of communication. By means of restricted number of lexems one expresses the overall diversity of the world phenomena. (Tosovic, 1995, 100). Research suggests that relativelly small

groups of most frequent words encompass a huge part of the usage and that 1.300-1.500 most frequent words encompass 60-70% of the used words and 2-2.500 lexems most frequntly used comprise 75-80% of the general words (Frumkina, 1973, 175). Just because of this language did not take other course in its development the ideal one designated by linguists: one word – one meaning – one word. But then it would be necessary to create millions and millions of words. However, in language most words (especially the most frequent ones) it has such a form system and lexico- semantic and syntactic connectedness that it can express whatever is needed (Tosovic, 1995,101).

More meaning words are more represented in languages than one meaning words. In dictionaries some meanings of more meaning words are divided by numbers.

More meaningness phenomenon meets the demand for the lexical means economy.

For example, previously mentioned noun start represents in sports terminology register a term with the characteristics of polysemybecause it manifests more than one meaning: 1) starting point, for the competitors; 2) starting of the game; 3) starting of the movement.

In Sebian there are much more words showing the feature of polysemy than the monosemy.

More meaningness occurs as a consequence of the feature to designate one but at the same time to designate the other phenomenon in the real world, if that phenomenon has common features with the named phenomenon. (Шанский, Н.М., 1964).

The existance of one or more meanings depends on its semantics and grammar characteristics.

Such words as pronouns and numbers are almost always one meaning words. More meaning words are nouns, verbs, adjectives.

A word attains a new meaning the moment this meaning is known to everyone who use this word in spoken version and in dictionaries as well.

Historically some words obtain new meanings and some lose them

Some examples of polysemy registered in this research are the following:

ACE
1) champion, the best (in sport, in auto races, in piloting);
2) in tennis, a point scored from the serve.
OUT
1) an area outside of the border line the course (in football and other sports);
2) throwing the ball outside the border line of the course
BASKET
1) jarg. Basketball ;
2) basketball played by arbitrary number of players on one basket;
THROWING
1) movement to throw the apparatus (apparatus, ball, weight) by hand to some distance or to some target
2) a grasp in combat sports

THROWER
1) Athletics: a competitor in throwing disciplines (shot put, javelin, disk);
2) Baseball: a player who throws the ball from the inner middle field to the setter standing next to the fourth base;
3) Cricket: one of the players standing behind the cross line of the course and throws the ball strongly to the opponent gate so as to bring it down;
BODY BUILDING
1) athletic discipline of weight lifting.
2) weight lifting and other workouts to develop, enlarge and shape the muscles;
GOAL
1) gate in football and other ball games;
2) shhoting the ball into the goal in football games and other ball games;
SOLE
1) a part of sports shoes;
2) a type of foul;
CHANGE
1) change of players;
2) change of positions during the game;
3) change of sides after the half time;

BASKET

1) a hoop with a net whose lower part is open and players try to score the point ;

2) a score, a point in basketball;

CROSS

1) a type of blow in boxing when the boxer twists the opponetns arm;

2) light athletics discipline,competition in running in the open,

CUP

1) competition with the elimination where the winner gets the cup;

2) cup; especially the award cup which in sport eaech year a player or an organization win if they are the best in successive mathes of some sports discipline

NET

1) cover from the back or side of the goal that detains the ball (in football, waterpolo);

2) dividing line that divides the course into two halves (in volleyball, tennis).

ATTACK

1) attack, attacking action of the players into the opponents part of the course;

2) a part of the sports team attacking in order to score a point;

DEFENCE

1) a move, action to prevent the counterpart actions;

2) defense players;

OFFSIDE

1) in football: irregularity in game when the player is located between the opponents backs and the golakeeper and thus obtains the ball, for this situation a referee whistles a penalty kick against the team whose player was found in offside;

2) (in rugby, hockey) illegal position of the player in front of the ball;

PENALTY

1) penalty kick due to the foul committed in the goalkeeper line;in football a penalty, in handball seven meter shot

2) violation in basketball;

3) in voleyball strong smash throw performed immediately above the net, and earlier then the usual smash

STANDING

1) in ball games shoot loosely but precisely ;

2) take a standing on the chart by eliminating the opponent and then go into the following phase of competition;

PRESSING

1) a name for the sudden attack, unexpected attack of the players that are most of the time defending;

2) in team sports a form of defense where each defense player strictly cover one of the opponents player and tris to disable him from taking any action;

RACKET

1) piece of equipment used in tennis and table tennis to throw the ball;

2) the one playing table tennis;

3) in basketb. Marked area beneath the basket

REPRESENTATION PLAYER

1) the best representative of some collective sports discipline in the state;

2) an athlete competing for the national representation;

START

1) starting point, for the competitors; (runners, walkers, velosipedists, pilots, rowers, horses 2)starting of the game;

3) the first appearance at some competition

starting of the movement.

4) decisive ball attack when it is in the possession of the opponent player (in football,);

START

1) start from the start line;

2) start the game, sports competition;

3) attack the opponent players so as to take away the ball (in football,);

4) take part in the game (as a rower, runner, swimmer, pilot);

TECHNIQUE

1) certain manner of movement;

2) training area,
FOOTBALL
1) football ball;
2) sports game;
ATTACKING PART
1) part opf the shoe;
2) type of player, role in the team;
3) part of the attack;

When talking about polysemy it can be said that it manifests some specific characteristics: one term is often used with different meanings in some sports disciplines. Therefore given type of more meaningness can be called register inner system polisemy. For example a term racket has different meanings in tennis and in baksteball. Genre polysemy is thus functionally restricted. A term is usually one meaning word within the real of that sport. However, there are more meaning terms whose meanings are not restricted by the genre it belongs to, for example the meanings of the term basket**:** 1) a hoop with the net whose lower part is open so as to enagle the player to throw the ball in it and thus score a point; 2) a score, a point in basketball.

Introducing science into the practice of physical education, sport and recreation means growing demand for clear and unique terminological and conceptual terminology.

Different terminological and conceptual designation process of labelling the phenomena, processes and objects that the physical education experts will inevitably meet seriously affects and burdens the dialogues and attitude harmonization between them.

Having in mind all mentioned alongside with the development of physical education it is necessary to deal with the ways of using the words in physical education, especially foreign words that represent terminology of physical education science.

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SESSION 3

CURRENT ISSUES IN BUILDING THE MACRO CYCLES IN TOP SPORTS

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Twentieth century, among other things, has been marked by a great development of sports. This in particular applies to the second half of the XX century, when practically all sports disciplines have sped up their development by improving the training methodology, expanding forms and scope of competition, construction of new sports facilities, much better organization of championships and trainings etc. All of said has been accompanied by increasingly voluminous expert and popular information, rising popularity if sports and financial investment in sports. Hence, from leisure activity, sport has become a professional activity for many individuals. For those who invest the money in sports, it is an opportunity for profitable business venture which generates financial as well as other gain.

Such momentum in sports has not been possible without educated professional personnel and influence of the science, which according to measure of progress in sports has been gaining an increased importance. By discovering certain patterns in sports, the science has enriched the practice, but the athletic practice, prompted, in biggest part by need and will to reach the maximum, has always been one step ahead.

The accumulated practical results and experience have asked for professional and scientific explanations. However, only after the World War Two, especially in the period from 1960 to 1970, first works had been published which explained in entirety the segment of training and competition. By leaning on his predecessors, in the first place L. Pikoli and N. V. Oyolin, the most reputable international authority in this field, L.P. Matveyev (1964) had formed new theoretical postulates which he expounded in detail in his subsequent books (Matveyev, L. P. 1977, 1999, 2001, 2008). These works had a profound impact on practically all theoretical works of this type in the world (e.g. Ulatovski, T. 1971, Harre, D. 1974, Bompa, T. 1983, Platonov, V.N. 1987, 1997, Choutka, M. Dovalil, J.1991, Željaskov,C. 1998) and in Yugoslavia (e.g. Petrovic,D. 1977, Malacko, J. 1991, Najsteter, Đ.1991).

Macro cycle, as a generally accepted term, has been in the beginning identified with one season (year) in sports, since the single cycle variant of training was dominant which comprised preparatory, competition and transition period. A substantive increase in the number of competitions and improvement of financial basis of sports made possible the championships throughout the whole year (even in the typical seasonal sports disciplines), which, in turn, effected the change in the traditional structure of the season. Instead of a season with one championship period, now more frequent are cycles with two, three and even more competition periods. If each of these cycles has retained all three periods which make its constituent parts, even much reduced, that has meant that during the seasons more macro cycles could have been realized.

The breakup of classical competition-training season where the competition period lasted long-time (6-7 months) into two shorter macro cycles, fully complied with the patterns of getting, keeping and losing sports fitness. Older researches (Matveyev, L.P.1977) but also newer research (Matveyev L.P.1991, 2001) as well as sports practice have shown that provided the strict criteria are adopted in regard to sports fitness an athlete can remain in good shape/with good sports fitness up to 2,5 months. With good planning and realization of training process, that period coincides with competition period. The next macro cycle commences with the new training period which favors creation of conditions for getting back athletic fitness and its duration in the course of second competition period. Because of the said, many athletic disciplines have moved from monocyclic to two-cyclic variant of the season.

Due to ever increasing domination of the seasons with two and three macro cycles, a monocyclic variant of the seasons has been neglected and considered as obsolete. However, very soon, it has come out that *"... the structure of the annual training-competition cycles of top athletes is not built from 3-4-5-6 macro cycles as deemed by some experts*" (Suslov,F.P. Šepelj, S.P.1999). The more complex structure of macro cycles and training-competition season, besides traditional factors which determine it (development patterns, keeping and losing of sports fitness, specific characteristics of athletic discipline, patterns of athletic development of an individual and his adaptation abilities, orientation toward important contests etc, Koprivica, V. 2002), has been caused by many factors and is of later date.

In the current development of sports, for one sports season consisting of one or more macro cycles, the following features are important:

1. All seasons differ among themselves, and in particular the season in which athletes prepare for the main competition, not only during that seasons, but also preparations lasting for several years - for Olympic Games.
2. A season may have more macro cycles, but three at most, since practical experience shows that in athletic disciplines wherein three-cycle periodization is used, practically there are no athletes who prepare at the same time for three main atheltic events divided into three macro cycles (Suslov,F.P.1998). Top tennis players are forced to do that by the system of valuation of results, but in particular because of this, in equal international competition, it is almost impossible to win all four Grand Slam tournaments in one year.
3. Sports calendar which is under ever increasing pressure of sports commercialization is expanded up the measure which is no longer rational. The calendar often extends to 10 months per season so that the former separate macro cycles of the seasons have been completely joined. So, we have again obtained a monocycle variant, without interim period necessary for recuperation and new preparation. Since competitions in many athletic disciplines extend during major part of the season, it would be more correct that the competition period be named period of basic competition.
4. The ratio of duration of competition and preparation period is being more and more disrupted. A theoretical recommendation is that the preparatory prerіod must last from1/3 to 1/2 of the season's duration, is being less and less honoured in practice. In Chart 2 we can see that that ratio is 1:4,5 and not in relation to the whole season, but only to competition period.
5. The optimal ratio of training and competition practically does not exist any longer if it is participated at all or at most of the competitions throughout one season. There is an important difference here between individual and team sports. The advantage of individual sports is that for an athlete an individual competition calendar may be made which suits his needs and abilities. Hence many top athletes, especially in the year immediately prior to Olympic Games, pay all attention to main competition of the season. Some of the most successful athletes choose mono cycle variant of the season in which they increase the duration of the preparation period and reduce the number of competitions to needed minimum period (see Chart 1). Even in these circumstances, the athletes in some sports disciplines cannot evade a large number of competitions during the season. (J. Jankovic 83, R. Nadal, R. Federer, N. Djokovic each 80 games in the year 2008).
6. Preparation period is used for gradual long-time getting into shape/obtaining athletic fitness. In order that a greater improvement of results and stability of sports fitness may be guaranteed, it is necessary that in macro cycle sufficient time be set aside for preparation period which provides unforced getting of athletic fitness (Matveyev, L. P. 2001). Because of that in professional sports literature preparation period is most often called a period of fundamental preparation.
7. The ever decreasing preparation period imposes a need that the preparation period be extended to the first part of competition period and that less important competitions be used as an poweful factor of preparation for acquiring sports fitness during main competition events (Koprivica V. 2002).
8. The increase in the number of competitions, among them commercial competitions as well, did not bring about an increase in the number of appearances of most of the top athletes in individual sports in the course of the year. However, in sports disciplines the number of competitions and matches is increasing continually which the top teams cannot evade. For example, in basketball, from former periodization with two or three macro cycles (Furaeva, N.V.2001), now there is an enormous number of matches which account for over 30% of active days of the training-competition cycle (see Chart 2) and season with one competition cycle which lasts long time. (Elevič, S.N.). Because of the said, the teams that want to win the title, gather a large number of top players who can jointly bear the burden of a strenuous season and win. In some athletic games, a number of matches in the same sports year are within reasonable framework (see Chart 3).
9. Very often in sports literature is neglected the fact that a periodization of sports training is a process of managing the athletic fitness. The competition calendar is put into the first plan again, as the main factor which determines the structure of annual cycles. According to research done by N. V. Furaeva (2001) even the experts are doing this. This can be a great strategic mistake in practice which moves away the athletes and teams from success at major competitions.
10. The changes which had been noticed brought about a series of positive effetcs: a complex management of the training and competition process has caused the formation of a numerous expert staff made up of specialists of various profiles; a control of tranings and competitions is

being improved as well as the system of monitoring competition activites; possibilities for contol of athletes' health are improved, doping control is improved as well as methods and forms of its application; conditions for rehabilitation of injured athletes are being ameliorated; athletes' diet is under more strict expert control; better and faster information are obtained on opponents; modern information technology makes possible fast data transmission and procession thereof as well as forming of valuable database; new trainining machines and better equipment are used; conditions for fair refereeing at athletic matches are much better etc.

11. In more and more complex situation the following may be noticed as well in the practice:
    - A hierarchy of competitions is being disrupted and advantage is more often given to commercial, well paid competitions over major sports events of the season, even over the Olympic Games;
    - There are no required cycles of recovery in long competition periods;
    - The athletes are increasingly exposed to enormous specific strains so that some of them after extremely strenuous seasons receive serious injuries and are poorly prepared for the next seasons, where, as a rule, they obtain poorer results.
    - A transition time period is reduced so that in athletic games the players who in this period have both preparations and matches for the national team are overstrained;
    - There is a growing number of major sports events/competitions in successive order during the season, and thereby a possibility is diminished for: variation of load, rational distribution of load, change in direction of load and rest, correct ratio between general and specific, application of prophylactic training etc;
    - The phase of immediate preparation for the main competition is mostly in the competition period, so the risk of loss is increased if the various competitions are intertwined;
    - A map of sports competition is expanding, since the competitions are taking place on all continents and trips and frequent changes of time zones and climate conditions are an additional load on athletes (e.g. Novak Djokovic traveled 115 thousand kilometers in 2008)
    - Work with national team selections requires a correction of sports calendar in the year of major sports events so that the athletes may have rest from competition in the first part of the year, and then prepare themselves well for the main competition of the season;
    - Due to increased number of sports obligations (competitions, trainings, travels), a possibility for top athletes to get educated and qualified for life after the athletic career is finished is diminished.

An acute problem of creating macro cycles of top athletes and their place, number and structure in the season is not followed by presentation of concrete material from practice. Example given in Chart 2 for the squad that participated in four competitions in the same season may serve as an indicator of current competition and training load in top sports. In this example, through figures and ratio of various parameters of the season, one can see numerous issues of macro cycles and competition seasons in top sports.

Chart 1. Structure of monocyclic and two-cyclic variant of annual cycle (without transition period) of the world's top athletes (according to Suslov,F.P, Šepelj,S.P.1999. revised)

	Macro cycles	**WEEKS** (average number, min-max)			No. of appearances (average)
		Preparation period	Competition period	Total	
Two-cycle variant (N=12)	First MCC	16,4 (12-20)	4,2 (2-8)	20,6 (18-23)	5,4 (3-10)
	Second MCC	9 (5-13)	18,5 (8-23)	27,5 (21-31)	21,4 (7-36)
	Total	25,4	22,7	48,1	26,8 (13-43)
Mono-cyclic variant (N=7)	MCC	29 (24-34)	18,6 (13-23)	47,6 (46-49)	19,7 (13-33)

Chart 2. Basic information on preparation and competition period "Partizan" Basketball Club in the 2007/2008. Season

INDICATORS		Numerical indicators	%
Duration of the preparation and competition period		**318 days**	**100**
	Preparation period	58 days (18%)	
	Competition period	260 days (82%)	
	Ratio of duration of preparation and competition period	1:4,5	
1. Active days (trainings and matches)		**280 (100%)**	**88**
	Competition days	88 (31,4%)	
	Training days	192 (68,6%)	
	Ratio of training and competition days	2,2:1	
2. Days of rest		**38**	**12**
	Ratio of active days and days of rest	7,4:1	
Total trainings (matches and trainings)		**447**	**100**
1	**Matches**	88 (100%)	**19,7**
	Official	76 (86%)	
	Preparatory	12 (14%)	
2	**Trainings**	359 (100%)	**80,3**
	During preparation period	81 (23%)	
	During competition period	278 (77%)	
	Ratio of trainings in preparation and competition period	1:3,4	
	Ratio of trainings in preparation and competition period	4,1:1	
Average exercise per day		1,6	
Ratio of number of days of the competiion period and number of official matches		3,4:1	

Chart 3. Overview of matches played (official) of the Red Star volleyball players in the 2007/2008. season

COMPETITION	CHAMPIONSHIP	HOME CUP	INTERNATIONAL CUP
NO OF MATCHES	**14** – Regular part of the seasons **6** – Mini league **8** – Play off	**1**- 1/8 Finals **2**- ¼ Finals **2** – Final tournament	**6** – CEV cup
TOTAL NO. OF MATCHES PER COMPETITIONS	28	5	6
TOTAL MATCHES	**39**		

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RELATIONSHIP BETWEEN MOTORIC CAPABILITIES AND BASKETBALL SKILLS IN YOUNG PLAYERS (13 to 14 yrs old)

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Introduction

Basketball is a very complex sport activity with very specific structural and functional traits (24) on the basis of several criteria: **a)** It is a complex team sport based upon groups of specific simple and complex movements during close collaboration between players. **b)** It is mostly anaerobic sport with domination of energy processing; **c)** There is domination of skills here, because basketball is a sport of subtle and precise coordination, strength, endurance, and velocity (19).

Basketball activities present actually skills based upon specific basketball techniques that encompass specific and styled motor structures by which player has to resolve certain given play situations (13). Just like in any other sport good results in basketball (2, 9) depend mostly of the quality of technique and its efficacy (16, 23). That is why it is very important to work continuously on the improvement of the technique in order to make it ever more and more effective. In that way it is necessary to be familiar with standard factors (biomechanical and structural characteristics) which influence the quality of the technique as well as changeable individual characteristics of the players themselves (16). By adequate trainings it is possible to influence both of these two factors. As for basic motor capabilities every sport discipline require certain level of them. There is also significant interconnection of motor functions and specific motor efficacy in different sports (1, 15) As for basketball skills motor dimensions are of primary importance. Optimal development of those skills gives better results, or one can say they are base of successful basketball play (13, 20).
Specific basketball motor structure is a very important factor which has two main dimensions: explosive, powerful strength and coordination (21) On the other side, certain given motor abilities are the base during the process of selecting young players to be(20). These can be recognized during training, during individual execution of specific motor structures. First selection takes place usually at the age of twelve years. when first pioneer's competition teams are formed. Pioneers, here are children 12 to 14 years old. There are relatively few studies about basic motor abilities of such young players (4, 5, 8, 10, 11, 14).
The aim of this study is evaluation of motor abilities and basketball skills of the best young players of Serbia, aged 13-14 yrs as well as interconnection between these two.

Methodology

Sample of subjects

Our sample consists of 118 young pioneers (13 – 14 ± 0.5 yrs.), chosen as best by experts of Basketball Union of Serbia. Every player was already about two years in the program of systemic, organized basketball trainings.

Variables and instruments

Variables in general motor domain. 20 motor tests were used here. The tests applied were already used earlier in several investigations mostly in our terrains. So, for evaluation of explosive power five tests were used.(3, 6, 12, 17). Results of four tests are presented in centimeters: longitudinal jump (variable SDM) , triple jump (TSM), vertical jump after Sargent (variable VS) and throwing of medicine ball (variable BM), while results of running 20 meters test (variable T20M) are expressed in seconds. For evaluation of repetitive power four tests were used. Number of repetitions was calculated (17, 22): push ups on parallel bars (variable SNRA), striating up of the body (variable IST), raising up of the body (variable DTSK) and pull ups on horizontal bar (variable ZNV). Locomotion speed was evaluated by two tests, with results in seconds (17, 22): running 30 meters (variable T30M) and running 50 meters (variable T50M). Agility is tested by four tests, results in seconds (3, 12, 17): T test (variable TT), zigzag movement in lane (variable CCKR), suicide (variable KAM) and running 4x15 meters (variable T4X15). In evaluation of articulations movements three tests were used, results expressed in cm. (12, 17, 22): test with stick (variable TSP), spagat (variable SPA) and bench stay and reach

(variable PNKL). Balance was evaluated by two tests, results given in seconds (better being longer duration, - 17, 22): standing on one leg (variable SN1N) and transversal standing on the beam (variable PSNG).

Variables of the basketball skills. Basketballs skills (techniques of the play) were evaluated by four terrain tests of American association for health, physical education, recreation and dance - AAHPERD (7): **a)** test of control dribble (Figure 1) where player starts from "weaker side" at cones A and, at a signal, dribble using weaker hand further on as shown on pic.1 around the cones; Task has to be repeated three times: the first is just to try and two others are measured in seconds and times added together (variable CD), **b)** test of defensive movement (Figure 2) in which tested player stands in defense posture, back towards basket at start position A. He should finish the task as soon as possible moving by sliding as shown by arrows.. Task is performed three times, first just to try and two others measured in seconds, added together (variable DEFM), **c)** Test of giving the ball during movement of 30 seconds (Figure 3). Here the player is in front of target A behind the line and at signal, with chest pass shoot target A, picks the ball rejected from the wall, moves laterally in front of target B and shoot at it; continues to target F, performing giving the ball two times and continue backwards toward E, D, C... all until A in which he also performs two giving, then again... and so he does for 30 seconds... Hit at a target or a rim is valued by 2 points, out of it 1 point; task is performed 3 times, first to try and values of other two are joint (variable PASS), and **d)** shooting test during 60 seconds (Figure 4); the tested player can start the task from any position behind the sign which is at a distance of 3.65 m. At a given signal he shoot the ball then gets it again and dribble to some other point, shoots again; uses high kick and 4x lay-ups, of which two cannot be sequentional; tested player has to perform at least one shoot from each position. Hit from the first shoot receives 2 points, while after missed first each next is only for 1 point. The task is performed 3x, first to try and other two are valued jointly (variable SSSH60).

Statistical analysis

Standard descriptive statistics was applied: mean (AS), standard deviation (SD), minimal (Min) and maximal (Max) values. In order to interconnect these two domains canonic analysis was used. Data are elaborated using statistic program STATISTIKA 5.0.

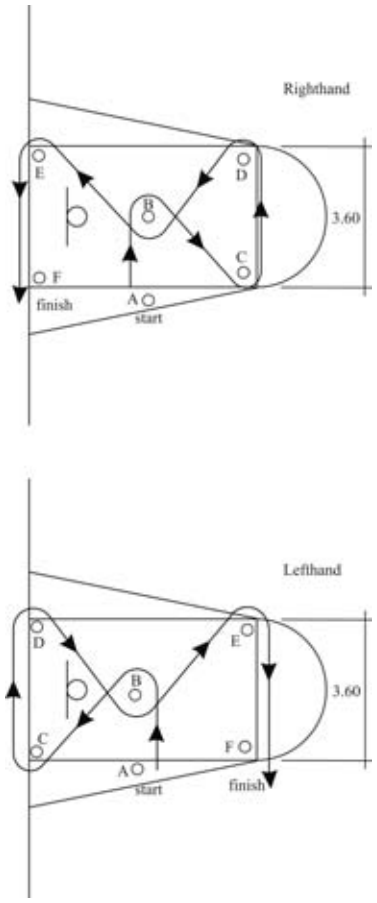

Figure 1 Test of control dribble

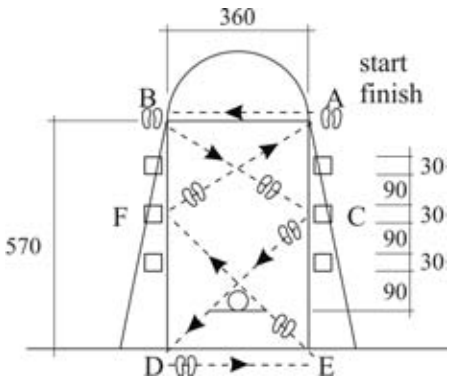

Figure 2 Test of defensive movement

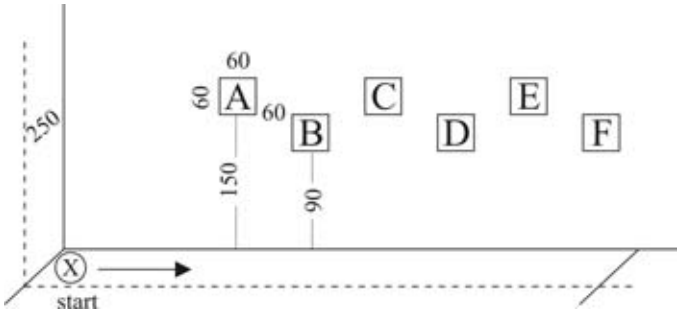

Figure 3 Test of passing

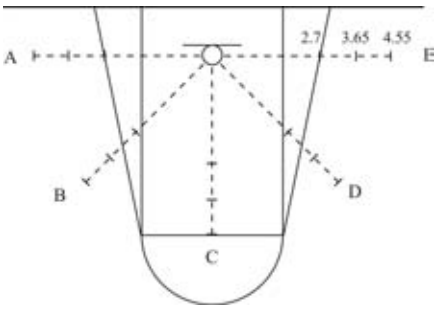

Figure 4 Test of shooting

Results and discussion

Descriptive parameters of all variables can be seen in Table 1. Maximal differences are covered by 2 to 3 standard deviations. As for motor variables, authors have not found proper data that can be used for comparisons. We could compare only variables in longitudinal jumps and running 50 m. with results of Koprivica's study (14). Our tested players achieved better results. That was expected since the sample of this study was highly selected and these data about motor capabilities in basketball can be taken as a norms for young boys 13-14 yrs old. Since there are very few such data for this age, these results can be added in the data base for comparison of young talented basketball players.

Results in tests of basketball skills can be compared with those of AAHPERD (7). Our players did better in tests of control of dribbling (CD) and ball passing in movements (PASS), but weaker in other two: defensive movement (DEFM) and shooting (SSSH60).

Table 1 Descriptive parametersof all variables

Variable	Mean	Min.	Max.	Std. Dev.
SDM	203	156	267	.23
TSM	599	460	790	.73
VS	40.32	25.00	60.00	7.23
T20M	3.67	3.16	4.32	.25
BM	452	285	710	1.14
SNRA	14.68	0.00	78.00	17.15
IST	30.00	10.00	70.00	10.80
DTSK	39.33	1.00	154.00	32.21
ZNV	2.09	0.00	12.00	2.70
T30M	509	4.24	6.20	.53
T50M	8.09	6.57	9.87	.32
TT	11.0	9.49	13.37	.88
CCKR	7.3	5.93	8.61	.54
KAM	33.63	27.42	40.43	2.34
T4X15	15.09	12.77	18.03	.99
TSP	78.02	44.00	127.00	16.07
SPA	38.21	10.00	66.00	9.99
PNKL	4.41	-15.00	22.00	6.15
SN1N	34.86	4.82	100.00	29.50
PSNG	22.10	4.15	100.00	31.33
CD	16.48	13.47	20.50	1.25
DEFM	23.33	19.06	27.14	1.87
PASS	88.38	60.00	126.00	14.07
SSSH60	30.03	13.00	40.00	5.93

Table 2 Chi-Square test

Removed roots	R	R^2	Chi-sqr.	df	p	Lambda Prime
0	.92	.85	282.89	80	**.000**	.066
1	.60	.36	82.93	57	**.014**	.452
2	.42	.18	35.54	36	.490	.711
3	.37	.13	14.97	17	.596	.866

Results of canonic analysis (R = .92) show significant connection between two tested domain (p=0.000). Four canonic roots were extracted. Table 2 contains results of Chi-Square test from which one can see that first two canonic roots are significant. They carry the major part of variance R-2 and are taken for interpretation

Related to significance of the first two characteristic roots, tables 3 and 4 show factorial structure of the root in relation with both domains.

Results in table 3 show that variables for evaluation of explosive power (SDM, TSM, VS, T20 and BM), variables of speed (T30M and T50M) and of agility (TT, CCKR, KAM and T4X15) have high projections at first root. Especially variables TSM – triple jump, TT – T test. Variable of repetitive strength SNRA and DTSK have high projection at second root.

Table 3 Projection of motor abilities variables to first and second root

Variable	Root 1	Root 2
SDM	**-.76**	-.14
TSM	**-.84**	-.11
VS	**-.73**	-.00
T20M	**.68**	-.12
BM	**-.72**	-.38
SNRA	.37	**.41**
IST	-.36	-.25
DTSK	.13	**.46**
ZNV	**-.64**	-.03
T30M	**.65**	.22
T50M	**.69**	.13
TT	**.92**	.02
CCKR	**.83**	-.26
KAM	**.86**	.00
T4X15	**.84**	-.21
TSP	-.03	.01
SPA	-.30	-.15
PNKL	-.40	-.42
SN1N	.07	.09
PSNG	.20	.07

Results in table 4 show that variables CD, DEFM and PASS have very high projections at first root , while variable SSSH60 has a very high projection at second root. Negative for signs appear in some measurements in which results are expressed in different variables.

Table 4 Projection of basketball skills variables at the first and second root

Variable	Root 1	Root 2
CD	**.86**	-.23
DEFM	**.92**	-.13
PASS	**-.84**	-.39
SSSH30	-.35	**.64**

Relations between first canonic factor of basic motor variables and variables of skills show that individuals with better results in variables of explosive power (SDM, TSM, VS, T20 and BM), speed (T30M

and T50M) and agility (TT, CCKR, KAM and T4X15) achieved better results in variables in basketball skills as well (CD, DEFM and PASS).

High interconnection of variables can be seen in Fig.5 which shows projections of variables from both the systems at first root. Relation between other factors show that tested players with better results in variables of repetitive power SNRA and DTSK had also better results in variable SSSH30. Lesser intensity of variables connection can be seen at Fig.6 which show projections of variables from both the systems at second root. Interconnection of results in tests of explosive power, speed and agility with the results of tests in dribbling, defense movements and passing in move asserts already mentioned influence of explosive power and coordination on results in basketball technique (21). Relations of these skills according to the kicking tests are not significant, because most important motor quality here is precision. This indicates a need for further tests for evaluation of general precision. On the other hand concordance of results in tests of shooting with variables of repetitive power SNRA and DTSK can be explained by demanding test in which in 30 seconds player has to perform as many kicks as possible. So, we can presume that developed repetitive power of brachial and abdominal musculature will have positive influence at tests results.

Figure 5 and 6 show relationship between variables of two spaces on the first and second root.

The applied basketball skill's tests place great demands on explosive power and agility. They do not evaluate «pure technique» but also explosive power, agility and anaerobic capabilities since tests are 7 to 60 seconds duration. In all tests and especially in control dribble and defensive movements players have to move as fast as possible. At the same time they have to take care about proper way of executing given activity related to the given task. So, in dribble test very good control of the ball is requested, in passing and shooting tests more important is accuracy than the speed of movements. In that way tests tasks circumstances get close to real game.

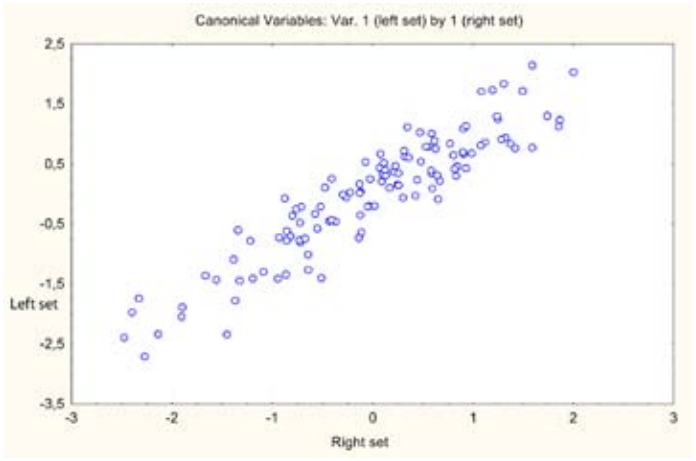

Figure 5 Relationship between variables of two spaces on the first root

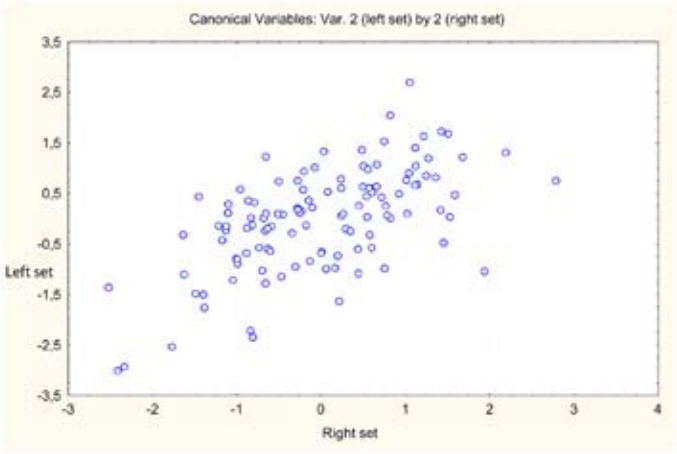

Figure 6 Relationship between variables of two spaces on the second root

According to results it is very important to stimulate, during trainings explosive power, speed and agility in young players (13-14yrs old) because these motor abilities are developing also naturally in this age. After the age of 13 there is significant increase in agility and speed. So it is also necessary to work on repetitive strength in the same way (18). Of course, the primary task at these ages is to learn and improve basketball skills.

Since particular motor abilities were evaluated by several tests, for practical reasons it is important to diminish number of tests. Values of projections of particular variables, from these examinations, to the first root can recommend particular test for praxis as well as easiness of application: T-test, triple jump test and running 20 meters test.

Conclusions

On sample of 118 high quality young basketball players 13 and 14 years old particular motor abilities (20 variables) and basketball skills (4 variables) were investigated as well as canonic correlations between these two sets of variables.

The data about these abilities and skills might be included in data base to compare other talented basketball players of these ages.

Significant relationship between these two domains was found but only two first canonical roots are really significant. These relationships are based on motor ability variables: explosive power, speed and agility and basketball skills variables: dribble, defensive movement and passing. These variables have high projections at the first root. Values of projections of particular variables, to the first root can recommend particular test for praxis as well as easiness of application: T-test, triple jump, and running 20 meters. The results also point at necessity and importance of systemic training influences in order to develop all of these abilities and skills.

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CORRELATION OF MOBILE, SITUATION-MOTOR ABILITIES AND BASKETBALL SKILLS

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1. INTRODUCTION

This work deals with the problem of assessing the degree of education of the pupils of the fourth grade of the primary school regarding the basic elements of the basketball technique. Besides, the results of the research also lead to the issues of the necessary structure and the quality of mobility skills as an important predictor for successful acquisition of the mobility skill within the area of basketball. The identified correlations between the two formally different , but in terms of contents the same ways of assessing the sport-technical education within basketball, imply that it is possible to model two methods for assessing the level of mobility information within basketball. The results of the work also imply to the consequences that may arise in case of insufficiently differentiated teaching.

2. METHODOLOGY OF RESEARCH

2.1. Subject of the research

The subject of the research is of didactic-methodical nature and it is in relation with the assessment of sports-technical level of education of the pupils of the fourth grade of primary school regarding the basic elements of the basketball technique.

2.2. The aim and tasks of the research

The research has been realized with the aim to determine the correlation of two essentially different methods used in the assessment of mobility information within the main elements of the basketball technique. Besides, the aim of the research is to determine the importance, structure and the quality of the mobility abilities as an important predictor for successful acquisition of mobility skills within basketball.

On the basis of the set target it was essential to fulfill the following tasks of the research:

1. Perform the assessment of the sports-technical level of education from the main elements of the basketball technique using a battery of standardized basketball tests.
2. Perform the assessment of sports-technical level of education through observation and scaling according to Sekeljic and Stamatovic (2006).
3. Determine the level of mobility skills of the schoolgirls and schoolboys using a battery of 18 tests.

2.3. A sample of the examinees

The research has covered 183 examinees of the fourth grade from 2 primary schools in Uzice and Pozega. The sample was made of 102 girls and 81 boys. No restriction has been made in terms of nationality, social status, education, cognitive and connate dimensions.

2.4. A sample of variables, techniques and measuring instruments

For the needs of their research 17 variables have been used to assess the sports-technical level of education and 18 variables from the field of mobility skills.

The assessment of sports-technical education in the field of the main elements of the basketball technique has been made using 6 standardized movement tasks according to Karalejic and Jakovljevic (1998).

Control of the ball

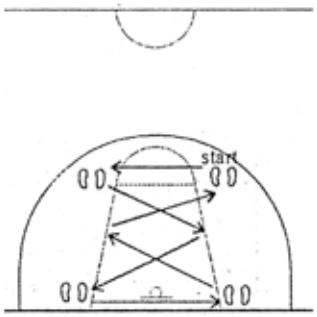
Task: A basketball player is standing and carrying the ball with both hands at one part of the head. When given the sign, he turns the ball around his head throwing it from one hand to another, then around the body, around his legs, around the body again and around his legs for one turning of the body.

Assessment: Each circle around the head, the body and the legs performed within 30 seconds is given one point.

Moving in the defense position

Task: The player standing at the start sign is turned to the basket with his back (picture 1). When given the sign, he begins moving along the set lines, as fast as he can, (following the alphabetic order) up to certain points and at each point he has to step at the racquet line with one foot. The finish and the start are at the same position.

Assessment: The time necessary for the examinee to get from the start to the finish line is measured.

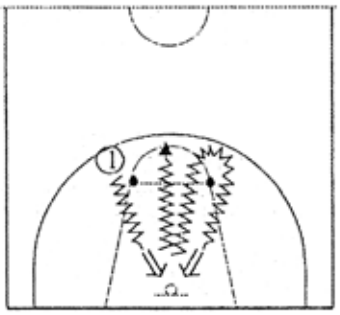


Picture no. 1 Moving in a defense position

Basketball double step movement[1)]

Task: A basketball player is holding a ball on one side of the racquet , and at the end of each racquet there is a stand (picture 2). When given the sign, he breaks through towards the basket and shooting from a double step movement he scores or misses a point. After shooting he takes the ball as fast as can, dribbles it around the other stand and heads towards the basket from the other side.

Assessment: The number ofscored points within 30 seconds is measured.



Picture no. 2 Basketball double step move

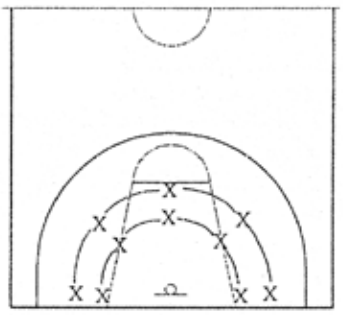
Shooting from a distance [2)]

Task: Five positions for shooting are chosen and they are evenly placed in a semi-circle around the basket at the distance of 3m (picture 3). The basketball player is standing at the initial side position and when he shootes twice towards the basket he moves to another shooting position.

Assessment: The number of scored points out of a total of 10 shootings from 5 positions within 60 seconds is measured.

1) A basketball double step move has been performed using a basket of standard dimensions and referring to the rules of mini basket.

2) Shooting at the basket has been done from the distances of 2 m and 3 m towards the basket of standard dimensions and referring to the rules of minibasket.

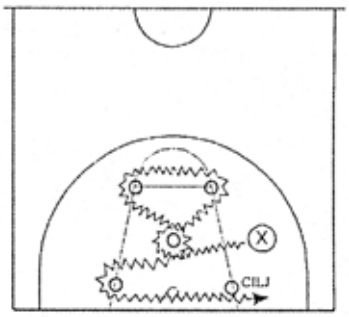


Picture no. 3 Shooting from a distance

Dribbling

Task: A basketball player is standing in the middle of the racquet at point X (picture 4.). When given a sign he moves while dribbling and bypasses the obstacles as shown in picture 6.

Assessment: The time from two attempts is meassured and added together.

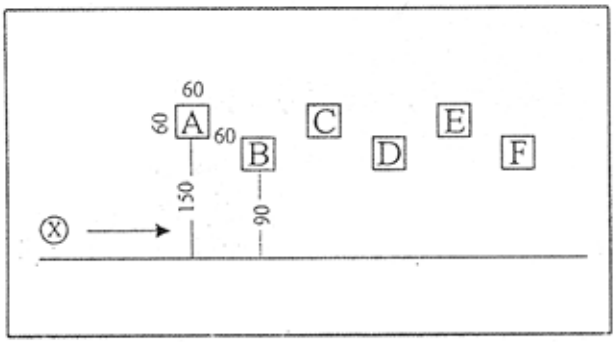


Picture no. 4 Slalom dribbling in the racquet

Passing (shooting)

Task: A basketball player is standing in front of "targets" marked by the letter at the distance of 2.5 m (picture 5).When given a sign he moves sideways and using a technique of basic pass with both hands starting from his chest shoots the targets in the following order A, B, C , D, E and F and goes backwards shooting again F, E, D, C, B, A and again A, B etc.

Assessment: Each shot gets one point. The number of points within 30 seconds is measured.



Picture no. 5 Passing (shooting)

Assessment of mobility skills has been done using the techniques of observation and scaling on the basis of already formed semi-ordinary scales with precisely defined and described criteria for assessment as have been recommended for Sekeljic and Stamatovic (2006). The main idea is that the chosen elements of the technique in the observance list, which are subject to assessment, be divided into parts. It is possible to compare the model established in such a way with derived mobility skills forms. Each part of the mobility form has a certain numeric value, on the basis of which it is possible quantify in a numeric way by pure addition, the

achieved level of mobility skills. By precise and quality system of asessment, on the basis of clearly anticipated structures of the elements of the overall technique, it is possible to reduce the influence of subjecttivity and form the mark in a more objective way.

Table no. 1 Observance list for the assessment of dribbling

Basketball dribbling	
Task: dribbling along one half of the basketball court, with the change of direction of dribbling with a front change of the hand which is dribbling.	
Assessment: The pupil safely masters and controls the ball with both hands. The ball is pushed back fiercelt with fingers and bending in the hand joint so that the ball bounces to the height of the hip. The front change is performed safely, by low dribbling without losing either balance or safety in controlling the ball.	
Controls the ball well	1point
Controls the ball withot looking at it	0,5p
Pushes the ball back hard enough and doesn't lose balance when changin gwithout looking at it	1p
Pushes the ball back with fingers and does not hit it	2p
Dribbles with a hand that is farther from the opponent and protects it with a hand, a shoulder and the body	0,5p

Table no. 2 Observance list for the assessment of holding the ball, the main posture in attack and pivoting

Basketball stopping, the main posture in attack, holding the ball, pivoting	
Task: The examinee gets a particular task: to stop in one contact, to take the main basketball posture and pivot with front (chest pivot) three times around the right leg.	
Assessment: The pupil is capable of taking the main basketball posture and perform the pivoting task correctly	
He is capable of taking the correct basketball posture in attack	1p
Distinguishes stopping out of one or two contacts	1p
He is capable of performing the pivoting task	1p
Has the correct straddle (wider than the width of the hips)	1p
Protects the ball during pivoting (the ball is at the hip or shoulder)	1p

Passing the ball and Catching the ball	
Task: Passing the ball in a pair at the distance of 3 m with both hands starting from the chest, with a step forward	
Assessment: The pupil should safely following a straight line and precisely (towards the chest of the fellow player) pass the ball with one step forward and to keep the balance so that he could come to the position for catching the ball. The pupil passes the ball with the maximum stretching of the arms and the final contact with the ball should be achieved with the ends of the fingers, and the hands should remain in such a position that the fingers are directed towards the target and the palms directed towards the ground or sideways. Catching-the pupil should place his hands towards the ball, and place his hands in a position for catching the ball. After the contact with the ball the elbows are bent, amortisation is done, and the ball comes to the basic position.	

Table no. 3 Observnce list for the assessment of passing and catching

Passing the ball	
Passes the ball with both hands	1p
Passing is strong enough (in accordance with the physical abilities)	1p
Passing is precise	1p
A step forward is used during the passing	1p
After throwing the ball the arms are bent and the fingers are streched and turned towards the ground and sideways	1p
Catching the ball	
The cirrect position for catching the ball has been taken (the legs, body and arms)	2 p
The ball is caught safely	3 p

Table no. 4 Observance list for the assessment of shooting at the basket

Shooting towards the basket using one hand and without moving	
Task: shooting at the basket from the distance of 3 m	
Assessment: The player is able to concentrate on the hoop, tahat is the backboard. His feet are at an optimal distance from one another, directed towards the basket, the knees bent. The ball is held in front, on the side of the hand which is used for shooting and at the level between the shoulders and the ears. The arm which shoots is exactly behind the ball. The hand is relaxed and the fingers form a natural recess for the ball, where the ball makes the contact with the fingers and the upper parts of the palm. The elbow is turned towards the basket from the inside. After the strreching of the legs strechin the whole body begins as well as streching of the legs so that the final force and control of the shooting come with the bending at the hand joint and the fingers. After throwing out the arm should remain stretched in the direction of the basket with the palm and the fingers turned towards the gground. The balance is evenly divided and the player remains in the balance position.	
The shooting is precise (he needn't score a point but he has to be at the hoop)	2 p
He keeps the arm which throws the ball correctly as well as the arm which helps it	1 p
The arm (elbow) and the fingers after the throwing out remain streched and turned towards the ground	2 p

Table no . 5 Observance list for the assessment of a double stepmove

Basketball doublestep move	
Task: from the distance of 6 m the pupil starts dribbling from the right side and moves towards the basket and performs a double step move shooting at the backboard and into the basket	
Assessment: the pupil moves with a safe step, has the correct estimate of how far he is fom the basket, catching the ball at the right time, protecting the ball and emphasising the double step move and with a relatively precise and technically correct shooting he scores a point or is very near to scoring the point.	
He is able to perform a double step move after dribbling the ball and catching it and to make a takeoff with one leg	3p
He estimates the right distance so that he is in the right position under the basket (askance from the right side) for shooting	1 p
The shooting at the basket is rather prrecise (he needn't score a point but the ball has to be at the hoop)	1 p

Table no. 6 Observance list for the assessment of basketball defence position

Basketball defence position	
Task: moving in the basketball posture along the zig-zag line from one marker to another	
Assessment: the pupil moves to one side moving his leg which is on the side of the direction in whivh he is moving. He turns his foot inthe direction he is moving in and aggressively masters the area. As soon as the foot of the leg touches the ground, the other foot is quickly dragged towards the direction of the moving to the same extent as the first leg has been moved.	
The pupil is able to take the correct basketball defence position	1p
Does not cross his legs	2p
The posture with both feet apart is an optimal one (wider than the width of the hips) and while moving he doesn't lose his balance.	1p
While moving he doesn't make extreme oscilations in the vertical plane	1p

The assessment of the mobility area has been done using a battery made up of 18 tests: long jump, throwing the ball, raising the body within 30 seconds. Lifting the body, hanging while bent, dynanometry of the hand, sprint at 20 m with a flying start, sprint at 30 m with high start, tapping with the arm, tapping with the leg, high fromt bemding on the bench, standing on one foot with eyes closed, standing on one foot along the bench, 20 steps forward with withdrawing of the baton, hitting the ball against the wall within 15 seconds, shooting a horizontal target with a small ball, shooting a vertical target-darts, using a common procedure described in the monography of Kurelic and his associates (1975). On the basis of the applied battery of tests the assessment of 9 mobility skills has been made: Explosiveness of strength, repetitive strength, static force, sprint speed, segment speed, flexibility, balance, coordination and correctness.

2.5. Methods of the procession of the results

Pearson's coefficient of correlation has been used for this work. The represent of the overall achievement from mobility skills and sports-trechnical education in the field of basketball has been done using Z values. With the intention to determine and statistically verify the correlation between the achievements from sports-

technical education, the results on basketball tests and the mobility skills represented by Z values, a specific statistical procedure has been made. The results of the examinees, which are expressed by scores in case of certain variables, have been turned into standardised scores, so that they could be compared with each other(firstly into Z standardised scores (z=(X-M/SD), and then by linear transformation into Z values (Z=10 z+50)]. When this procedure is repeated for each variable in mobility skills, and individual Z values are added, the number we get is the one which represents the overall achievement of the pupils in mobility tests. The same procedure is repeated for the results achived at basketball tests. The represent of sports-technical education from the area of basketball technique is the total mark that we can get on the basis of the observance list.

3. RESULTS AND DISCUSSION

Using Pearson's coefficient of correlation it was determined that (Table 7) of sports-technical education correlates highly with the results achieved at the basketball tests (r= 0.70). The achieved relations are of stohaic nature because the coefficient of linear correlation is less than 1 (r<1), which means that the correlations between the phenomena refer to a part of the examinees in the sample, but the part which is of statistical significance. The correlation between the phenomena are direct which implies that the majority of the examinees in the sample who have achieved good results at basketball tests have also got good marks in the assessment of sports-technical education. That can be explained in a way as we have anticipated it when carrying this research, and it means that for the good result at basketball tests a good basketball technique is necessary. The high correlation (r= 0.70; p=0.000) of the achievements from sports-technical education and the ones at basketball tests, represented by z values, leads us to the possibility that the ssessment of mobility skills from the area of basketball technique can be done in a quality and reliable way by means of both tests. This fact can't be neglected because these are similar tests as far as the mobility is concerned, but basically diffeerent. As it could have been observed in the chapter dealing with applied methodology, basketball tests are conducted in such a way that the examinee passes a certain distance while dribbling, that he shoots from the right distance as many marked targets on the wall as possible within the given time and that he can score as many points as possible from the distance (out of a certain number of attempts). The successfulness is measured by a number of points, the shots at the target or in seconds. In the tests where the basketball technique is estimated according to the obervance list the parts of the technique have been explained more precisely and their value in points has been given.

Table no. 7 Correlation of success (achieved on the basis of Z –values, of mobility skills, the results at basketball test and the estimatedf sports-technical education.

		Sports-technical education	Mobility skills	Basketball tests
Sports-technical education	r	–	,629	,701
	p	–	,000	,000
Mobility skills	r	,629	–	,735
	p	,000	–	,000
Basketball tests	r	,701	,735	–
	p	,000	,000	–

High correlation (r-0.701; p-0.000) between the tests (table 7) points out that quality information about the level of acquired sports-technical education can be obtained in both ways. This is a proof of the supposition of the existance of two possible ways of modelling the objective instruments for the assessment of sports-technical education in the area of basketball. With coefficient of correlation a statistically significant correlation between sports-technical education and the values of mobility skills has been proved (r=0.63; p=0.000). Somewhat higher correlations have also been verified among the results obtained at basketball tests with the values of mobility skills (r=0.73; p=.000). The noticed intercorrelations of mobility variables and the basketball technique estimated in two different ways, signify that the pupils with better mobility performances, in a statistically higher number, have acquired better sports-technical education, which leads to the conclusion that the level of the acquired basketball technique partially depends on the level of development of the overall mobility potential. Thus the supposition of Karalejic and Jakovljevic (2001) is confirmed, according to which the elements of a basketball technique as a mobility structure have to be in correlation with the basic mobility skills.

Table no. 8 Mobility skills of the examinees of different achievements in sports-technical education (n = unsuccessfuli; p = aveerage; u = successful).

Variable	Initial examination					Final examination					Adjusted M					n:p		n:u	
	Mn	Mp	Mu	Fx	p	Mn	Mp	Mu	Fy	p	Mn	Mp	Mu	Fyx	p	t	p	t	p
Long jump	124.3	133.6	140.6	9.04	.000	130.8	143.2	148.4	11.4	.000	138.2	143.2	142.8	3.0	.05	2.29	.03	2.8	.05
Throwing the ball	3.38	3.49	3.74	3.34	.04	3.55	3.84	3.96	3.48	.04	3.70	3.89	3.79	2.50	.09	2.19	.04	.99	–
Lifting the body	14.67	15.77	16.08	1.40	–	16.45	17.93	18.66	3.02	.05	17.05	17.81	18.33	1.64	–	1.09	–	1.82	–
Stretching the body	12.06	13.96	15.52	228	–	18.76	21.77	25.34	3.67	.03	20.45	21.80	24.01	1.62	–	.63	–	1.76	–
Hanging while bent	10.02	13.28	14.64	1.96	–	8.53	14.28	13.40	3.84	.03	10.56	14.00	12.16	2.92	.05	2.39	.03	1.10	–
Dynamom. of the hand	67.18	65.29	68.19	.89	–	75.82	76.71	77.94	.21	–	75.48	78.07	76.71	.57	–	1.06	–	.49	–
Sprint at 20 m	3.97	3.80	3.83	2.71	–	3.86	3.66	3.65	5.74	.004	3.78	3.70	3.67	3.49	.03	1.90	–	2.61	.02
Sprint at 30 m	6.40	6.20	6.19	2.79	–	6.40	6.11	6.11	5.78	.004	6.27	6.16	6.16	3.90	.03	2.53	.02	2.47	.02
Tapping with a hand	29.92	30.66	31.33	.75	–	32.84	34.11	33.00	1.29	–	33.23	34.13	32.68	2.47	–	1.27	–	.75	–
Tapping with a leg	16.98	18.26	18.42	4.14	.02	19.84	21.07	21.12	4.62	.02	20.31	20.94	21.12	1.67	–	1.41	–	1.79	–
High forward bending	18.24	18.07	18.70	.16	–	18.34	18.91	18.75	.11	–	18.41	19.12	18.47	.49	–	.85	–	.07.	–
Spagat	134.7	136.9	143.5	8.34	.000	133.4	136.4	138	22.57	–	136.0	137.6	134.9	1.93	–	1.06	–	.74	–
Balance - the bench	6.57	5.88	5.51	.50	–	8.83	6.74	8.03	1.15	–	8.26	6.79	8.41	1.62	–	1.38	–	.14	–
Balance- eyes closed	20.42	24.87	21.76	.53	–	26.29	26.63	25.58	.03	–	27.24	25.63	25.95	.06	–	.34	–	.27	–
20 steps forward	37.51	25.28	37.28	.79	–	28.11	26.15	25.38	4.63	.02	27.92	26.41	25.23	5.51	.005	1.89	–	3.31	.02
Hitting the ball against the wall	14.18	15.23	16.31	5.55	.005	14.82	16.06	17.13	8.28	.000	15.48	16.12	16.55	2.95	.05	1.48	–	2.46	.02
Shooting the horizontal target	5.71	8.37	8.83	6.03	.003	6.82	8.56	9.52	4.23	.02	7.45	8.39	9.21	1.88	–	1.07	–	1.96	.05
Darts	3.47	4.30	5.59	3.68	.03	4.78	5.23	5.53	.51	–	5.03	5.28	5.27	.08	–	.35	–	.33	–

Interesting indicators of experimental treatment have been observed by means of the analysis which was conducted with 3 groups of pupils (unsuccessful, average and successful) constituted according to the values achieved in the field of mobility skills. The analysis of co variables (table 8) of the values of mobility skills of the pupils, during the initial and final measuring, indicate that between the groups there is a considerable difference in the initial measuring (seen in terms of statistics) which is to the benefit of the successful group in : both tests of explosiveness, both tests of precision, the tests of tapping the leg against the wall, spagat and hitting the ball against the wall. In the final measuring the difference was verified in case of: both tests of explosiveness, both tests of repetitive strength, both tests of sprint speed, both coordination tests, the test of hanging while making the bend, the test of tapping with the leg against the wall and the test of shooting a horizontal target. The achieved increase of some structures in the mobility area (column Myx) indicate that the experimental programme has influence on all three groups, but it is evident that the successful and average pupils have made better progress in: explosiveness, sprint speed, statistical strength, coordination and preciseness. This leads to the conclusion that success in basketball requires a certain quality of latent mobility structures, but playing basketball an intensive inverse influence on them is achieved.

The results which indicate that the group of successful pupils in the field of sports-technical education has achieved a growth increase of mobility skills compared to the pupils with worse technique, it is possible to explain it on the basis of already known relations between the mobility and functional skills of the youth with their interest for sport. Namely, Vlaski, Pesterac and Zdanski (1990) in their research concluded that the biggest interest for sport is among those pupils who have a high level of mobility skills, which is according to them biologically based. The passivity of a certain number of children with bad mobility skills is possible to explain by a series of cause-consequence relations based on motivation and the self concept with children. Namely, in the situations where children are compared, which is very common during PE classes, the pupils with worse mobility skills on the basis of worse achievements get negative messages about their own abilities,

which is often followed by negative emotions and attitudes. Such situations become unpleasant, which causes activation of defense mechanisms and the child tries to avoid such situations. That has as a consequence avoiding the classes, marginalization of the child during the class and his turning into a passive state. The decrease of activity during the class will result in lagging in mobility and functional abilities of the child as well as in sports-technical education.

Along tradition of physical education indicates that the aims of this area of teaching used to be based on the priority of social values and interests. Contemporary achievements in teaching physical education show that the teaching has reached educational-ideal based on the natural humanistic paradigm which means individually oriented education. That means that practically the right of the citizens to be educated and brought up on the basis of their needs and wishes, and following their ideals and models. During the whole experimental treatment the pupils could not choose the activity for they were particularly suited and talented, but they used the possibility to choose the scope and the intensity of operators. Big differentiation of teaching was achieved, which enabled the pupils with good mobility skills to gain good sports-technical education, and a considerable increase of mobility skills. However, in the teaching differentiated in such a way the pupils with worse mobility skills have neither achieved such good level of mobility information nor more intense involvement of mobility structures. Inadequate choice of methods and the forms of work did not enable this group to acquire sports-technical education of better quality. The consequence of that was a smaller scope and intensity of exercise, small reversible answer of the body and insufficient transformation of the structures in the mobility space. In this case the teachers did not succeed in realizing the aims in the teaching of physical education completely among all pupils, and these aims refer to the development of mobility skills, sports-technical education and creation of the custom to incorporate the physical activity into the culture of living.

4. RESUME

- Statistically important correlations between the two methods for the assessment of sports-technical education within the field of basketball have been established. This fact leads to the conclusion that using both ways a successful of the basketball mobility kills can be achieved, and thus on the basis of them the instrument for the assessment of sports-technical education can be achieved.
- Statistically important inter correlations between mobility skills (assessed by means of observance tests and basketball tests) and the level of mobility skills have been gained. This statement is confirmative in relation to the theory of Karalejic and Jakovljevic (2001) proving that the elements of the basketball technique must be in correlation with the basic mobility skills.
- Comparing the results of the initial and final measuring it has been observed that the examinees with better quality characteristics of latent mobility structures at the initial measuring had more considerable growth of the abilities in this anthropological space and at the final measuring.
- The results of the research confirm the statement that pupils are an important factor of the teaching process. Their interest or lack of interest for the teaching has as a consequence better or worse participation during thee lesson, and with it also better or worse involvement of mobility structures, which leads to their different transformations.
- Teachers are also important factors of teaching. Their methodological ability to organize and shape the teaching process, to use contemporary teaching methods and forms of activities, to homogenize the groups during the activities may influence the differentiation of teaching in its positive aspect, which as a consequence has optimal development of the mobility skills even in case of those pupils who had badly developed mobility skills at the initial stage.

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DEVELOPMENT DYNAMIC OF MOTOR ABILITIES OF PROFESSIONAL RHYTHMIC GYMNASTS

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INTRODUCTION

Rhythmic gymnastics (hereinafter RG) is an exceptional union of gymnast's movement and apparatus, harmonized with music accompaniment, expressing its character, rhythm, tempo and dynamics, with movements and body motion but also with movement of apparatuses. Richness and diversity of contents and principles of performance are the reason why the formed female gymnasts are gracious, strong, flexible, skilled with a developed sense of time and space and at the same time with good body status. Characteristics of competitive program point out that the following motor abilities are important for success in rhythmic gymnastics: coordination, power, speed, balance, mobility and endurance, and they have to be harmonized with each other. In compliance with it, the training process should be aimed at uniform development of all motor abilities.

The first information on motor abilities of female gymnasts were gathered in order to determine sports preparation, and than for the purpose of selection process. In order to establish connection between sports achievement and the level of physical preparation, Krakova (according to Popović,1986) selects the following factors: 1) active mobility of pelvic girdle, 2) passive mobility of pelvic girdle, 3) maximal mobility of spinal column, 4) speed power readiness, 5) asymmetric and coordination rhythmic structures, 6) explosiveness, 7) static balance, 8) ability of maintaining of uniform tempo. Popović, R. (1986) confirmed connection of success in RG and motor abilities, and pointed out an existence of five components, of which, success in RG, is primarily determined by three factors: 1) balance – general mobility, 2) general motorics factor, based probably on the mechanism for movement regulation, 3) component differentiating the ability of performance of explosive and rapid movements from the ability of maintaining balanced position. Based on the aforesaid, she concludes that success in RG depends on harmonized action of all mechanisms responsible for expression of balance, mobility, speed, coordination and explosive power.

By analyzing RG exercises, it is noted that they are characterized by great number of different jumps. Kocić, J. (1996) determines that of all motor abilities explosive power of legs and repetitive power of torso have the greatest correlation with the assessment of specific of gymnasts preparedness. Popović, R. and Bogdanović, G. (1996) came to the conclusion that static power, manifested in maintenance of a certain position, assigned technique element, is also significant.

Rhythmic gymnastics routines are characterized by very diversified and complex forms of movement of gymnasts and apparatus. The role of coordination in that process is referred to in one research (Popović,R.1998), where it is underlined that the highest significance for success is encountered with coordination in rhythm, coordination of the entire body, then coordination of arms and legs.

Mobility is very important feature of female gymnasts and occupies special position in the system of sports training. Popović, R. (1986) determined that results in RG are statistically significantly influenced by mobility of shoulder girdle, spinal column and hip joints. Similar results were obtained by Kocić, J. (1996) who determined that mobility of shoulder girdle is highly correlated with the assessment of specific training with female gymnasts preparedness.

AIM OF RESEARCH

The aim of this research is to determine the trend of development of general motor abilities in different age categories of young female gymnasts and whether the training process stimulates enough their uniform development by applying adequate specific programs of exercises.

METHODS

It was a longitudinal research. All tests were carried out in Didactic-research laboratory of the Faculty of Sport and Physical Education within the project „Morphological, motor and psychological factors of acquiring technique in rhythmic gymnastics".

The sample of subjects involved female gymnasts training in sports club "Ritam" from Belgrade, who competed in various categories at the federal level. The subjects were tested eight times in the course of four years, and for the purposes of this research they were divided into three subsamples according to their age: 7 years old -7 subjects, 8 years old – 10 subjects, 9 years old – 16 subjects, 10 years old – 17 subjects, 11 years old – 18 subjects, 12 years old – 15 subjects, 13 years old – 10 subjects.

The research included two variables for assessment of morphologic features and variables for assessment of motor abilities. For assessment of motor features body mass (BM) and body height (BH) were taken and for assessment of motor abilities the following variables:

Maximal power in isometric regime for extensors in knee joint (Ekol), for hip joint extensors (Ekuk) and for hip joint flexors (Fkuk), high jump without arm swings (ABBR), high jump with arm swing (ABSR), long jump (DALJ), speed of body extension (BOT), lying-sitting (LS30), hand tapping (TapR), leg tapping (TapN), obstacle course (KOOR), running 10x5m (10x5) and deep bend forward on bench (PRET).

The data obtained by testing were elaborated by descriptive statistics procedures, and significance of changes in values of the variables in different age categories was determined by t-test.

RESULT OF RESEARCH AND DISCUSSION

Morphological development of female gymnasts is accompanied by changes in body mass and body height. Body mass and body height of the subjects aged 7 and 8 did not show significant differences. Between the age of 9 and 10, a significant increase of body mass was noticed but this trend is not followed by body height. In the next age categories, from 10 to 13, permanent statistically significant changes were noticed in the values of these variables, i.e. a continuous increase of body height and growth of body mass of female gymnasts was noted.

Table 1 Signicance of differences of mean values of some morphological and motor

	7-8 years		8-9 years		9-10 years		10-11 years		11-12 years		12-13 years	
	t	sig.	t	sig.	t	sig.	t	sig.	t	sig.	t	sig.
TM	-1.31	0.215	-2.11	**0.046**	-2.02	0.052	-3.56	**0.001**	-3.11	**0.004**	-2.22	**0.037**
TV	-1.10	0.293	-1.66	0.110	-1.48	0.149	-3.35	**0.002**	-2.80	**0.009**	-2.34	**0.028**
EKOL	-1.32	0.218	-1.89	0.081	-1.03	0.310	-1.57	0.128	-1.21	0.237	-1.84	0.084
EKUK	-1.58	0.139	-2.09	**0.049**	-2.16	**0.039**	-2.25	**0.032**	-1.31	0.200	-1.68	0.108
FKUK	-0.18	0.863	-2.47	**0.022**	-0.73	0.474	-2.86	**0.008**	-0.35	0.727	-2.21	**0.038**
ABBR	-1.42	0.182	0.62	0.540	-1.83	0.078	-1.66	0.106	-1.64	0.110	-0.87	0.391
ABSR	-1.34	0.205	0.46	0.650	-1.63	0.113	-1.63	0.113	-1.93	0.063	-0.94	0.359
DALJ	-3.19	**0.008**	0.10	0.923	-2.28	**0.029**	-1.90	0.067	-2.65	**0.012**	-1.22	0.235
BOT	0.67	0.515	-0.10	0.920	1.74	0.092	1.07	0.293	1.13	0.268	0.02	0.988
LS30	-1.15	0.271	-2.91	**0.008**	-2.20	**0.035**	-2.06	**0.047**	-1.79	0.084	-2.11	**0.046**
TapR	0.02	0.982	0.57	0.576	2.01	0.057	1.68	0.104	3.14	**0.004**	1.31	0.205
TapN	2.04	0.092	2.61	**0.018**	1.53	0.138	2.35	**0.027**	0.56	0.579	2.02	0.055
KOOR	1.45	0.174	0.12	0.902	2.11	**0.043**	1.32	0.195	0.72	0.476	0.81	0.428
10x5m	2.18	0.050	1.39	0.178	2.52	**0.017**	1.78	0.084	2.35	**0.025**	1.53	0.139
PRET	-0.26	0.796	-1.45	0.161	-0.78	0.443	-1.38	0.176	-1.33	0.194	-1.10	0.283

The period with appearance of statistically significant changes of great number of motor abilities is between the age of 8 and 11. A great number of authors think that the most important changes occur at the age 7/8 until 11/12 years and that various movements of general developmental character positively influence motor development. Child's body at the age of 7/8 to 11/12 has a high and complex ability of adaptation, so that training applied at that age should result in high, stable and fast effect (Moskovljević, L. 2002).

Based on the differences in intensity of the measured muscular groups in subjects of different age categories, it is ascertained that motor development of female gymnasts is not continuous throughout various periods. Changes in power of knee joint extensors (Ekol) do not indicate statistically significant differences

when observed from one year to another in an overall sample. Changes in power of hip joint extensors (Ekuk) are statistically significant between the ages of 8 and 9 , 9 and 10, 10 and 11, while the changes in hip joint flexors (Fkuk) are statistically significant between the age of 8 and 9, 10 and 11, 12 and 13.

Of all the applied tests of explosive power (ABBR, ABSR i DALJ), statistically significant changes in the results between the observed groups are noted only at the test of standing long jump (DALJ), at the age between 7 and 8, 9 and 10 and 11 and 12.

The results on the tests of explosive power of legs (ABBR and ABSR) did not show statistically significant changes between the observed age groups of female gymnasts. In her research Damjanovska, M. (2000) ascertained that between younger junior gymnasts and junior gymnasts there are no statistically significant differences in the results of tests of explosive power, but that between junior and senior female gymnasts this difference is significant. Taking this into consideration, it could be expected to achieve improvement of the results in expression of explosive power in female gymnasts in the following period.

Lack of explosive leg power in female gymnasts, directly influences quality of jump performance. The jumps are most often, technically well controlled, great amplitudes are achieved, but the height is small, which to the great extent negatively influences final score of judges. Therefore, it is necessary to dedicate special attention in gymnasts training to development of explosive power of legs. Hutchinson, M. R. (1998) determined that training of leaping ability in elite USA gymnasts statistically significantly increased the height of jump for 16,2%, reaction time for 50% and explosive power for 220%. The experimental program lasted one month, and positive effects were recorded 4 months and one year later.

Changes in repetitive power, measured by lying-sitting test (LS30), are statistically significant between the ages of 8 and 9, 9 and 10, 10 and 11, 12 and 13. At the test of speed of body extension (BOT) the results did not demonstrate statistically significant changes in the entire sample.

Frequency of hand movement, measured by hand tapping test (TAPR), demonstrates statistically significant changes between the ages of 11 and 12, while frequency of leg tapping is significantly changed between the ages of 8 and 9, 10 and 11.

Agility, measured with 10 x 5 m test, shows statistically significant differences between the ages of 7 and 8, 9 and 10, 11 and 12. The results in coordination test (KOOR) indicate statistically significant changes only between the ages of 9 and 10 years.

Mobility is very important characteristic of gymnasts, and has a special position in the system of sports training in rhythmic gymnastics. This research did not identify statistically significant differences in improvement of the results in this ability in the entire sample. Having in mind the requests of competitive program of rhythmic gymnastics, it is considered that mobility must be measured by a specific test for this category of subjects, in order to realize more comprehensively the changes in this motor ability.

CONCLUSIONS

Pursuant to the obtained results certain conclusions and recommendations can be made for coaches regarding the targeted usage of specific programs for development of certain ability.

1. Since the knee joint extensors (Ekol) are very important for the performance technique of almost all specific exercises in RG, such a tendency of development demonstrates that training process must contain more contents directed at isolated engagement of this muscular group.
2. Statistically significant development of the hip flexors (Fkuk) and extensors (Ekuk) after the age of 8 points out that the training process directed at development of these muscular groups was good. The rate of hip extensors development significantly decreased after the age of 11. The slowdown in hip flexors' development occurred between the age of 9-10 and 11-12. but the improvement of this ability became significant again after the age of 12.
3. Significant result of the long jump test (DALJ) indicates that the test itself per its structure of movement and regime of muscular work is the most approximate to movements from the group of jumps and hops in RG and that is how such progress can be explained. In rhythmic gymnastics the occurrence of jumps with distinct movement in space is much higher than of vertical jumps. The situation in both high jumps (ABBR i ABSR) indicates that leaping ability in young gymnasts stagnates because no other exercises are used to its development except the specific RG jumps, which are not sufficient for development of this ability.
4. Development of repetitive power of stomach muscles showed uniform development tendency from 8-11 years of age. In the period from 11-12 there was a slowdown in development of power of this muscular group, only to become significant again after the age of 12.
5. Since RG is a discipline with very rich and diverse technique, it was expected that coordination is continuously developed in the period from 7-12 years of age, which corresponds to researches so

far. However, by applying coordination test (KOOR) significant development occurred only at the ages 9-10 . The assumption that this test was not adequate for the female gymnasts in RG because it depends on the speed of performance, and speed is not of primary importance in this sport.

6. By applying bend forward test (PRET) measuring general mobility, it was demonstrated that gymnasts did not increase significantly their mobility, which was not logical. Mobility is a primary motor ability in RG. The selection of competitors means that those girls already have good mobility of all joints. That points that they scored high results at the first test, which during their growth and further work could not increase to the extent which would lead to statistically significant differences. It was evident that this ability in gymnastic disciplines must be measured by specific test, in order to perceive more realistically changes of this motor feature.
7. It is evident that development of certain motor abilities was not continuous and that slowdown in development of certain motor abilities mostly occurred in the periods of transition into a higher competitive category (9-10 and 11-12 years of age). Due to conditions in which training is performed (available time of duration of training) and the speed of modification of Judges' Regulations, the work in these periods was mostly burdened with acquiring of technique of new apparatuses and much more complex forms of motion (greater number and level of difficulties), less space is left for general and specific preparation.

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YOUNG FOOTBALLERS' FOOT STATUS BEFORE AND AFTER A CERTAIN TRAINING LOAD

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1. SCOPE OF RESEARCH

Football has long surpassed its original form, which was primarily a game and entertainment. Not only has it become a business and a marketing tool, but a significant means of education as well. The football profession calls for early recruitment of talents and necessitates nonhuman premature exposures of players to great training exertion. Hard training sessions and games are often held in inadequate conditions (rain, snow, cold, uneven and slippery ground) and are thus a great challenge especially for young footballers whose bone-ligament interface has not been completely formed yet and whose muscle system is still insufficiently prepared for the imposed scope and intensity of load. Moreover, a football game is played requiring shoes that do not fully suit the natural anatomic structure of the foot, which also has an unfavorable effect on the foot status.

Due to the great strain, the muscles maintaining the foot arches (all the three sides of the shank and short plantar flexors) often cannot provide the needed tonus or enable physiological functions, which causes the imbalance of the anatomic elements of the foot. It has been noted that changes concerning the longitudinal foot arch occur during the training session as a result of growing demands of contemporary football as players, regardless of age and position in the team, are supposed to run 5-8 km during an activity (according to the latest statistics they run even more than 10 km). Such long distances often call for capabilities that surpass physiological capabilities of their muscle system. Numerous injuries among footballers are related to highly demanding training sessions. The facts stated so far initiated this research to be conducted. Its aim was to monitor the foot status of young footballers as it is the most subtle part of the open kynetics chain and is a linkage between the locomotor system and the ground. The change of the foot status was analyzed with respect to age, training load, morphological characterisitcs and the level of force of the muscle system.

In the common standing position, with regard to ankles, the force line of the body's center of gravity passes before its centres, so great torque is formed which has a tendency to cause the imbalance of the body frontwise. That is disabled by the back side shank muscles with constant isometric contraction. This indicates to the fact that there is a continuous pressure on the shank muscles and the foot during the day. The gravity force sole is a challenge to the muscle system and a continuous threat to the normal foot mechanics. Since the muscle system sustains additional pressure during a sports activity, the foot status is at risk when performing any phyisical activity. A case in point is football as a highly intense game during the course of which the muscles of the leg sustain the greatest pressure. The footballers' foot status is endagered to a high degree, especially of young footballers as well as of those inadequately prepared.

The abovementioned facts were considered when defining the initial hypothesis of this research. It was realisitc to assume that footballers with a weaker posture muscles, especially shank muscles, would be at great risk. Besides the initial status of the muscle system, another factor indicating to the change of the normal foot status was the training load the players were exposed to during both the training session and the game. This research aimed at monitoring the foot status with respect to the most frequent scope and intensity of work footballers were subject to during a training session and a game. It was expected that the common load would lead to more significant loweredness of the foot arch, which would consequently provoke the imbalance of the normal mechanics (statics and dynamics) of the system of movement and could also be an incentive for a number of sport-related injuries, such as muscle and ligament injuries.

2. RESEARCH METHODOLOGY

2.1. Experiment description

This empirical research was designed as a short longitudinal study aimed at monitoring foot status changes of young footballers during a typical football training session, which, by its structure, scope and intensity, is a close reflection of the load sustained during a football match. Data were gathered in the Football Club «Partizan» during three training sessions of young footballers – pioneers, cadets and youth players.

Prior to the experiment, the foot status was determined for each research participant. The procedure was performed in the in-house physiatric office of the FC «Partizan», located in the training centre «Teleoptik». The foot status was determined utilizing Thompsen's plantography procedure. After plantography, basic force parametres were assessed for all footballers by classic dynamometrics. The force parametres were determined during plantar extension (toe raising) in isometric strain conditions. This datum was later used in the analysis of the impact of force of the muscle system on the change of the foot status. Subsequent to the initial testing, research participants were subject to a 120-minute training session whose structure (scope and intensity) closely resembled the load sustained during a football match. In the course of the training, each player's movement was monitored and utilizing an observation sheet and a stopwatch the scope and intensity of load were recorded. Calculations were done for every individual player with respect to the distance run and the time spent in a low, moderate and high load zone. Upon the completion of the training session, all research participants underwent the same Thompsen's plantography assessment of the foot status so as to determine whether the training load brought about any significant changes related to the longitudinal foot arch. All data gathered were entered into a uniform pool of data and were analyzed by adequate statistical procedures with the application of the SPSS system.

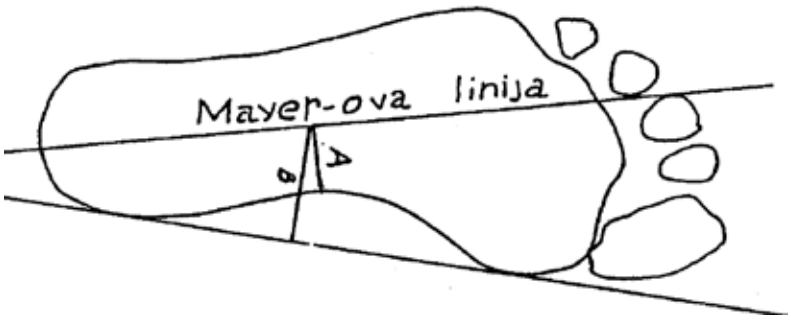
2.2. Research sample

The research encompassed 53 participants aged 13-18 who, at the time of conducting this research, had been practicing regularly for two years. The group including pioneers (17 participants) related to boys aged 13-14, the group including cadets (10 paarticipants) related to boys aged 15-16, whereas the youth group included young men aged 17-18.

2.3. Plantography model

For the purpose of assessing the foot status, Thompsen's plantography model was utilized providing percent values. The model is applied when the Mayer's line is inscribed on the plantogram (the line linking the middle of the heel with the lateral edge of the third toe and thus represents the borderline between the normal and lowered foot). In the case when the footprint does not go beyond this line towards the medial foot edge, the longitudinal foot arch is considered normal. If the foot, though, goes beyond the line, it indicates the lowered foot arch and calls for further plantogram analysis. It then necessitates mapping the tangent linking the most prominent footprint place of the medial foot edge with the print of the front part of the foot. After that, the closest part of the footprint around the middle of the foot is linked at the right angle with the Mayer's line. From the joining place on the Mayer's line, right to the tangent, another line is mapped (B) whose length is given in mm (Picture 1). After measuring these two values, the index of the loweredness of the longitudinal arch is calculated as a quotient of the lines A and B multiplied by 100 (A/B x 100). In that way, the degree of loweredness is expressend in percent values, and is interpreted in the following way:

- value between 1-30% indicates to the first degree of loweredness,
- value between 31-60% indicates to the second degree of loweredness,
- values between 61% indicate to the third degree of loweredness.
- The index value for people with the normal foot status is zero.

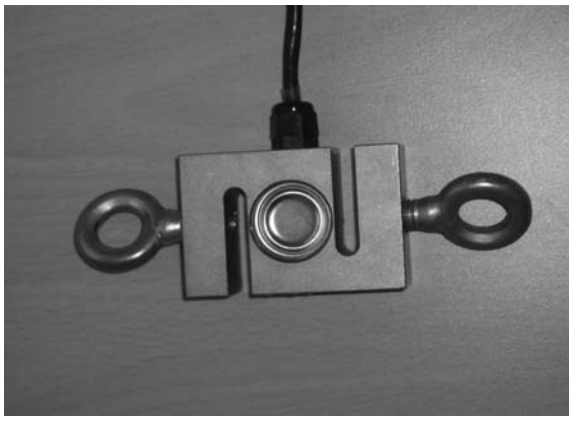


Picture 1 Plantogram analysis by Thompsen's method

2.4. Determining force parametres

The force of the actual muscle system is determined by *Globus ergo tesys system 1000,* a dynamometer adapted for performing the isometric contraction in the position of toe raising (Pictures 2-3), which engages plantar extensor in the ankle. When doing the test, the electronic system registers only two force parameters –

maximum values (Fmax) expressed in Newton values and the time needed for force realization (t_F) expressed in seconds. The speed of the force realization (F/t relation) is calculated based on their relation.



Picture 2 Globus ergo tesys Dynamomenter

Picture 3 Dynamometrics of plantar extensors

2.5. Assessing the training load

For the asessment of the scope and intensity of the training load a chronometric method was used. Moreover, one observer monitored only one player during the course of the training and recorded data on the observation sheet relevant to each distance run (distance in metres run, intensity, i.d. running speed). In order to simplify data recording, the intensity was recorded using one of the three modalities: low (slow running or walking), medium (running at medium and higher speed) and high (running at maximum and sub-maximum speed).

2.6. Statistical analysis of data

The data gathered were analyzed by descriptive and comparative statistics. Central and dispersive parametres were determined for each variable. For the purpose of assessing the significance of the diffference between the average values of the foot status obtained at the initial and final tests, T-test for dependent samples was used, whereas variance analysis was applied for testing differences between the average values of different age groups (pioneers, cadets and youths). The relation between the changes on the foot arches (as the only variable) and those variables that were hypothethically determined as predictors (force parametres and training load) was tested by correlation analysis.

3. RESEACH RESULTS

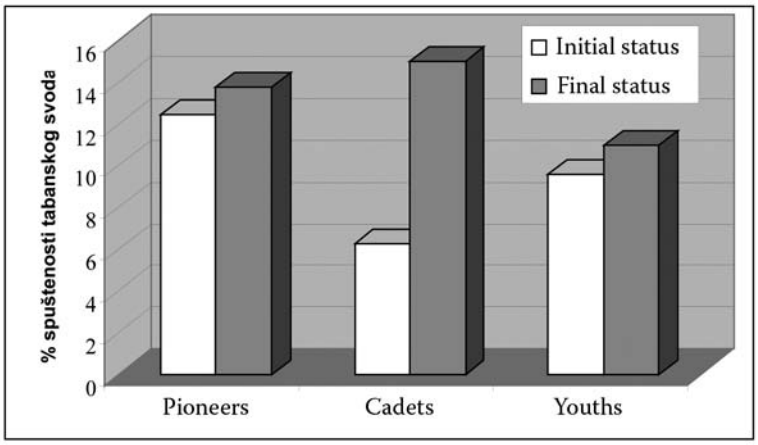
3.1. Foot status before and after training load

The first degree of the loweredness of the foot arch was noted among all participants at both the initial and final plantography tests. Results obtained at both testing times (pre-test and post-test) relevant to both feet and all age groups reveal the moderate loweredness of the longitudinal foot arch among the majority of the participants. Analyzing average values obtained by Thompsen's scale (Table 1), it becomes evident that none of the 12 values of the arithmetic mean obtained by initial and final plantography do not belong to the category of the normal foot. Young players predominantly have the first degree of the loweredness.

It seems that the applied training load did not affect equally the foot status of all age groups. Statistically negative changes were noted with the two younger groups (pioneers and cadets), wheres they were absent in the youth group. With the pioneers, it became obvious that the training load did not have the same impact on the left and right foot (Table 1 and 2; Pictures 4 and 5).

Table 1 Average percent values of the loweredness of the longitudinal foot arch obtained by initial and final plantography of the right foot in the three age groups.

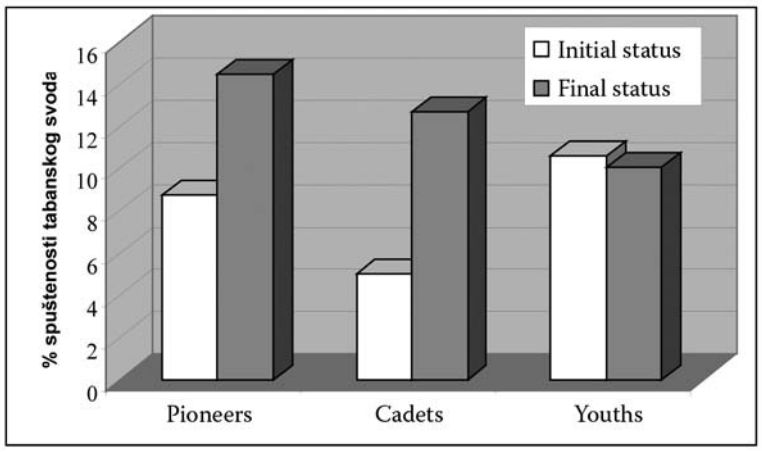
Age group	**Initial status**	**Final status**	**t**	*Sig.*
Pioneers	12.4594	13.7588	*-.876*	*.394*
Cadets	6.262	15.010	*-3.393**	*.008*
Youths	9.6127	10.9958	*-.890*	*.382*
F	.458	.218		
Sig	.653	805		



Picture 4 Changes of the foot arch of the right foot upon application of the training load

Table 2 Average percent values of the loweredness of the longitudinal foot arch obtained by initial and final plantography of the right foot in the three age groups.

Age group	**Initial status**	**Final status**	**t**	*Sig.*
Pioneers	8.7388	14.5006	*-2.676**	*.017*
Cadets	5.020	12.693	*-2.657**	*.026*
Youths	10.6146	10.0758	*.559*	*.581*
F	.430	.350		
Sig	.654	.707		



Picture 5 Foot arch changes due to the training load

The value indicating the difference between initial and final values of the foot status indicated to the direction of changes that occurred during the training. The calculated values showed that the level and direction of changes were not the same for the left and right foot. Having investigated average differences for the right

foot, it was evident that negative changes occurred among pioneers, cadets and youths. In other words, the percentage of the loweredness was the same and it increased from the initial to the final measurement (Table 3). Varince analysis showed that the changes were not the same for all age groups. The greatest changes were evident among the cadets, whereas with pioneers and youths they were significantly smaller and relatively equable. As for the left foot, unlike the right foot, there were negative changes among pioneers and cadets, whereas with youths, the loweredness of the left foot decreased (Table 4). Variance analysis indicated that the changes among pioneers, cadets and youths were significantly different, whereby the variability cause was a more favorable foot status with the youths and great negative changes among pioneers and cadets.

Table 3 Average differences between initial and right foot status for three age groups

Category	Differences(%)	Std. Dev.	Std. Error	Min.	Max.
Pioneers	-1.2994	6.11581	1.48330	-14.87	9.39
Cadets	-8.7480	8.15219	2.57795	-21.43	0.45
Youths	-1.3831	7.92338	1.55390	-31.11	15.56
Total	-2.7458	7.85712	1.07926	-31.11	15.56

F-test = 4.014*; **p** = .024

Table 4 Average differences between initial and final left foot status for three age groups

Category	Differences (%)	Std. Dev.	Std. Error	Min.	Max.
Pioneers	-5.7618	8.87835	2.15332	-33.34	3.09
Cadets	-7.6730	9.13348	2.88826	-21.97	0.73
Youths	0.5388	4.91748	.96440	-11.34	13.16
Total	-5.7618	7.95434	1.09261	-33.34	13.16

F-test = 6.436*; **p** = .003

3.2. Plantar extensors' force parametres

As expected, average values of the maximum force for the three age groups (pioneers, cadets and youths) are, statistically speaking, significantly different. It is logical that the geatest values were among the youths, and the smallest among the pioneers. On the other hand, despite salient differences among the calculated arithmetic mean, the three age groups were not, statistically speaking, significantly different neither in relation to the time of realization of the maximum force nor with regard to the F/t relation (Table 5).

Table 5 Force parametres determined for participants of different age (Fmax – maximum isometric force; t_F – time of force realization)

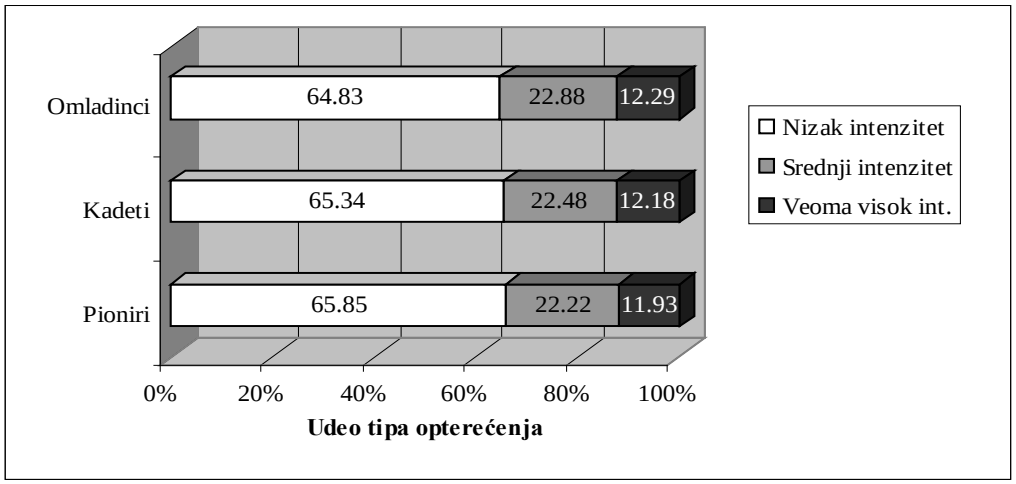
Category	Fmax (N)	t_F (seconds)	F/t (N/s)
Pioneers	1081.3124	1.1682	1163.8193
Cadets	1176.3608	1.1800	1168.0580
Youths	1551.2688	1.1392	1849.5595
F	51.907*	.049	1.746
Sig.	.000	.952	.185

3.3. Structure of the applied training load

The total scope of load, as well as the scope pf activities performed with low intensity, which were evident in three different age groups, were even. Significant differences between sub-samples were observeable only with acivities performed with medium and high intensity. In comparison to the pioneers and cadets, who were even in those zones, significantly higher scope of work of medium and high intensity was noted just in the youth group. Therefore, small differences were identified between the total scope of work performed in different groups, which points to the fact that the same training load was applied to all the research participants, regardless of age (Table 6 and Picture 6).

Table 6 Scope of load (in metres) of different intensity determined for the three age groups

Category	Low intensity	Medium intensity	Very high intensity	Total scope
Pioneers	2708.38	913.75	490.72	4112.85
Cadets	2699.33	928.92	503.09	4131.35
Youths	2782.14	981.76	527.35	4291.24
F	1.229	6.825*	6.296*	2.561
Sig.	.302	.002	.004	.088



Picture 6 Per cent values of the load of different intensity in the total scope of work

3.4. Relation of the foot status and muscle force parametres

For the purpose of testing the numerical value of the foot status changes and force parametres of plantar extensors, Pearson's correlation coefficient was used and calculated between differences (difference between initial and final foot status) and three dynamometric parametres (maximum force, time for its realization and F/t relation).

Table 7 Correlation matrix with Pearson's coefficients (r) and realized levels of significance (Sig.), calculated between the right foot status changes that occurred during the training and force parametres of plantar extensors. The correlation analysis was done on the complete sample. Asterisks (**) show coefficients significant at the level of 0.01.

Force parametre / Category	F_{Max} **r** (*Sig.*)	t_F **r** (*Sig.*)	t_F **r** (*Sig.*)
Pioneers	**.926**** (*.000*)	**.322** (*.208*)	**-.347** (*.173*)
Cadets	**.903**** (*.000*)	**-.630** (*.051*)	**.541** (*.107*)
Youths	**.744**** (*.000*)	**.314** (*.118*)	**.-.054** (*.796*)

Table 8 Correlation matrix with Pearson's coefficients (r) and realized levels of significance (Sig.), calculated between the left foot status changes that occurred during the training and force parametres of plantar extensors. The correlation analysis was done on the complete sample. Asterisks (**) show coefficients significant at the level of 0.05.

Force parametre / Category	F_{Max} **r** (*Sig.*)	t_F **r** (*Sig.*)	t_F **r** (*Sig.*)
Pioneers	**.515*** (*.034*)	**.436** (*.081*)	**-.351** (*.222*)
Cadets	**.292*** (*.05*)	**-.373** (*.288*)	**.361** (*.305*)
Youths	**.475*** (*.014*)	**-.193** (*344*)	**.330** (*.100*)

Statistically significant relation with the foot changes provoked by the training load was shown merely by the maximum value measured in isometric conditions. While the time of the force relization and the F/t relation were not linked to the changes that occurred on the foot arch, between the maximum force and evident differences (differences between initial and final status) there were acquired high and statistically significant correlation coefficients for all age groups, as well as for both feet (Tables 7 and 8). The direction of calculated Pearson's coefficients indicates to the positive impact of the maximum force of the shank muscles in maintaining the foot status.

3.5. Influence of training load on the foot status change

As chronometric measurements lead to the conclusion that the load structure applied to the pioneers, cadets and youths was not significantly different (except for high intensity zones), it was realistic to assume that approximately the same load would affect the foot status of the age groups differently. Therefore, the correlation analysis was done for each age group separately. Among 24 coefficients (four for each foot for each sub-group), there were only two that were significantly different. They both referred to the changes occurred on the left foot of pioneers while performing movements at medium or high speed. In the remaining cases the realized levels of significance were far beyond the theoretical limit (*Sig*>.05) and indicated that the acutal muscle force was not, statistically speaking, significantly related to the left and right foot changes among the cadets and youths, or those of the pioneers' right foot. Consequently, the participants' age is the crucial predictor in determining the level of exertion on the foot status. Training experience contributes to the improvement of the muscle system maintaining foot arches, so physical strain influences only the youngest players. Besides that, the training load applied without prior considering the players' age probably affected the results.

Table 9 Correlation matrix with Pearson's coefficients (r) and realized level of significance (Sig.) calculated between the right foot changes occurred during the training and the structure of the applied load. The correlation analysis was done on the complete sample.

Load / Category	Low **r** (*Sig.*)	Medium **r** (*Sig.*)	High **r** (*Sig.*)	Total **r** (*Sig.*)
Pioneers	**.071** (*.624*)	**.110** (*.446*)	**.088** (*.543*)	**.083** (*.565*)
Cadets	**-.009** (*.981*)	**-.009** (*.981*)	**-.009** (*.981*)	**.009** (*.981*)
Youths	**-.151** (*.467*)	**-.151** (*.467*)	**-.151** (*.467*)	**-.151** (*.467*)

Table 10 Correlation matrix with Pearson's coefficients (r) an realized levels of significance (Sig.) calculated between the left foot changes occurred during the training and plantar extensors' force parametres. The correlation analysis was done on the complete sample. The asterisk (*) indicates coefficients significant at the level of 0.05

Load / Category	Low **r** (*Sig.*)	Medium **r** (*Sig.*)	High **r** (*Sig.*)	Total **r** (*Sig.*)
Pioneers	**.261** (*.117*)	**.323*** (*.022*)	**.310*** (*.028*)	***.261*** *(.067)*
Cadets	**.481** (*.153*)	**.487** (*.153*)	**.484** (*.153*)	**.483** (*.153*)
Youths	**-.165** (*.430*)	**-.165** (*.430*)	**-.165** (*.430*)	**-.165** (*.430*)

4. CONCLUSION

The results obtained through plantography at all points of time and for all age groups indicate to the fact that with most young footballers who participated in this research moderate loweredness of the longitudinal foot arch was determined. This fact shows that there was inadequate treatment during the training sessions, as well as that there is no regular control of the posture status. Ample research (Krajčinović, 1976; Radisavljević i Koturović, 1982; Jarić i Radisavljević, 1985; Radisavljević, 1989) also shows that a growing number of children and young people suffer from the first degree foot loweredness. Even though it was realistic to expect that children and young people who exercise regularly have stronger shank and foot muscles, and therefore less frequent irregular posture status, research participants (young footballers) fit into the typical results of the average population. This can be explained by the coach's inadequate treatment of young athletes (over-exertion, great load, absence of prevention exercises, etc.), which indicates to the linear approach of load dosing while paying not attention to the age factor.

Due to the comparison of the research findings and those of the research previously conducted (Simić, 1985; Radisavljević i Radisavljević, 1989; Gordon, 2002), it becomes obvious that first degree foot loweredness is customary for top athletes exposed to early selection and specialization, as well as for amateurs exposed to monotonous activities. This research has shown once again that monotonous specialized activities has a negative impact on the foot status.

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DIFFERENCES IN ANTHROPOLOGICAL CHARACTERISTICS OF FOURTEEN YEARS OLD ACTIVE SPORTSMEN AND TEENAGERS WHO ARE NOT ACTIVELY INVOLVED IN SPORTS

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INTRODUCTION

Basic purpose of gym classes is to meet fundamental human and biological need for movement and to improve the abilities and the knowledge of the participants to the level that will offer them easier socialisation and solving some general tasks and problems. Most experts in the field of kineziology consider two gym periods a week, which is a general practice in Croatia, not nearly enough. Additionaly, since gyms are rather far away from the place of other instruction in some schools, gym classes are often organised as two periods at a time, and in some school a single period a week only is dedicated to gym classes! We shall try to give our contribution in answering the question whether this is enough and satisfying or not.

Despite inumerable possibilities of choosing sports, high-quality coaches and training, only an insignificant proportion of school children are actively involved in sports. One of the reasons are obviously preocupation with school tasks, while the other is certainly lack of information on the part of the children and students regarding sports, health and the benefits of daily bodily exercise. Of course, there is also the question whether we, kinezologists, can, in the course of a single period a week, „infect" anybody with love for physical exercise. The experts say that it is necessary to have at least three periods a week to improve gym classes in any significant manner, if not having the exercise every day. Having a single or two periods a week in a gym, it is utterly impossible to cause any significant changes in the field of functional and motoric abilities of our students. It is thus necessary to involve the students into out-of-school activities of a kineziological character. Sports included in this investigation are basketball, soccer and handball. These are complex games which include running, jumping, coordination, keeping balance and flexibility in successful performance. Additionaly, these are the sports that involve in a significant proportion, energy from aerobic sources and it is evident that dominant activities in trainings are those that develop the aerobic capacities. The component of explosive power dominates in basketbally, together with the abilitiy to manipulate the ball by hands. In soccer, the aerobic capacity, coordination and controlling the balls using legs are of key importance, while handball training is characterised by agility and explosive and repetitive power of the upper extremities. The biggest differences should be expected in tests in the above described areas of activity.

METHODOLOGY

A group of 98 students took part in the investigations. Out of this number, 50 students were not involved in any sports, apart from gym classes at school, 16 of them were active soccer players in the FC «Karlovac», 13 played basketball in the BC «Šanac» and 19 were handball players in the HC «Karlovac». All of them were of the same age and attended the first class (freshmen) of secondary schools in the Karlovac county. Nine tests were used such that are obligatory used in gym classes in secondary schools in Croatia. The tests include anthropometric characteristics, as well as motor and functional abilities, such as tallness (ATV), body weight (ATT), hand taping (MTR), broad jump from the spot (MSD), polygon backwards (MPN), raising the trunk (MPT), sitting touch-toe with legs apart (MPR), arms-bend hanging endurance (MIV) and Cooper test for 6 minutes (F6'). In the course of data processing, the arithmetic mean was calculated for all the testing groups and the results were compared with the average for the students of the age group in Croatia as a whole. The results were graded as: poor, under average, average, above average and excellent.

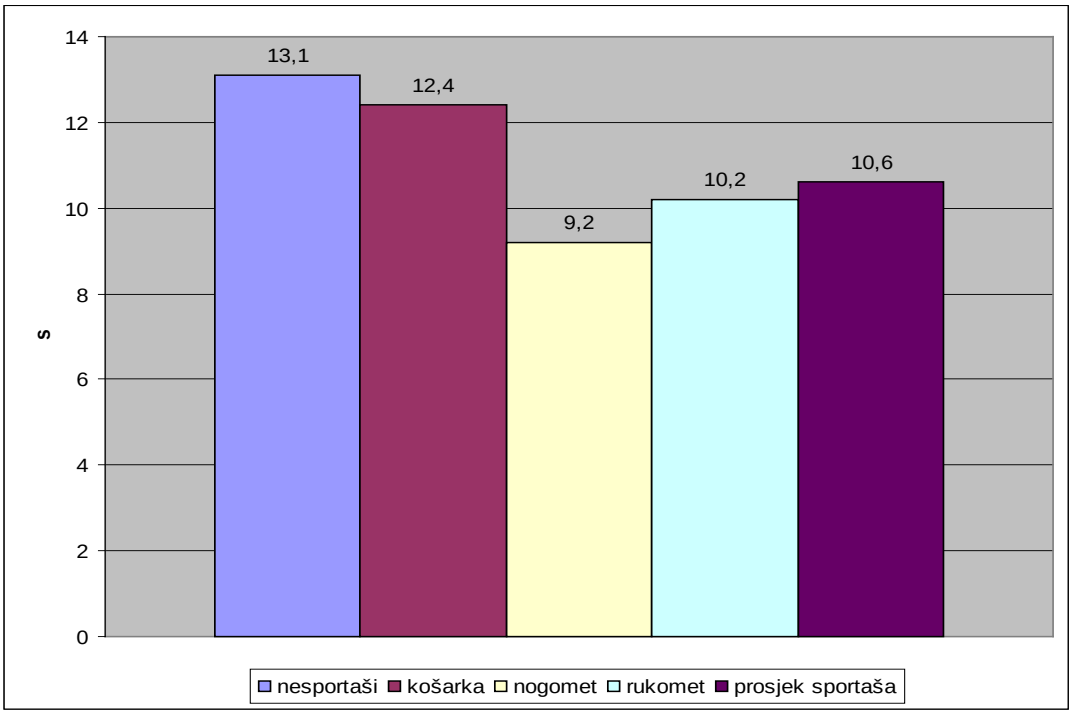
RESULTS

Table 1

	Non-athlets	Basketball players	Soccer players	Handball players	Sportsmen on average
ATV	167.5	176.3	166.1	170.5	
ATT	63.4	66.4	59.2	64.1	
MPN	13.1 average	12.4	9.2	10.2	10.6 above av.
MPR	47.3 poor	60.6	50.1	53.4	54.7 average
MSD	186.9 poor	237.0	205.4	228.3	223.6 above av.
MTR	32.2 below aver.	31.5	31.3	37.9	33.6 average
MIV	18.3 poor	41.3	44.9	60.4	48.8 average
F6'	1121.7 poor	1393.6	1454.1	1414.5	1420.7 above av.
MPT	39.8 average	43.3	52.7	49.2	48.4 excellent

Table 1 shows significant differences in motorical and functional abilities of the groups compared. When testing anthropometric characteristics, all the groups were in an excellent conditions and the differences were negligible. Basketball players were the tallest and the heaviest, while soccer players were the shortest and the lightest. As expected, the biggest differences occured between the sportsmen and non-athlets in motoric and functional tests. It can be seen that non-athlets reached poorest results in 6 of seven tests. The biggest difference was in hanging endurance which clearly points at static strength of the arms and shoulders of the sportsmen. The only motoric test in which the group of non-athlets did not exhibit the poorse results was hand taping, where they were slightly better than basketball players and soccer players.

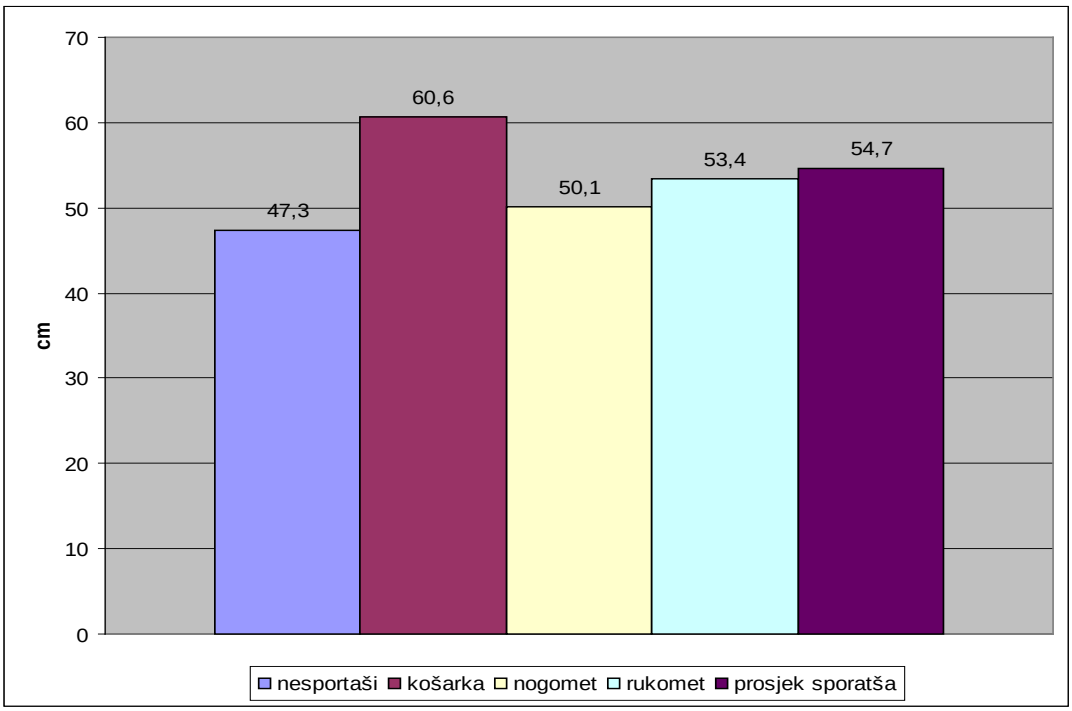
MPN – polygon backwards



Nesportaši – non-athlets,košarka – basketball,nogomet – soccer,rukomet – handball, prosjek sportaša – sportsmen on average

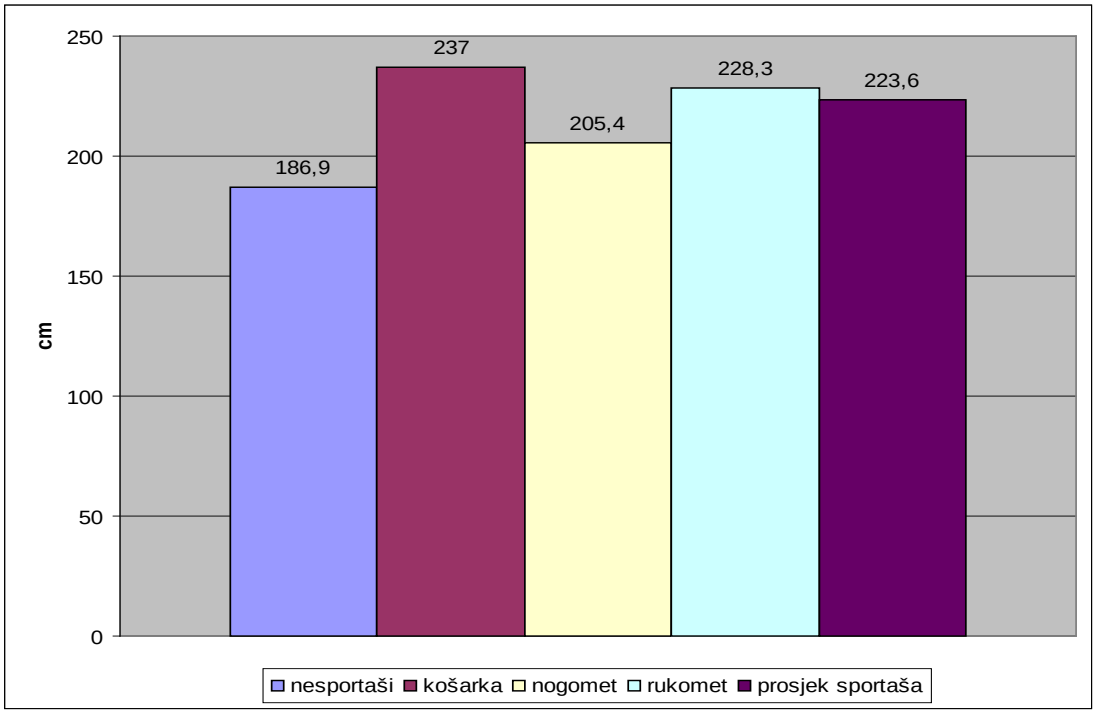
Non-athlets showed average results in the motoric test of polygon backwards, compared to the average of the age group in Croatia, while sportsmen were above average in this test.

MPR – sitting touch-toe with legs apart



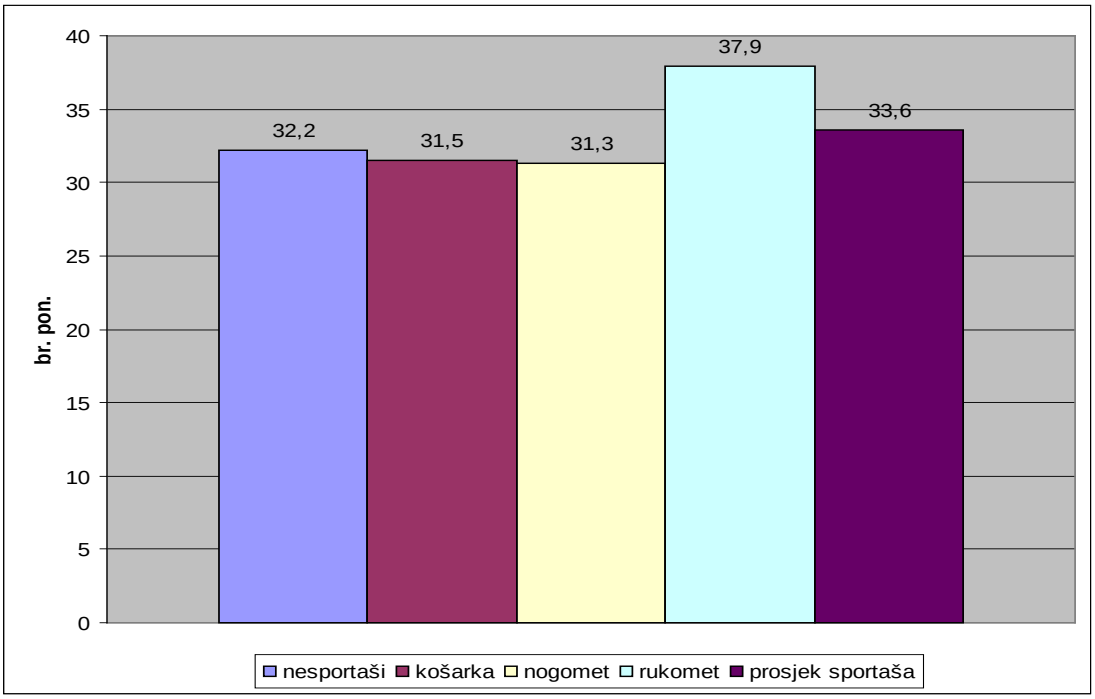
Nesportaši – non-athlets,košarka – basketball,nogomet – soccer,rukomet – handball,prosjek sportaša – sportsmen on average
Non-athlets showed poor results in the motoric test of sitting touch-toe with legs apart, while sportsmen were average in this test.

MSD – broad jump from the spot



Nesportaši – non-athlets,košarka – basketball,nogomet – soccer,rukomet – handball,prosjek sportaša – sportsmen on average
Non-athlets showed poor results in broad jump from the spot, while sportsmen were above average in this test.

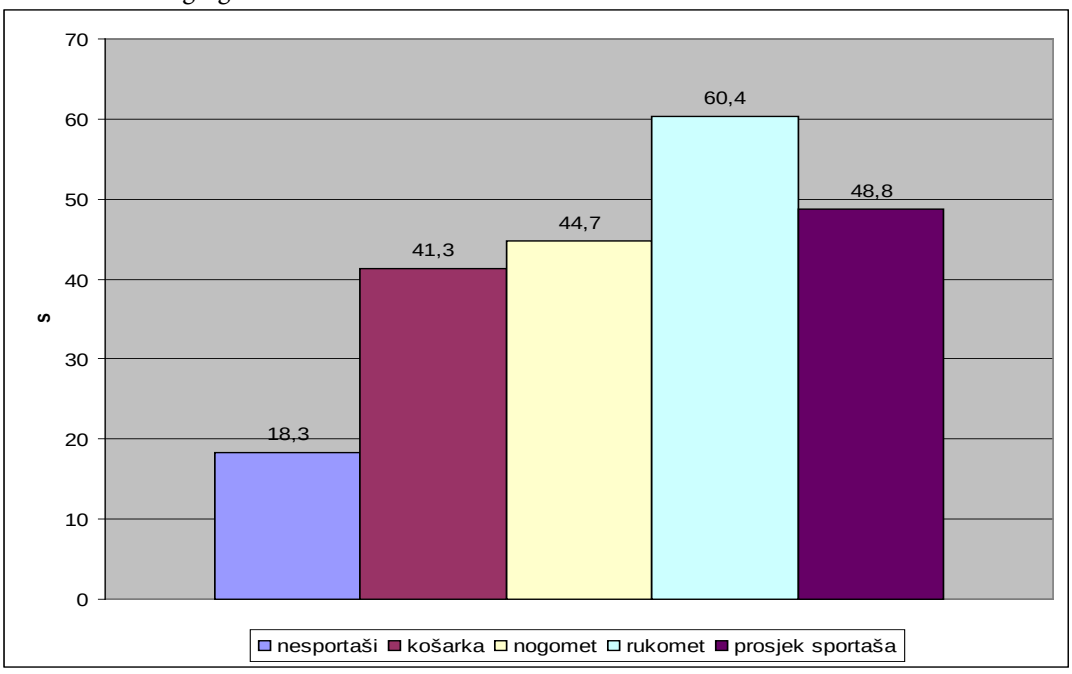
MTR – hand tapping



Nesportaši – non-athlets,košarka – basketball,nogomet – soccer,rukomet – handball, prosjek sportaša – sportsmen on average

Non-athlets and sportsmen exhibited the most similar results in the motoric test of hand tapping. However, comparing with the rest of the population, non-athlets were below average and sportsmen average in this test.

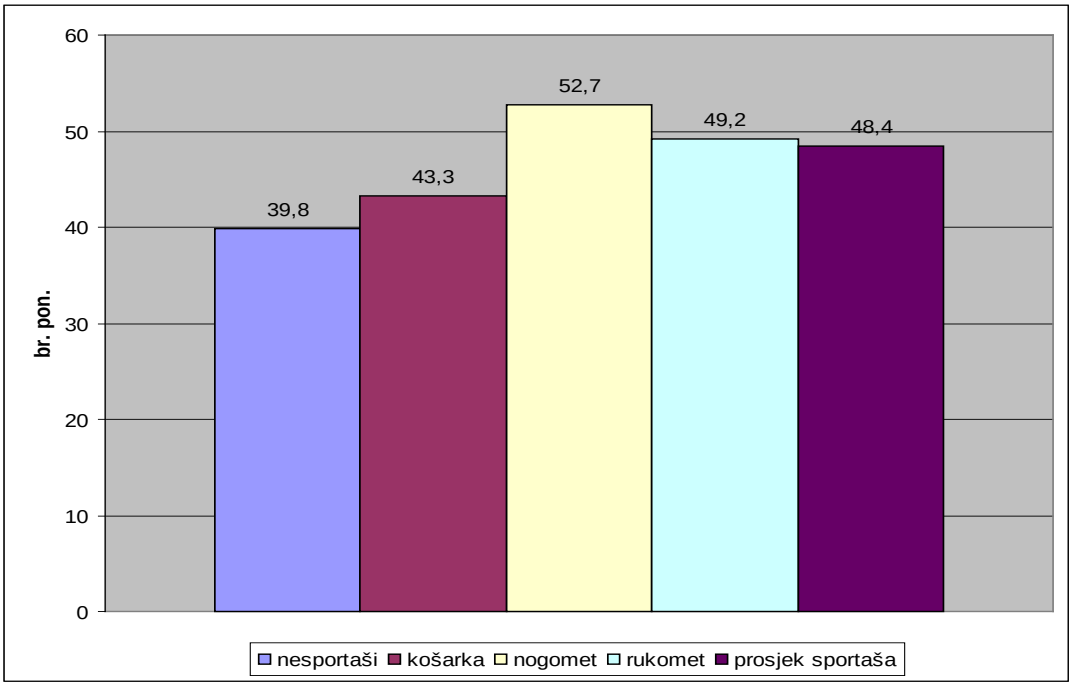
MIV – arms-bend hanging endurance



Nesportaši – non-athlets,košarka – basketball,nogomet – soccer,rukomet – handball,prosjek sportaša – sportsmen on average

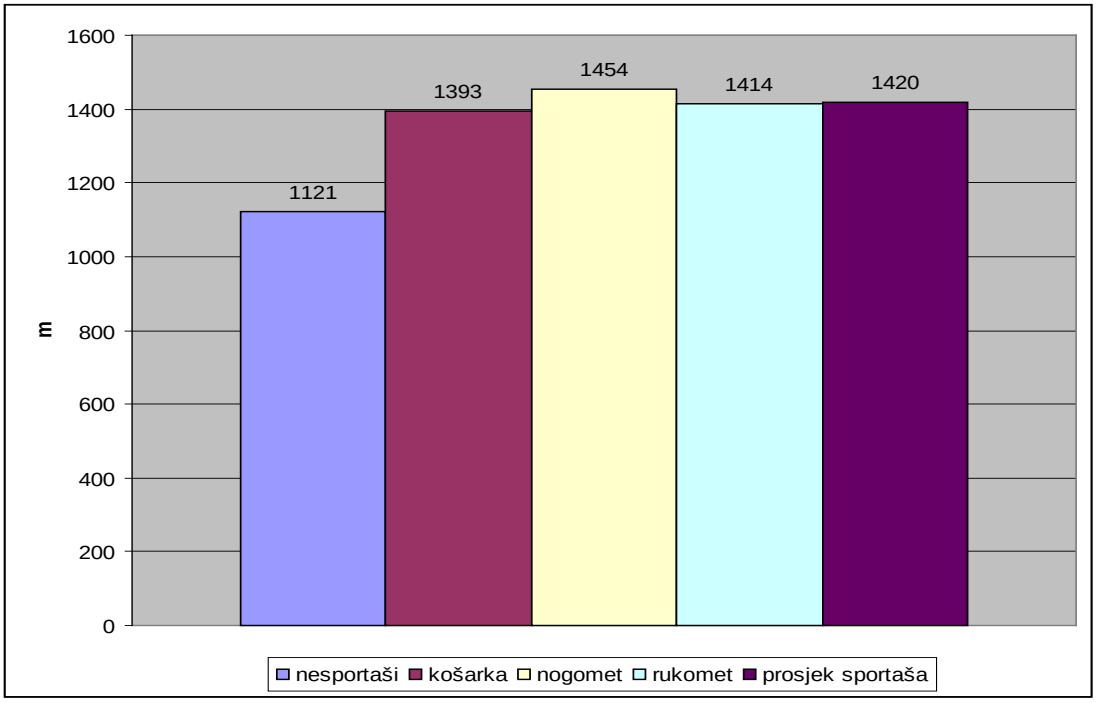
Non-athlets showed poor results in hanging endurance, while sportsmen were average in this test.

MPT – raising the trunk



Nesportaši – non-athlets,košarka – basketball,nogomet – soccer,rukomet – handball,prosjek sportaša – sportsmen on average
Non-athlets showed average results in raising the trunk, while sportsmen were excellent in this test.

F6' – running for 6 minutes (Cooper test)



Nesportaši – non-athlets,košarka – basketball,nogomet – soccer,rukomet – handball,prosjek sportaša – sportsmen on average

As expected, the biggest difference was exhibited in the functional test of running for 6 minutes. Non athlets were poor in this test, while sportsmen were above average.

DISCUSSION

Processing of the initial dana, obtained by measurig 98 students, indicates that there are significant differences in most motor and functional abilities, primarily between the boys non-athlets and those who have participated in a sports traiuning for 2 years. Comparing the results of non-athlets with prescribed standards, we have reached the conclusion that MPR, MSD, MIV and F6' are poor, MTR is below average, while MPN and MPT are average. Not a single test is above average, except for individual cases, and there is no exampole of an excellent test on the part of a non-athlet. Results exhibited by sportsmen are considerably better = MPT – excellent, MPN, MSD, F6' – above average, while only MTR and MIV are average.

The differences between non-athlets and average results of the students who are involved in soccer, basketball or handball raise the question whether two periods a week in a gym is really enough. The obvious answert is it is not! The investigation has undoubtly shown that two periods a week is not nearly enough to cause qualitative changes in the anthropological status of the students and it is definitely not enough to improve their health and working ability.

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SIGNIFICANCE OF SCHOOL SPORTS EDUCATION IN ANIMATION AND SELECTION OF DISABLE ATHLETES

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1. INTRODUCTION

Altough is very hard to establish precisely exact number of individuals with some form of invalidity, the number is aproximatelly presented as 10 % of total population. That number varies depending on country or region for which is expressed, so in some countries number of disabled individuals is presented with 7-8 % of total habitants population, while in some Subsaharian African countries that percentage expounds more than 30 %. Indeed, number of disabled individuals in Serbia is presented with more than usuall 10 %, but according to the estimates, its going up to 14 % (Zdravkovic, 2004.).

On the first view, it is very clear that those individuals present very huge number of total human society, so the significance of their integration in all spheres of society and stream could be considered as priority tasks of every modern society. Significance of this process in Serbia is very important, altough the whole society awareness is far from required and expected. However, among other things much is performed, either on education field or sport, still we got hard impression that performed steps were commonly been extorted with standards regulated by Europian Union, rather than it was product of our creative opinion. Particulary, education and sport distinguished themselves as important part of society, trully featuring total integrity amount of this part of population society. These parts present ideal ground for afirmation and realisation of inclusive model of inserting disabled individuals in all society pores.

2. EDUCATION OF DISABLED STUDENTS IN SERBIA AND WORLDWIDE

Educational and pedagogical system in Serbia includes obligatory preparatory pre-school programme and primary education, as well as secondary education and upbringing which is not obligatory. Existing educational system of young and adolescents with special needs, including disabled children, is organised in 3 different modes: separate schools for these children, separate classes in regular schools and classes of regular schools where these children are beeing educated with other schoolmates. The group of children with special needs, except disabled children, e.g. children with physical, mental and sensorial disability, includes also children with behavioral disorder, children with chronical deseases or children on long-termed hospital or home recovery, children with emotional problems, children from social, cultural and material depriviated enviroments, children without parents care, abused children, war children, hindered children, refuge and displaced children, as well as specific category of extraordinaly talented children. According to Institute for education and upbringing advancement (2007) data, there are 74 schools in Serbia for schoolchildren with development disorders, including 49 primary schools, 25 secondary schools, with about 7 500 pupils. Huge number of these schools, about 36 primary and 18 secondary, deal with the mental disordered children, 7 primary and 5 secondary schools deal with schildren with hearing disorders, with children with sight disorders deal 2 primary and 1 secondary school, altough there are 2 primary schools for schildren with physical disorders. Besides, there are 82 primary and 6 secondary schools, with more than 7 000 schoolchildren, which have special classes for these children, althoug 18 000 schoolchildren with development disorders are educating in regular classes. In regular classes, out of children with development disability, there are more than 3 100 schoolchildren with sight disorders, about 800 schoolchildren with mental disorders, 250 schoolchildren with hearing disorders, 200 schoolchildren with physical disorders, and about 60 schoolchildren with cereberal palsy. All this children studing is based on plans and programmes, which can be: regular- in regular schools, modified – in regular schools but for the schoolchildren with developed disorders, as well as special programmes in special schools. Altough UNICEF (2001) estimated that more than 85% of children with special needs are not included in educational system, according to the rough estimates for our country; huge number of that population is inside the educational system than out of it. (Experts group, 2004).

Taking into account noticed weeknesses and problems, which strain actual educational system, seems that there is a need for installing and stimulating inclusive model everywhere is possible, untill that model is not jeopadizing the best interests of disabled schoolchildren and other schoolchildren. Educational system of

schoolchildren with disability, as well as schoolchildren with other needs, is necessery to connect with other social institutions and services, including health care system, labour market, rehabilitation institutions, social-care institutions, organisations dealing with this problems, associations of schildren with special needs and their parents, media… Connection with these services enable completing solution of all relevant aspects of life and work of disabled individuals and their continuous promotion, and giving them significance in education they realy deserve. Sport assosiations and clubs of individuals with special needs are among the institutions and services, where is necessary to accomplish high grade connection and cooperation.

In international practise experience in education of children with particular needs, 3 different categories of education system are determined (Experts group, 2004). First group represent countries which develope practise of including almoust all schoolchildren in regular education: Italy, Greece, Cyprus, Spain, Portugal, Sweden, Norway, Ireland. In the second group are countries with system between special system and regular system, developing number of services, and these are Finland, Danmark, Great Britain, France, Poland, Check Republic, Lythuania, Slovenia, Croatia. The third group of countries is with paralel and separate systems, which are independent, including Belgium, Switzerland, Germany, Serbia and Montenegro. Extensive study developed by UNESCO (1994), noticed many weaknesses in children education in countries all over the world and recommended inclusive model as the most acceptable. Although most of the European countries made great progress in this field, huge number of children worldwide is far from this aim. Nowadays, inclusion is considered to be an aim or an ideal, to whome we have to aspire and it represents continuous process which is permanently developing and needing some time. Physical education and sport present almost ideal field for additional development and promotion of the idea.

Education model of schoolchildren with special needs in Serbia, suggested by Experts group (2004), implies great programme and methodological coordination of different levels and segments of educational system. Vertical permeability means continuous connection of pre-school, primary school, secondary, two-year college-level education, as well as university education and adult education. Horisontal permeability is established on branch principles and diversity principles, to consider differences as much as possible and specifity of some schoolchildren. Within horisontal permeability 3 general options are suggested, but number of variation and modalities is higher. Tree general options mean inclusive education, partially inclusive education and special education, related to pre-school and school education, as well as adults' education. For two-year college-level education and university education only inclusive form is predicted.

Inclusive education means total including of disabled schoolchildren in regular classes, with giving obligatory help to these schoolchildren. In educational and pedagogical field, term "inclusion" present pedagogical attitude for pre-school and school education wich will enable children development no matter if they are extraordinaly talented, average talented or children with development disorders.

Partialy inclusive education could be organised in two basic variations. First variation includes organisation of special classes of disabled schoolchildren in regular schools, for which will be organised participating in teaching with other schoolchildren only for some subjects and sections. Second variation of partialy inclusive education includes organisation of common teaching for schoolchildren of special classes at special schools with their agemates from regular schools in neighborhood.

Special education would be retained in special schools for schoolchildren with hard disability variations, who need extraordinarily help and close-knit education with habilitation and rehabilitation. Physical education of children with disability in special schools is presented with 3 equal and functionaly encircled field (Prosvetni glasnik, 1993.):

1. Basic physical education – contributes to development of necessary capacities and schoolchildren characteristics (basic and accomplished locomotion, common and applied manipulations, resistence of own body and resistence of exterior milieu, games)
2. Directed physical education – hase to satisfy individual needs and intresests of every child in complience with their residual needs (corrective excersise, additional excersise, optional exercise, selective exercise)
3. Appliedd physical education – aimed at recovering special motoric knowledge and skills, primarily based on schoolchildren ability and their interests.

Classes are obligatory for all schoolchildren and physical educaction teacher forms groups of schoolchildren, based on their abbility and depending on it, determining concrete activities. Principally, children with disabilities are behind their physical upgrowth, mainly displayed in unsufficient arms and legs coordination, so physical education is directed on rejection and relaxation of existing deficiencies.

3. SPORT IN INDIVIDUALS WITH DISABILITY IN SERBIA AND WORLDWIDE

Many authors, who deal with sport problems and physical activity of individuals with disabilities, emanated their great significance for this population (Winnick 1995, Deusen 1977, Drench 1994, Valiant 1990). Negative consenquences, which follow staccato stagnancy, were explained in detail, as well as possitive effects of physical activities on organism (Kasum, 2007.). Despite all this unequivocal messages and invitation, there is relatively small number of individuals with disability, who are included in activities and fitness clubs in Serbia. In the Serbian association for sport and recreation of disabled person, 17 000 athleths with disability were registered, representing only about 2% of total number of individuals with disabilities in Serbia. Not forget that this number of athleths is not realistic, because many registred are not really included in sport activities, only figuring throughout administative data. Reasons of this poor response are not determined in detail, but after all, some reasons are stand out as the most logical. One of that reasons is poorly developed awareness of sport activity necessities, as much individuals with disability as their family members. Also, we recognize that number of sport clubs for individuals with disabilities is not enough, as well as a fact that their organisation is mostly not in enviable level. Individual mobility in sport activities for individuals with disability is often cosequence of acquiring some favourable circumstances, not result of organized and systematic inclusion of this individuals in sport. Athleths with disablity mostly begin their sport practice associating with some accdidental engagement with coach or other athleths with disability. These stories sound very interesting, also indicating serious problem of bad information and organisation of disabled individuals. Results on Paraolympic Games accomplished by our athlets, on world and European championship are impressive, but they rather more present great enthusiasm and individual engagement than organisation of sports associations and sport clubs for disable individuals. One of the reasons of this poor situatuation is in bad connection between physical education process and longtermed competitive sport inclusion of this population. With better organisation and connection this two systems, along with relatively small investments, it is possible to achieve notable results in the aspects of quality and also quantity of sport in disable individuals.

International Paraolympic Committee is established in 1989, today including 27 sports. On the auspices of Paraolympic Committee of Serbia, established on 5 th of July, 2006, stand for 12 sports: athletics, swimming, table tennis, archery, bicycling, dance in trolly, basketball in trolly, sitting volleyball, skiing, golball, judo and horse sport. Till now, Yugoslav and Serbian athleths won 82 medals in total. Associations of disabled individuals also organize some sport activities. Belgrade paraplegic association, established on November, 25th, 1986, currently has about 420 athlets in six sports: basketball in trolly, table tennis, athletics, archery, chess and automobilism (www.upb-beofeniks.org.yu).

In 1997. SPORTHUS arised - Serbian disabled schoolchildren sport competitions. Programme was made in imitation of existing competition programme for regular population, but it is specific compapring its aim and mission which resulted from characteristics of disabled schoolschildren. Competitions are in table tennis, basketball, small football and athletics (100 m running, jump into distance, shot-put).

All sports, exercised by disabled individuals can be:

- segregative - exclusively competition of disabled individuals,
- integrative – disabled individuals are competing with general population without any adaptations
- inclusive – disabled individuals are competing with general population with necessary adaptation.

4. INCLUSION IN PHYSICAL EDUCATION AND SPORT

Physical education indoctrination is possible to realize efficaciously toward inclusive model. During the class, teacher hase to pay attention and give support to disabled children or if its not enough, to employ contributors in schooling specialy charged for this children. Very spontaneously and discretely is possible to include disabled children in sport activities, already practiced by general population children.

If there is a need, occasionaly disabled schoolchildren can be dissociated in small groups where specialists for dealing with these children are working, or individual work can be done. With this educaction mode, great security feeling, selfrespect and emotional control, effective communication capability development, sensibility for others needs and their successful socialisation is achieving. Parents have chance to acquaint possibilities of their children, developing their skills, but also developing realistic view on childen possibilities and children's future. At the same time, children without disabilities accept differences as something natural and devolope sensitivity for disabled children needs. Physical education in spontaneous and discrete way significantly conduse to this aim realisation. Throughout realisation of schoolplans, children and also disabled children construct their selfrespect and emotional stability; develop communication skills, tolerance and understanding for others, as well as general self-respectness and self-confidence. Even without additional stimulation and motivation, disabled children have a need to compare and compete with children of the same age from general population, especially from school mileu. Specialy valuable and actively can be sports activities on which existing dissability has no preferable importance. This idea is the best illustrated with examples of our and

world athlets with disability who sometimes, except they practice with athlets without disability, accomplish even noticed successes on general population sports competition.

Physical education is especially pleasant subject for realisation according to partialy inclusive model. Sometimes for disabled schoolchildren in separate classes of regular schools is complicated or even not possible to organize complete education with general population schoolchildren. However, with more creativity and mortgaging it is always possible to organize realisation of physical education along with general population schoolchildren. It is even possible to organize content adapted to disabled schoolchildren possibilities. Sport activities chosen on the right way make possible that disability for those children who have it, is not presenting as liming factor. For this idea some sport sections are nearly ideal outbuilding and work up. Also in another variant of partialy inclusive model, physical education is one of the prime subjects for wich is possible to organize teaching, and schoolchildren of special classes in special schools could attend classes of physical education or sport sections in some of the regular schools. Within special schools is possible to organize several different curriculums, at the least one with inclusion elements and it would present some kind of preparing individuals or schoolchildren groups for removing regular system education. In essence, it is necassary to enable all 3 models of primary education systems to be compatible, coordinated and elastic, giving easy transmition from one to another system, within both directions. Flexibility and elasticity have to exist within every system, so that schoolchildren could try different education ways and in every education phasis applied the variant which is giving best effects.

Disabled table-tennis athlets from Belgrade club "Stib" and club from Novi Sad "Spin" with good results competed in regular table-tennis city leagues, also having imposing results in Olympic Games, Europian and World Championship. Athlet Budimir Malešić, with both lower legs amputated, had third place on world cup for disabled individuals, having good results in matches of regular table tennis ligue. It is similar situation with huge number of table tennis athlets in trolly. Legend with large number of gold medals Zlatko Kesler, silver on Paraolympic Games in Beijing Borislava Perić, silver on Europian championship in 2007. Zorica Popadić, Sanja Mitrašinović, Ilija Djurašinović and Nada Matić are just some of table tennis athlets with great success also in regular population competitions. Miloš Grlica, our famous poorblind paraolympic athlet in javelin throw, started to practice sport as an 11-years old boy in Primary school for blind and poorblind "Velko Ramadanović". Physical education teachers in this school, as well as some personal friends recognized great sport potential in Miloš and recommended him to start with active practicing in Athletic club "Mladost", Zemun. Miloš accepted that and trained with young athlets of general population, beginning to stand up with his pleading and qualities he had. Performing training on inslusive model, he made progress very fast and as a result of it great success was done on international scene: gold medal on Europian championship, silver medal on World championship and bronse medal on the Olympic Games. In the period of his best results, he mosttly excersided with general population athleths in AK "Crvena Zvezda". Blind judo athlet Branislav Viktorović from Ruma regulary exercise and compete with general population judoist, and except great results on competitions for blind judoists, he had very good results as a member of judo team "Ruma". He started to practice judo as a young boy, at the time when he still had sight on one eye, and on the European championship in France in 2003, for blind and poorsight judoists he won fifth place. Nevertheless, great success he got in athletics: on European championship in 1998, he won gold medal in jump into distance with the result of 6, 67 meters and in the sprint on 100 meters he won silver medal with the result 12, 02 seconds. Above this, Branislav Viktorović had world record in bowling from 1997. to 2001, and successes he had were related to the fact that his education, as well as complete treining process, were realized in general population mileu. Draženko Mitrović from his 10- years was tied for trolly, primary school he regularly finished in Banja Luka. He used physical education classes to practice table tennis with friends, also practicing some shaping exercises, gymnastic elements, power source and some sports games elements. In this way organised classes of physical education awoke his interests for sport and also acquired good basis in general physical preparation, so after coming in Belgrade he relatively easily and very succesfully joined active trainings of basketball players in trolly after that athletics. As a result of his hard and devoted work, he had great sport results. Medals in throwing disc competition in European and world championships, as a crown in his career silver medal in Paraolympic Games in Beijing, anabled Draženko to make full personal afirmation and that a world can hear for him and his country Serbia. Story about Danijela Jovanović, who was in avgust in 2008, the only disabled woman who climbed onto the highest peak of Europe – Elbrus in Cuacasus, went around and amazed whole world. She climbed this peak on south of Russia, 5642 meters high, dispite she was born without both hand palms and feet and with mandibula deformity and complete preparations were done in general population mileu.

Great number of unhearing and hard-hearing top athlets has their starr-moments not earlier than they leave isolation and uncorcerning, given by their schools and colleges specialized for work with this population. Case of famous wrestler from Subotica, Senad Rizvanović, who in 1989, on spectacular and briliant way won European championship, ilustrates possibility and significancy of including these individuals in general population sport competitions. Sport result he had, enabled Rizvanović to become sport hero and favourite person in his town Subotica, in Serbia and former Yugoslavia and to become famous and recognized in whole

Europe and worldwide. At the time when Senad Rizvanović was astudent in primary school at the Center of education of unhearing individuals in Subotica, teachers in this center recognized his exclusive potential and recommended him to join wrestling selection which gathered children from Center and children from general schools. Already on the first training it was obvious that recommendations were not out of reasons, and everything that Rizvanović later won, during his marvolous career, gave him great life satisfaction and gladden all sport lovers (Kolundzija, 1998). We can freely say that life of this sportsman was totally turned around in possitive, regarding to spirituality and insight of people who in a timely manner recognized his potential and refered him on sport activities toward inclusive model. On the same model today is working several clubs in Serbia. One of them is judo club "Hrabro srce" from Belgrade, where children from School for children with hearing disabilities "Stefan Dečanski" and from regular schools are training and competing together.

During realisation of physical education classes by inclusive or partialy inclusive education system, as in special education with inclusion elements, it is possible and desirable to choose those sport activities which are siutable for making teams where disabled children would participate equally. Great number of sports enable children with disabilities to equally join in, with minimal or some significant rules corrections. In some sport games teams some children with small disabilities can be included, or if there are more childen with disabilities, equal number of children with and without disability. Rules corrections refer to: playground dimension, number of players and changes, time of game or competition lasting, dimensions of ball or goals, altitude of basket or net for volleyball, pause number in game, specifity in poents, way of inserting ball in game, etc. Specially, competitions in individual skills can be interesting, which essentially present implementation of sertain motoric tasks wich are costum-made to schoolchildren with weaker physical capabilities who still don't have well developed skills for significant participating in classic sports games. Tasks could be designed so that they require good ball-control ability and dribling, skill of kicking the ball, as well as combination skills of fast running and kicking the ball. In that mode can be scored time which player needs for leg dribling, along with potentially penal points for every ball turned-out from tagged space, accomplished point-scoring points from different possitions, also point-scored of quickly ball shooting from race throughout challenged doors. Victress itself can be proclaimed for each discipline separately, but also by collecting points for every discipline. Similarlit is possible to organize contest within stipulating aim outlined on wall, close to rule that hit into central part of the aim brings chief score, hit within the list of aim brings less, even hit near the aim can bring some points. Additionally, compete in skills of ball guideling and dribling basket ball between pins, as well as stipulating basket from different positions can be organized. On the same way it is possible to conceptualize polygons and contests in different individual and collective skills. Good competing model, named Special Olympics, is first organized in Chicago, July 20 th 1968. (www. specialolympics.org). This competition has great popularity in Europe and worlwide, gathering about 2, 5 milion athlets from 180 countries, and it is organized for competitors with mental disabilities, also for teams consisting competitors with mental disability and their partners from general population (Shriver). This kind of competing system facilitate great mass participation and hardly disabled individuals participation, so it is possible to organize sport activities also for other levels of disabilities. There are many examples of different sports where it is possible almost equally competition of sportsmen with and without disabilities, along with minimal corrections, or without any rule corrections. Goalball, football for blind, siting volleyball, boccia, bowling, different types of athletics segments and relay-race, enable to athleths with different levels of disability to be almost equal in competing with general population. Ilustrative is example of 21-year old quadriplegic athlete Miloš Mitić, on September 2008, who as a member of sport-recreative association of disabled individuals "Sve je moguće", performed parachute tandem–jump from 3 000 meters altitude. President of the Assosiation Milada Lazić announced similar emprise, presenting the first disabled woman in Serbia who is going to take tandem-jump with parachute. This means that inclusion in sport doesn't have borders, and that there are no objective resons for any kind of demarcations in sport activities of individuals with and without disability.

These models of physical education and sport competition impose necessity for their logical connection in unique system. Quite is certain that educational aims are going to be better and successfuly implemented in schoolchildren who competed and compared with general population coevals, and their sport results, as well as their sport orientation will be aloofe major and stable. Beside undoubted importance of this kind of organisation of educational system and sport for disabled schoolchildren, also great positive effect can be expected on schoolchildren without disabilities. More tolerance and understanding for differentness, developing system values, and sensibility for disabled children needs are some of results and effects which can be expected. More, physical education classes and sport competitions organised by inclusional system give opportunity to those general population children, weaker in motor capabilities and predispositions to outstand and express themselves. Frequently, children who are weaker in motoric capabilities than children of their age, in time start to palter sports activities and exclude themselves from any kind of competing and sport skills training. In this way organised sport educational classes and contest participation by inclusional system present great refreshment and challenge for general population children who are, by their motoric capabilities,

not in the foreground, as well as for disabled children who have wish and need for approving in front of other children, also in front of themselves. Sometimes, children with some small mental disabilities compete with general population children in some school or interschools competitions. Schoolchildren from special school "Ljubomir Aćimović" from Obrenovac often compete with their friends from regular primary school "Jovan Jovanović Zmaj" in internal tournaments. In these circumstances is clear to recognize affinity and sence of children for active sport pursuing. Good pedagogist have no problem to give directions to those children who have predispositions towards sport in general or any specific sport, refering them places or clubs where could, in the right way, show their predilections. Some of these children will maybe have their starry moments and fulfill their dreams, as it was with Senad Rizvanović, but for sure all children will find some satisfaction in sport, have great experience and significantly relieve seeping throughout life.

As addition of idea support and inclusion movement in sport, some disabled athlets who have great results in internation scene can be good example. Arm amputeted Australian sprinter Tim Matthews in 1999. ran 100 meters for 10, 87 seconds, and poorsighted Nigerian sprinter Ajibola Adoeye ran the same distance for 10,76 seconds. Only one milisecond needed unseeing American swimmer Trici Zorn to be member of American Olympic swimming team in 1992. It was spectacular story about 21- year old Southafrican both lower–legs amputated sprinter, Oskar Pistorijus, who wanted to compete in regular Olympic Games in Beijing. Oskar Pistorijus was born without fibulas and both lower-legs were amputated when he was 11 months old, started practicing running not earlier then in 2003. In 2004. he won on Paraolympic Games in 200 metars race, being third in 100 metars race and several times he competed with good results with regular athlets. At the begging of April in 2007, in competition in South Africa, he set new world record for amputated legs athlets: 100 m – 10, 91 sec, on 200 m – 21, 58 sec. On January 14 th, 2008, World Athletic Federation forbad this athlet to compete with specialy designed graphit prothesis insted of legs, but World sport arbitrage court in Losana on May 16 th, 2008, canceled this IAAF decision, because it was not proved that Oskar was running faster with prothesis than he would run in the case without invalidity. It was no enough time to prapare for regular Olympic Games, result of 46, 25 sec in 400 metars race, which he had from July 17 th, 2008 in Lucern, was not good enough to make olympic norm of 45, 55 sec. However, he persuasively won in Paraolympic Games in 100, 200 and 400 metars races, announcing that in the Olympic Games in London 2012. his dream will come true. On revial competition, between javelin throw athlets in trollies and regular population javelin throw athletes, British olympic recorder throwed javelin 20, 32 meters, while paraplegic athlets realised results from 20,73 to 23,16 meters (Galić, 2003). All these sport results confirm that line between sport in individuals with and without disability is not significant and often vanishing.

5. CONCLUSION

Physical education of disabled schoolchildren in Serbia has significant importance. Altough, relatively strict borderline between regular system and special education made fact that disabled schoolchildren physical education is predominantly realized in conditions insolated from general population. Occasional practice in education and sport activities realisation by inclusive and partialy inclusive system, indicated on advantages of this access, so number of educative and sport organisations operating in this mode is growing. Advantages of in this way organised education system and sport are reflected in significantly higher and succesfull disabled induviduals possibilities for complete integration in general socciety, as well as their fair accepting by general population. One of the possitive effects, which help in physical education realisation by inclusive system, is also animation of huge number of disabled children in join sport activities.

Classes of physical education in schools by inclusive model implicate that disabled children, whenever is possible, realize the same programme for children from regular population, and only whenever is not possible and when its neccesary work on adaptive or totally different programme. In order to organize education on inclusive programme, it is neccesary to select sport activities for which schoolchildren disability is not going to be prefarable factor for acters' efficacy and outcome of sport competition and comparing. This aim is possible to make by rules induction that all teams have equal number of disabled children. Beside, all classical sports and sport games, as very favorable contents for inclusive programme different polygons and competitions are recommended in different skill, including segments and examples for practice assigned from totally certain sports and sport games. Positive effects of educational organisation will have both disabled schoolchildren and regular population schoolchildren, so programme can particulary be useful and significant for children with some motoric weeknesses comparing to general population children. Most of our top-level paraolympic athlets life-stories, also great world champions with disabilities, present apotheosis of inclusion and in the best way propagate the idea. Valuable and significance of inclusion idea is having growing understandingness and acceptance, but for its upgrade and improvement stays great degree space. Direct and concrete coherence between physical education realisation and sport clubs involving, present logical steps of this extremely qualitative and advanced idea promotion.

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THE EFFECTS OF THE MODERN MODELS OF TEACHING THE ACTIVITIES IN NATURE ON THE RESULT'S SUCCESS IN DIVING

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1. INTRODUCTION

Diving at breath and length is sports event which, mainly, takes place at swimming pools.
Diving at breath at length consists of the following phases:
a) hyper-ventilation
b) start
c) underwater swimming
d) finish

The hyper-ventilation takes place immediately before the start and in front of the starting line. It is practiced on the following way: the diver relaxes completely, he relaxes all the body muscles and makes from five to ten deep breathes in and breathes out. The number of breathes in and breathes out depends on the individual characteristics and physical condition of every individual. However, the diver has to stop with hyper-ventilation in the moment he/she feels mild dizziness, as it can cause falling into the unconsciousness due to abrupt falling of the partial pressure CO2 in artery's blood.

When the hyper-ventilation has been finished, the diver gives a sing to the referee that he/she is ready for start and he/she starts immediately. A start can be either standing or flying one.

When the diver starts with the flying start, after the hyper-ventilation, he/she dives from five to seven meters in front of the starting line and it happens on the following way: the diver makes the deep last breath, reaches out left arm, moves head abruptly downwards, the body bows in the waist and he/she plunges. In the phase when the right hand is returning to the outstretched position, the diver underwater starts using rubber foot-fin by using 'dolphin' swimming style, which will immediately bring the driver to the appropriate depth. After the plunging the diver starts using the legs by using the crawl style and he/she is trying not to lose time and pressure while switches from one style to other. Starting with the flying start the diver is going to cross the starting line in full speed.

The other way of starting flying start is so called the start from the surface. By the hands outstretched in front of him/her the diver swims on the water surface, using only his/her legs. In the moment when he/she appears from four to six meters in front of the starting line, the diver shortly paddles with his/her hands using the butterfly style, than raises his/her head above the water surface, takes a breath, and outstretches the arms forward and dives on the same way as while swimming the dolphin style. After the diving, the diver stretches out his/her arms ahead putting the palm of one arm on the above the elbow of the other arm.

Both above mentioned ways can give good results, if the diver is well physically and technically prepared.

The divers who are less prepared can use the standing start. This way shorten the length of the distance, but the diver loses the time by reaching the speed after the start.The mode of carrying out the standing start is the following:

After the hyper-ventilation, the diver takes a deep breath and then he/she strongly strokes loosely hanging arms towards the surface, while the palms are turned upwards. On that way the diver pushes the body underwater, and then by bowing in the waist he/she puts the body in the horizontal position, while the arms are in front of the body. At the same time the diver starts to make the movements with his/her legs using the crawl technique. The movements of the legs are wide and strong at the beginning in order to reach a starting speed, and after that the diver turns to faster and shorter strokes.

The divers at breath underwater use the crawl or dolphin style for legs' movements.

The divers using stereo fins can use dolphin style, but they rarely use it. For those who use mono-fins it is the only swimming style. In the recent times mono-fins are more and more used, although these fins are not suggested to young divers, who are still in the phase of development.

The speed of the underwater swimming depends of the body position, amplitude and the frequency of the legs' movements, shape and the elasticity of the fins, and in the swimming pools it also depends on the swimming depth. The best results can be achieved when the diver swims at 1 or 1.5 m depth. If the diver swims

at the smaller depth, there is the possibility that the fins or a part of diver's body emerge at the surface and spoil the result. The other disadvantage of shallow swimming is the fact that in the swimming pools there is the counter water flow on the water surface and it slows down the diver. The counter water flow appears at the bottom of swimming pool, too, and it slows down the diver's movement, if he/she is swimming at the bottom level of swimming pool.

The finish takes place at the distance two or three meters in front of the finishing line, and it consists of the following : the diver strokes strongly with one hand, pulling it from his/her hip, while the other arm is outstretches awaiting for the contact with the finishing line or with the pool's wall. The effect of the finish can be diminished, if the diver emerges his head to se the finishing line.

During the underwater swimming, from the start to crossing the finishing line, the diver has to hold his/her head between his/her arms, and the eyes should be turned downwards, towards the bottom of the swimming pool. In order to achieve the best possible hydro-dynamics of the body and minimize the water resistance, it is necessary that during the legs' movements the angle in diver's hip is about 15° and in his/her knee about 35°. The amplitude of the movement of the fins depends on their length-the longer fins the smaller amplitude und vice versa. All the time the feet are outstretched backwards and as much apart as it is necessary to evade any contact.

1.1. Theoretical frame of the study

For the students of the third year at the Faculty of Physical Education at the University in East Sarajevo the classes were organized on the following way: 1+4=theory + practical classes with exercises. The theoretical lecturing took place once a month. After six terms, the students had a practical part of the teaching activities in the nature, while they were settled down in the camp on Tjentiste, from 11th to 17th of July, 2008. On Friday, 11th of July, at 12p.m., there were pitching the tents and arranging the camp, so that that day there were not important activities, apart from sports - recreation activities. On Saturday, 19th of July, two groups, one consisting of 34 and the other of 31 students, were climbing the Maglic Mountain (2386), the highest Mountain in B&H. The other students went for an excursion at Sava's grave and were arranging the tents. After the students came back from Maglic Mountain, all the students had the dinner. On Sunday, 20th of July, all the students returned from the stationary camp at Tjentiste. The remaining seven days the students were practicing different games in the nature, orientation, alpinism (descending 30meters long rope), kayaking and applied swimming with diving at breath.

After the lunch, at 5 p.m., there were organized different activities, all of which had sports-recreation character. The students played: football, handball, volleyball, basket (basketball), and at the tennis court they played some elements of the tennis. By 2002 the students had walking tours led with one assistant or teacher during the activities in nature, and then from 2003 to 2008 they were settled down at Tjentiste in the National Park Sutjeska, where they were divided into seven groups. Every group consisted of about 15 students and they had a leader (assistant or teacher). Besides, the vice dean managed the camping. The last three days the subject teacher joined them. The aim was to make the teaching activities in nature more efficient using the modern models and more versatile, practicing the sports-recreation contests such as: football, basket (basketball), volleyball, handball, and the elements of the tennis. During the classes of applied swimming, apart from jumping and demonstration of the elements of rescuing the drowned man, there were present the diving at breath.

Using such modern teaching models in the nature, this study is supposed to show their effects on the result's success in diving at breath by comparing statistically notable differences between initial and final measuring.

1.2. Former researches

Koprivica (2000) specifies the following sports events in diving:

- The swimming by using the fins is purely pools' sport, where the time necessary for swimming some distance is measured. The competing swimmer has to belong at least to the category of the diver at breath. The equipment consists of fins, mask or goggles and breathing device.
- Speed diving is pool's sport as well. The competing diver has to belong to the young diver category. The equipment consists of the apparatus with a regulator, fins, mask and breathing device. The time necessary for the diver to cross some distance is measured.
- Underwater orientation is the competition in precise moving using the compass and in the speed of underwater swimming. The pathway can be set in some different ways and the competition can be team and individual one.
- Underwater games are new team completion events, among them the most attractive are underwater hockey and rugby.

- Underwater angling is a competition, where a competitor is diving at breath using underwater angling equipment. The caught fishes weighing more than 500gr are evaluated. The competition can be team and individual one. The time is limited.
- Underwater photography. The competition takes place in the see. The quality of the photography and photographed objects are evaluated. The time of taking pictures is limited by one camera and the depth is limited by length of the rope on the diver's buoy.

Paunic (1999) writes about his impressions of the climbing Njegus (at the foot of Lovcen), starting in Kotor and going along the old (almost forgotten) path,which was used for centuries for transport between highland and see. This path begins at the spring of Skudra River, which is under town Kotor fortress.The author cites the descriptions of this path and remote trips written by Niko Lukovic, Isidora Sekulic, Ljubo Nenadovic and other domestic and foreign authors who were the passengers on this picturesque path.

Paunic(2001) is writing about his travels in his 'Planinarenje Zevsu u pohode'. He describes all physical and psychical efforts which accompany an eighty year old mountaineering lover. He has written it on the occasion of 100 anniversary of Mountaineering Association of Serbia (1901-2001) and climbing the highest mountain in Greece, and the second highest mountain in the Balkans. Paunic describes all in detail, literarily, epically, including mythical heroes of ancient Greece and God, above all goods, Zeus, after whom mythical mountain Olympia is famous for. Paunic also describes all the efforts during 24 hours long climbing starting from the see level in Paralaija and reaching the peaks of the Olympia Mountain (Mitikas 2917 and Skolia 2911), which is almost three hundred meters of height difference. He also describes mountain diseases and all crises which accompany the climbers during the climbing and returning down. All is described in a breath of a boy's enthusiasm and young spirit. It is the story of a lover of the natural beauties. These beauties have occupied in desirable and dreamy way a man from Macva, a man from lowland, who is eager for the mountains' pitches where "the land touches the sky".

Trivun (2008) has done the research on the sample of 24 tested male students, who were the representatives of the group of the students of the Faculty of Physical Education at the University in East Sarajevo in 2003/4 and 2004/5. The students took place at the final phase of the competition in kayaking, running, swimming during mountaineering and camping like the ways of the activities during a special camp in Tjentiste. The results gained using descriptive statistical analysis show that there are the causality and difference between results' success of specifically mobility abilities of the students. The specific mobility abilities, which are showed at 100m swimming the crawl, kayaking at 200m and running 400m show great variety of results in swimming (at 100m) and running (400m). They show statistically better values in comparison with the results of the variables in the kayaking (at 200m). As the ground (at the stadium) was not standard, it has been expected that the results of running (400m) would have statistically less importance, but this research hasn't shown that.

2. THE SUBJECT AND PROBLEM OF THE RESEARCH

2.1. The subject of the research

The subject of the research is to show the effects of the models of the teaching the activities in the nature on the result's success in diving testing the students of the Faculty of Physical Education at the University in East Sarajevo.

2.2. The problem of the research

The problem of the research is the result's success in diving at breath during the teaching the activities in the nature, while the students of the Faculty of Physical Education of the University in East Sarajevo were in the stationary camp in Tjentiste.

3. THE AIM OF THE RESEARCH

The main aim of the research is to find out the effects of the models of the teaching the activities in the nature on the result's success in diving testing the students of the Faculty of Physical Education at the University in East Sarajevo.

4. HYPOTHESIS OF THE RESEARCH

According to the aim and operative tasks, there can be stated the following hypothesis.

H – The teaching activities in the nature have statistically important influence on the diving at breath.

H1 – The results of diving at breath and length statistically significantly differ at initial and final measuring.

H2 - The results of diving at breathe and diving at plunge statistically significantly differ at initial and final measuring.

5. METHODOLOGY OF THE RESEARCH

Descriptive statistics has been used in the research. The results of descriptive statistics are showed in the measures of central tendencies (minimum, maximum, rank, span….). Apart from the descriptive statistics there has been used t-test at initial and final measuring.

5.1. The sample of the tested people

The population out of which the sample has been extracted is 69 male students of the Faculty of Physical Education at the University in East Sarajevo. All the students were 23-28 year and ± 6 months old.

5.2. The sample of the variables

The sample of the variables has been selected so to representatively cover the realm and give the information about effects of the models of teaching the activities in nature. The activities have been in the relation with the variables of diving at breath and length and the diving at breath and plunge.

5.2.1. Description of tests

5.2.1.1. A diving at breath and length test (b.l.)

A tested person swims in place and at the whistle sign plunges at 2m depth and starts swimming using legs and arms. The diving length is measured and expressed in meters. Along the swimming pool there is a metal measuring ribbon and the exactness is expressed in 0.1m.

5.2.1.2. A diving at breath and plunge test (bpl)

A tested person swims in place and at the whistle sign plunges at 2.5m depth and is moving using legs and arms. The time of plunging and emerging is measured. The emerging is the moment when the head appears on the water surface and the diver raises his/her hand, which is holding an object. The exactness is expressed in 0.1sec.

5.3. The methods for analyzing the results

The results of the research are analyzed so to give the information about central and dispersive parameters for all the manifestations of the variables: mean value, minimum and maximum (numerous) result, standard deviation. T-test is the test for comparing statistical series using small depending causes.

6. THE RESULTS OF THE RESEARCH AND DISCUSSION

6.1. Central and dispersive parameters of the variable distribution

Table 1

	Mean	Valid n.	Min.	Max.	Stand. Dev.	Range	Skew.	Kurt.
B.l.i.	12,18116	69	3,900000	29,40000	4,723822	25,50000	1,085081	1,580716

The table 1 shows central and dispersive parameters of diving at breath gained by testing the students at the Faculty of Physical Education of the University in East Sarajevo. Inspecting the table 1 we can note the following results: Mean value (mean=12,18), the worst result (min=3.9), the best result (max=29.4m),

standard deviation (stand. dev.=4.7). The results point to that there are no homogenous results in diving at initial measuring.

Table 2

	Mean	Valid n.	Min.	Max.	Stand.Dev.	Range	Skew.	Kutr.
B.l.f.	12,33188	69	4,800000	29,50000	4,677056	24,70000	1,143524	1,700776

The table 2 shows central and dispersive parameters of diving at breath gained by testing the students at the Faculty of Physical Education of the University in East Sarajevo. Inspecting the table 2 can note the following results: Mean value (mean=12,33), the worst result (min=4.8), the best result (max=29.5m), standard deviation (stand. dev.=4.6). The results point to that there are no homogenous results in diving at final measuring.

Table 3

	Mean	Valid n.	Min.	Max.	Stand. Dev.	Range	Skew.	Kurt.
B.pl.i.	6,289855	69	3,500000	9,900000	1,836168	6,400000	0,407704	-0,985819

The table 3 shows central and dispersive parameters of diving at breath gained by testing the students at the Faculty of Physical Education of the University in East Sarajevo. Inspecting the table 3 we can note the following results: Mean value (mean=6.28), the best result (min=3.5), the worst result (max=9.9c), standard deviation (stand. dev.=1.8). The results point to that there are no homogenous results in diving at plunge on 2.5m at initial measuring.

Table 4

	Mean	Valid n.	Min.	Max.	Stand. dev.	Range	Skew.	Kurt.
B.pl.f.	6,221739	69	3,300000	9,600000	1,750115	6,300000	0,431551	-0,918539

The table 4 shows central and dispersive parameters of diving at breath gained by testing the students at the Faculty of Physical Education of the University in East Sarajevo. Inspecting the table 4 we can note the following results: Mean value (mean=6.22), the worst result (min=3.3), the best result (max=9.6c), standard deviation (stand. dev.=1.7). The results point to that there are no homogenous results in diving at final measuring.

6.2. T-test for comparing statistic series by using small depending samples of initial and final measuring.

Table 5

	Mean	Stand. Dev.	H	Dif.f.	Stand. Dev.	t	df	p
B.l.i.	12,18116	4,723822						
B.l.f.	12,33188	4,677056	69	-0,150725	0,368472	-3,39785	68	0,001139

In the table 5 a T-test is used for comparing statistic series using small depending samples of initial and final measuring at diving at breath of the students at the Faculty of Physical Education of the University in East Sarajevo. Inspecting the Table 5, we can note the following results: t (-3.39), which point to that the students have negative results at diving at breath at initial and final measuring, and on the level of importance the result is the following p=0.001. All this shows that the models of the teaching activities in nature has negative effects on diving at breath at length.

Table 6

	Mean	Stand.Dev.	n.	Dif.f.	Stand.Dev.	t	df	p
D.pl.i.	6,289855	1,836168						
D.pl.f.	6,221739	1,750115	69	0,068116	0,330993	1,709440	68	0,091930

In the table 6 a T-test is used for comparing statistic series using small depending samples of initial and

final measuring at diving at breath and plunge at 2.5m which has been practiced by students at the Faculty of Physical Education of the University in East Sarajevo. The results are the following: (t=1.7) and the value (p=0.09), which point to the insufficient influence of the models of teaching the activities in the nature on the result's success in plunging at 2.5 m depth.

7. CONCLUSION

The sample of the tested people consisted of 69 male students of the Faculty of Physical Education at the University in East Sarajevo. They all were 23-28 year and ± 6 months old students of the third year. Applying the effects of the modern teaching models during the students' camping and mountaineering at Tjentiste, there were extracted the results in stylistic ways of moving during the diving (at plunge and at length). The results of descriptive statistics presented in measures of central tendencies (minimum, maximum, rank, span….) showed the minimal differences between the results in diving when applying modern methods of teaching the activities in nature. Applying the methodical analysis and using the t-test, the analyzed models of diving at plunge at 2.5m depth showed insignificant difference between the results at initial and final measuring. The results of diving at length had negative values. The reasons for these negative results in diving were probably inadequate acclimatization during 8-9 days long stay in stationary camp at Tjentiste and condensed and versatile activities in nature which were practiced in the morning and afternoon. This research can be useful for similar researches on the students of the Faculty of Physical Education and Sport.

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THE FORMS AND WAYS OF IMPROVING PSYCHO-PHYSICAL ABILILTIES – MILITARY PRACTISE SKILLS

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HYSTORY OF MILITARY PRACTICE ACTIVITIES AND SKILLS

Physical activities and physical exercising is a characteristics of all societes and epochs. In primeval societies they were manifested in different forms of games, competitions and temptetations imitating ordinary daily tasks, hunting, war games connected to the development of physical strength, endurance and willful characteristics in younger generations. In order to survive in his struggle with Nature a primeval man needed skills, physical strength, endurance. Those qualities man has developed at first while hunting and fishing. Later when farming, cattle raising man has used for this aim certain, many times repeated, moves and movements representing first forms of physical exercising. Preparations for hunting, harvest collecting and other important occasions were celebrated through different rites and rituals implying different imitation moves and movements.

During the performance of these moves and movements by members or even the whole tribes collective harmonious actions were developed. At the same time life vital habits and physical abilities were improved.

In some primeval communities physical exercising was on a high level of development. Ethnographic research shows that in every nation certain forms of physical exercising were developed. The Australian people developed games, boomerang and stick throwing, ball games, wrestling and dancing. American Indians nurtured walking, running, swimming, boat racing, throwing and throwing games, ball games. African tribes developed target throwing, bat fights, running, jumps, long and height spear throwing, war games, dances.

As a consequence of society class disintegration, primeval communiction degradation and development of states there rose a need for the military preparation. Physical activities and physical exercising took on a form of military-practical characteristics (fist fighting, arm fighting, chariot competitions, jumps over sword or spear).

In Sparta even rhythmical dances were included into a spartan system of the young warriors preparation and they were complex ones. Within these dances dancers imitated spear throwing or opponent combats. Simultaneoulsy they manipulated armour, shielding themselves from the real danger – stones that adult spectators tried to throw at them. Such dances developed agility, endurance, movement speed and other qualities necessary for a warrior.

In slave holding society physical exercising took a character of a society organized system for the youth preparation for social and military service and was administered in families and social institutions as well. Ancient Rome created a system of the military physical preparation later on taken up by many armies. Physical preparation of the roman soldiers was accomplished during traning period in the camps where they were tranied to master those exercises, procedures and actions applied in combats. The training system of the legioners comprised the following: field running with hurdle mastering, different jumps, actions with and without arms and weapons and frontal fights, then they practiced wrestling, climbing, water obstacles mastering. Soldiers were engaged in marches, longlasting cruises under full equipment, they learnt to use seige devices and catapults that implied great physical strength and endurance. For their training special training devices were used – ladders for the conquest of fortresses, dummies for fencing, wooden horse for riding practice.

In fuedal society physical exercising became a basis for the knight education – riding, fencing, wrestling, bow and errow, swimming, hunting, and military games. With the development of towns physical exercising spread to different classes of towns' and nearby country population which lead to the formation of archery and fencing associations and competitions of citizens in running, wrestling, bow and errow targeting, ball games and the like taking place during holidays as well.

Physical preparation of soldier in the course of history was targeted to the solution of different tasks: forming of important military-practical movement habits, development of physical abilities (muscle strength, endurance, speed, coordination), and willful characteristics such as courage, determination, persistance. All these were conducted with the participation of soldiers: 1) participating in public games and competitions; 2) during special preparations; 3) in war activities (marches, fights);

MILITARY –PRACTICAL GAMES

Game and war are two constant companions of the human society. Game as an activity is an important means of education of the children and youth. Game as a conflict, struggling is unfortunately still present nowadyas and especially was in the past. Each man is familiar with some war games from the childhood on– cowboys and indians, partisans and enemies, throwing of balls of plastic moulds or paper arrows .

Pcyhologists think that a need for agression in war games of boys and men is a sign of satisfaction of the need for domination existing as well in all males of animal species and eventually in men. Weapon is one of the favourite toys of boys the same way as dolls are for the girls.

In contemporary society war games have become a phenomenon although recent one surely is so represented that it already has a history and tradition of its own.

Technical achievements have brought nearer this aspect of games to children and grown ups as well. Although children used to play war games 10-15 years ago using wooden pistols and machines and crying: «Drop dead!», today these copies have replaced improvised weapons, monition is the same as the real one and the players are often grown ups and even women.

This has caused historically conditioned formation of the specific aspect of military-practical games for children, youth and adults. Military-practical games are the games of sports type with the elements of theatrical performance of military actions or manoeuvres. They contain elements of warring, terms and concepts used in military theory.

These games are interesting for children and youth because they like unusual events spiced with adventure. Military-practical games have the topics taken from many sources. Mostly these are events from the near or distant past of its own nation but these can be events connected to the legendary courses of history (life and fight of the Indians, Samurais, Vikings, etc.) In Serbia there is a great number of cultural manifestations whose contents are knights games suggesting connection with the heroic past of Serbia fighting with Turkish invaders (Vidovdan's knight games, Mitrovdan games, Medieval games). Then sources can be some local myths, adventures books, some newspaper stories).

Military-practical games can be performed in different spaces and time intervals. They can be performed during marches, walking, trips, in camps and the like. Choice of games depends on season and nature. These games should have educational aim but they have to remain games for the respective age of youth and children totally devoted to them. During the game their tasks and ways to achieve them must be attractive and interesting. Additionally each game should try to achieve some objective or otherwise it will turn into its conradiction and become fun for short but will not have educational vallue. On the other hand, if education values are too emphasised the games character will be overemphasised. So for the game to stay a game a mutual aim should be accomplished to avoid extremities override fun and override seriousness.

In contemporary military-practical games participants imitate military combats of different scales (from battles to wars) use pneumatic (or laser) models of fire arms, imitations of weapons and pyrotechnical devices– smoke bombs and the like. As a monition one uses plastic bullets, colour balls, seldom lead balls for standard pneumatic weapons. As protective devices one uses protective vests and their variants, protection for eyes (plastic glasses, masks, and helmets).

War games popular with male population during centuries are now available in all their variants: on computer, in Lasertag-clubs, military-terrain games and even military tourism. Everything is available depending on finance and specific demand.

Contemporary military-practical games attracting large number of people are: paintball, strike ball, hardball, lasertag.

Paintball is a game in which the opponents shoot at each other using paintballs. Its origin is supposed to be in Canada where the woodchoppers marked the trees with special devices and later on for fun they marked one another.

Air soft is a game using pneumatic weapons throwing plasic balls of 6 mm and 8 mm. It is not a commercial game and scores are fixed by the players themselves and fair play is implied. The game originated from Japan with the aim of training police units in weapon usage since fire arms were forbidden.

Hardball is a game using pneumatic weapons. Bullets are lead balls of 4,5 mm. The same as airsoft fair play is brought to the foreground but the conditions are most close to miliary ones. This game originated in the former Soviet Union.

Lasertag has many variants and its essence is to target a player an opponent with the laser beams from the bluster. A shot is registered with the special sensors tagged on the players outfit.

The play was invented by George Carter after seeing the movie «Star wars».

MILITARY –PRACTICAL ASPECTS OF SPORT AND PHYSICAL EXERCISING

Conseil international du sport militaire – CISM was founded on 18.2.1948. in Niece (France), with the aim of perfecting physical abilites of the military population. It organises competitions in 28 sports. Military, sports: aviation penthatlon, military penthatlon, navy penthatlon, parachuting, arhery. Individual sports: athletics, cross-running, cycling, chivalry, swimming, diving, rescuing, waterpolo, naviagation running, modern penthatlon, alpine skiing, nordic skiing, golf, thriatlon, and sailing. Combat sports: boxing, fencing, judo wrestling, and taekwondo. Team sports: basketball, football, handball and volleyball.

Military – practical aspects of sport represent a bond of different exercising specific for certain sports or taken from them, having military –practical importance, which contribute to the development of quality of habits necessary for different military defending needs.

Military – practical aspects of sport make men physically stronger, build and strenghten his will and contribute to the development of creative tactical thoughts.

Most of these sports originate in combat skills in ancient past which have undergone historical transformation and have developed some altered forms and created a basis for the generation of todays numerous sports of practical character.

In papers dealing with military history, military pedagogy and psychology necessity of high physical fitness of soldiers and their psychological peparation for the success in wars are greatly empasised.

According to the data from the history of physical education, military history, system of physical preparation enompassing specific taks, means. forms and methods of training and organisation a great deal of attnetion was drawn to the disciplines that today make up many sports.

Conditions and life style have always determined the level of production means development and these have in turn determined the use of weapons, military tactics, combat and physical preparation.

Military – practical forms of physical exercising and skills have originated and developed in the course of human history and are manyfold. Basic forms in all ages were natural forms of moving (walking, running, jumping, throwing,) comprising the basics of most modern sports. All of these forms were combined with certain means and have thus created other forms of physical exercising and skill (walking under full equipment, marching, long jumping, spear throwing, discus throwing). Many old skills developed formerly just for the realisation of military ends have been preserved even today in some altered forms adjusted to altered social and technical conditions (bow and arrows, archery, fencing, riding, horse racing, rowing). Some modern sports have been generated as a consequence of military practical needs. For example: biathlon was created as a military practical skill from the military skiing patrols competitions where the connection of speed and weapon targeting was emphasised. It was demanded that skiers were able to perform some military task while moving on the snow. Biathlon has changed considerably but the essence is the same – connection of the speed and weapon targeting.

COMBAT SKILLS

Different forms of combats with and without weapons were represented in all nations. History has introduced us to different combat systems in the Egyptians, Inks, Greek pankration, and Indian vadzra-mukti, knights combat of meddieval age, boomerang and seeth throwing. Vikings also had their combat skills, so did the Celts, Northamerican Indians, Australian Aborigins, Mongols and the like.

Many combat skills were created by borrowing the basic elements from the combat arsenal of the pankration which makes this form of fighting the basis of different forms of fighting foounding on throws and grasps, kickings and knocks.

Historical data tell us that many contries have had some forms of combat skills. This is natural because they had been meeting the needs of men for moving and creation of defence reflex (preservation of own integrity). Today, combati skills make up indispensable part of physical education

History of contemporary combat skills dates ages ago and the first trace historians make in China, where the combination of war skills, dance, physical exercising and ritual acitivities was made.

Development of combat skills took threefold direction: state (military), civil and monastery, parallely and intermutually. In the VI and VII century there was a breach between the military and combat skills which was reflected in other cultural traditions, preserved on one hand in applied skills used in the army, police,

security sevice and on the other hand in all forms of combat skills having sports, sport-combat, mediative or other direction.

It is also known that in China army for the first time an exam system was used to test combat skills, whose scores were used to give ranks to the soldiers which in turn made it possible to qulify for the master ranks. The most famous combat skills methodologist was Chinese leader from the XVI century Ci Ciguan. The basics of his methodics were to transfer the system of the monastery training to the state army conditions so as to speed up the soldier's preparations.

Thus, specific form of physical exercising taking form of combat skills was created in China and was further developed in the East and Southeast Asia, and in XX century in had its renessaince, spreading up worldwide in the form of traditional eastern skills (usu, budo, muai-tai, hapkido, bando, ect.), and newly formed synthetic combat skills comprising the elements of the traditional ones. Indian culture has up to the new era had also wide repertoare of combat skills but had a limited influence.

It can be said that China is a cradle of combat skills in the East but Japan although took many elements from them had a greter influence on their creation and development in surrounding countires. Massive cultural expansion of exotic eastern combat skills started after the second world war just form the territories of Japan and the first Olympic aspect of eastern combat skills was Japanese judo.

CONCLUSION

Military –practical activities and skills are based on active-dynamic methods of psychophysical preparations where during training great attention is drawn to the formation of conditions and situations close to the real warlike conditions. For the modelling of these situations and conditions besides usual means there was used and still are specially aids and means and devices. Methods used and still in use were specially designed so as to perfect those people whose psycho-physiological abilities were to be preserved and thus enable their functional balance of all life systems of the organism in usual and extreme conditions.

All things considered it can be said that in preparation of the professional soldiers there are some basic elements and principles whose purpose was confirmed by multicentury practice.

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THE RELEVANCE OF REGULATION ACT «THE CONDITIONS AND ASPECTS OF PERSONNEL PREPARATION FOR IMPLEMENTATION OF PROFESSIONAL WORK IN SPORT» IN ORDER TO IMPLEMENT MORE QUALITATIVE PROFESSIONAL WORK IN PHYSICAL EDUCATION

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Regulations on training personnel requirements and methods for professional sport management still does not exist in the Republic of Serbia's regulation system, although *Law of Sport*[1)] passed in 1996 according to article 61, paragraph 1[2)] of the law, made the basis of law for its legislation. The problem of nonexistent sublegal acts which result from Law of Sport's decrees, is broader than the problem of long-standin not-legislating of the Regulations on training personnel requirements and methods for professional sport management. Thus from the whole 16 regulations whose legislation is expected by the Law of Sport, only eight have been legislated so far.

The legal void which has been existing for twelve years nas been conducive to creating a chaotic situation in the domain of organizing and putting into effect physical education curriculums, as well as numerous problems in terms of skilled management in P.E. domain.It is obvious that the work of sports and P.E. experts' is very important, and the experts competence is a prerequisite for high quality conducting of P.E. programme. Unfortunately, there is an estimate of 80% sport experts who take part in P.E. for children and youth, but they do not have proper qualifications, i.e., do not fulfill the requirements needed in terms of minimum education and the level of training which the persons involved in this management should. In this field, the Republic of Serbia falls far behind the majority of European countries, and because of that, the legal regulation of this field should be one of this country's top priorities.

Ministry of youth and sport is aware of a need for systematic searching for a solution of previously descried problem and in Septemebr 2008 formed a working group who are to prepare the *Regulations on training personnel requirements and methods for professional sport management's* which is well-known to a wider audience as *Regulations on working licence in sport*. The issue of appropriatness of one term or the other for future regulations shall not be considered in this text, and in this work we shall use the title *Regulations on training personnel requirements and methods for professional sport management,* because this title is accepted as a «working name» by the working group who prepare the Regulation's text.

To understand the importance of the future *Regulations on training personnel requirements and methods for professional sport management*, we must recognize the complete legal frame by which P.E. is regulated in the Republic of Serbia. It is necessary, also, to have in mind the way in which the notion of P.E. is defined in our professional literature and regulations.

Legal frame which regulates P.E. in the Republic of Serbia

The Republic of Serbia's regulations do not contain the definition of P.E. notion, although the legal definition would significantly make easier regulating and developing of this activity. There is a possibility for us, too, to define a legal P.E. notion in the frame of some future law which regulates the field of education.. However, for inclusion of such legal definition in the regulations' text, we must chose one of the current P.E. definitions determined by science.

In domestic technical literature there is a confusion of terms, i.e., the usage of a large number of similar terms for the same phenomenon – P.E. Particularly the problem is in confining of notions such as sport, physical culture and P.E., because the terms are not in synch and the notions overlap in this country's regulations and there are myriads of expert analyses as a result of heterogenuous and inconsistent usage of some termes in the domain of sport in media, professional debates and textbooks.

An obvious example of the confusion in terminology, is the fact that many journalists, when writing articles or reporting sport events for radio and TV, use the terms physical culture, P.E., and sport as synonyms, though they are different notions. On the other hand, an enormous number of citizens use the terms physical culture or recreation

1) "Official Gazette of the Republic of Serbia», no. 52/96 and101/2005.

2) Article 61, paragraph 1of the Law of Sport says : „ Minister in charge of sport managemnt issues further requiremens for organizing certain training for professional sport management and the methods of this training.»

for sport, and teachers and pupils ar schools call the same activity physical instruction or physical education [3]. In this situation a legislator has a difficult task, to choose one from the three terms (physical instruction, sport training, sport education), which are almost equally used in a number of professional papers, tetbooks and monographies. The answer to the question which term is more appropriate, physical education or sport education, science should offer, and a legislator shall accept the final academic approach and include it as a legal norm. Apparently, many authors define terms physical instruction and physical education and there are more definitions of physical instruction and physical education, and there is not a generally accepted definition of these terms.

Law of Sport , as fundamental – umbrella law that regulates the subject of sport in the Republic of Serbia [4], contains the legal notion of sport, but does not contain a legal notion of physical instruction, which is mentioned in the regulations' text twice, in the articles 52 and 55 of this Law. According to Article 2 of *Law of Sport*, sport is defined as: «sport education (education in physical instruction, development of physical capability, and acquirement of sport habits); competitive sport (sport activities aimed at sport results); recreational sport (sport activities aimed at recreation, performed independently or in sport or some other organizations); school competition in sport (sport competition for pupils and students)». On the basis of Article 2, we may conclude that the Law of Sport, perfectly and properly, has no ambition to solve these «theoretical dilemmas» concerning the notion of sport, just to describe the fields contained in the notion of sport in terms of the needs of the Law itself.[5] If we consider the contents of articles 52[6] and 55[7] of the *Law of Sport*, we can clearly see that the legislator, this term sport education, which is an integral part of the notion of sport defined according to Article 2 of the Law, does not use as a synonim for physical instruction. When regulating the meaning of a word sport in terms of the *Law of Sport*, legislator defined the notion of sport, among other things, including sport education which is physical training instruction, development of physical capability, and acquiring sport habits. It is possible and perfectly justifiable, to defend thesis that the purpose and contents of physical instruction is identical to the contents of sport education regulated by the *Low of Sport*, i.e., the essence of physical instruction is training in physical practice, development in physical capability and acquirement of sport habits. This comprehension leads to the conclusion that the terms sport education and physical instruction coincide.

Law of sport, as it is, does not include a definition of physical instruction, although its norms use the term, and Aticle 52 of *Law of Sport* regulates curriculums of physical instruction in elementary and secondary schools, as well as some parts of instructive and educational curriculums concerning physical training at pre-school institutions; because of these facts,they are issued by previously obtained opinion of the ministry in charge of sport management pointing to the fact that pimary legal authority for regulating the subject matter of physical instruction is entrusted to the ministry in charge of education and rules which regulate education and instruction in the Republic of Serbia. However, *The Law of basic educational and instructive system*[8] , does not mention, in any of its articles, physical instruction, and thus does not contain a legal definition of the physical instruction notion. It seems logical that such law should, at least mention physical instruction notion, as it does not define it. In contrast to the *Law of Basic Educational and Instruction System*, the *Elementary School Lawi*[9] and *Secondary School Lawi*[10] use the term physical instruction.

The Elementary School Law mentions physical instruction within the norms regulating organization of educational-instructive management. Article 25, paragraph 2 of *Elementary School Law* regulates: «*For third and fourth grade pupils the instruction can be organized in the two from the following three subjects at the most: art, music, and P.E.*». Such formulation clearly points to the previously mentioned article of Law that the *Elementary School Law* treats phsical instruction as one of the curriculum's subjects. The Article 45 of the Elementary School Law issues that a pupil can be exempt, temporarily or during the entire school year,

3) S. Radovanović, The Right to Sport, Dossier, Belgrade, 2002, p. 28

4) D. Šuput, Legal Regulations of Sport in the Republic of Serbia, in: Current Issues of Contemporary Legislation – A Collection of Papers from Lawyers Conference in Budva, Belgrade, Union of Lowyer Associations of Serbia and Serbian Republic, 2008, p. 491.

5) N. Đurđević, Commentary on the Law of Sport, Institute of Legal and Political Sciences at Law School in Kragujevac, Kragujevac, 1997, p. 5.

6) Article 52 of the Law of Sport says: «Physical training curricilums in elementary and secondary schools, as well as parts of training and educational curriculum concerning physical training at pre-school institutions, are issued by previously obtained opinion of the ministry in charge of sport management».

7) Article 55 of the Law of Sport says: « The part of the school, i.e., faculty, intended to implement curriculum and and physical training programmes of pupils, i.e., students, is regarded as sport building in terms of the article 5 of this law.»

8) «Official Gazette of the Republic of Serbia", no. 62/2003, 64/2003-corr., 58/2004, 62/2004 –corr., 101/2005 – sec.law, 79/2005 – sec. law, 81/2005 – corr.sec.law and 83/2005– corr.sec.law.

9) «Official Gazette of the Republic of Serbia», no.50/92, 53/93, 67/93, 48/94, 66/94 – decision of USRS, 22/2002, 62/2003 – sec. law, 64/2003 – corr. sec.law and 101/2005 – sec. law.

10) «Official Gazette of the Republic of Serbia", no. 50/92, 53/93, 67/93, 48/94, 24/96, 23/2002, 25/2002 – corr.., 62/2003 – sec. law, 64/2003 – corr.sec.law and 101/2005 – sec. law.

from physical instruction, on the whole or partly, as well as that the school council make a decision to exempt a pupil fom physical training on the basis of a physician's suggestion. *The Secondary School Law* has a similar appoach to legal regulations of that issue; it treats physical instruction as one of curriculum's subjects, and by article 50[11)] limits itself only to those regulations concerning reasons why a pupil can be exempt from physical instruction.

In addition to the laws regulating elementary and secondary school activities, where the subject matter of physical education or instruction is only sporadically and partialy regulated, the ministry in charge of education management also issued the two professional instructions significant in the field of physical instruction. They are:

- Professional instruction for organizing sport activities in elementary schools[12)], and
- Professioal instruction for the process of exemption of an elementary or secondary school pupil from physical training[13)].

On the basis of the whole legal frame content analysis, whose norms regulate physical instruction in the Republic of Serbia, our impression is that physical training as an activity which includes both educational and sport function, is not systematically regulated, in spite of the fact that the number of rules, very partially, regulate some of the issues concerning physical training. Such situation is partly the result of the fact that the departments of the ministries in charge of education and sport are separated; because of that general legal acts which regulate sport, are compulsory separated from geneal legal acts regulating educational and instruction system, and the physical trainin, too. Because of that, the legal acts whose legal norms mention physical training, do not recognize this form of training as a separate – wider category, only as one of numerous school subjects, which is not good. At the same time the creators of these legal acts did not have in mind that for persons involved in physical instruction special requirements should be regulated in terms of their education and level of skill in order to provide high quality and security training for children and youth.

Practice of the most European countries points to the fact that education and sport are compatible activities which are not to be strictly separated, special regarding educational and instructive function of sport and recreation in educational system for children and youth. Thus the future *Regulations on training personnel requirements and methods of professional sport management* shall have just an indirect significance for physical instruction system because it shall primarily be related to to professional management in sport – coachers, fitness instructors, managers, and others, and not P.E. teachers inolved in educational system for children and youth.

Recognizing the legal frame which regulates physical instruction in the Republic of Serbia, we must also discuss the solutions included in *Bill of Sport* of November 2007, and define whether legislator tried to create a basis for a more precise physical instruction definition. *Bill of Sport,* in legislative procedure since the end of 2007, was withdrawn from the Serbian Parliament because of parliamentary election's schedule. In the following period, since forming a new goverment of the Repulic of Serbia (july 2008), the Bill was not debated in the Parliament, whose members decided to draw up a new *Draft of a Sport Law*. The nature of legislator's decision on regulating physical instruction in a new *Law of Sport*, whose legislation is in progress, shall show itself in the following cuple of months, but we can surely conclude that the solution formulated in the frame of *Bill of Sport* of November 2007, did not contribute to the clarification of terminology confusion.

Bill of Sport of November 2007, according to article 2, defined sport as an activity of special importance for the Republic of Serbia and did not deal with physical instruction definitions. As a legal category, physical instruction was mentioned only once in that Bill, in article 130, according to which school sport was organized as extracurricular sport activity in the field of physical instruction, including school tournaments, carried out throgh school system, according to the curriculum. By such legislator's approach, the notion and role of physical instruction are additionaly confusing, which is used as a categiry in defining the notion of school sport. The concept that: «*school sport is organized extracurriculum activity in the field of physical instruction, including sport tournaments at school, carried out through school system, accordingto the curriculum»,* could only bring in additional confusion in defining the place and role of physical instruction in educational system.

11) Article 50 of the Secondary School Law says: « A pupil can be temporarily or during the entire school year exempt from physical training/instruction, on the whole or partly,on account of illness or some physical defect. The school council makes a decision to exempt a pupil from physical training/instruction and to grade him or her on the basis of physician's suggestion.

12) Professional instruction issued by Ministry of Education, no. 110-00-449-05/02 of 22 June 2005

13) Professional instruction issued by Ministry of Education, no. 610-00-45/93-01 of 26 April 1993

The Purpose of Regulations on Training Personnel Requirements and Methods for Professional Sport Management's Legislation

When working group started writing regulation on training personnel requirements and methods for professional sport managemnt, their approach was that after he Regulations being written and legislated, they shall be applied,too, in order to improve professional personnel involved in sport, in an organized and systematic manner and long-term plans for the development of personnel involved in sport system of the Repulic of Serbia. Only in the background was the idea that by applying regulations, professional sport managemnt could be improved in physical instruction. Due to previously described separation of legal authorities of Ministry of Education and Ministry of Youth and Sport, the Regulation's application shall be able to improve professional standards, and indirectly, quality of performance, only of those professionals who are involved in physical instruction for children and youth in school and faculty's curriculum activities. In fact, the Regulations and requirements issued by them, shall be applied to those professionals involved in sport education, seen as instruction in physical training, physical capability development, and sport habits acquiring in terms of article 2 of *Law of Sport*.

New *Regulations on training personnel requirements and methods for professional sport management,* shall be compatible to decrees of the new *Regulations of nomenclature of sport profession and titles*, whose writing is in progress, too. Coordinated and systematic application of the two Regulations should solve the problem spotted back in 2007, by the Faculty of Sport and Physical Education, Belgrade University; the existing poblem was recognized by other higher education institutions in the field of sport during public hearing. In fact, the Faculty of Sport and Physical Education, Belgrade University, and numerous sport associations in the Republic of Serbia, have been facing, in recent years, a serious problem concerning inpractibility of the *Regulations of nomenclature of sport professions and titles's* [14] worthy application. The Regulations were legislated in 1999, according to article 62, paragraph 2 of *Law of Sport*.In the following years, a numerous sector rules, which regulates some fields of social life, directly or indirectly influencing sport, sport activities and physical instruction, has been changed in the Republic of Serbia, and with this, application of rules regulating sport and educational and instructive system in the Republic of Serbia. Due to such changes, the *Regulations of nomenclature of sport professions and titles* and other rules in the field of sport law, are not coordinated with other legal system decrees in the Republic of Serbia, and non-existent *Regulations on training personnel requirements and methods for professional sport management*, seems to be a problem, which additionally complicate the situation.

As the Faculty of Sport and Physical Education is being coordinated with the programmes of higher education reform and Bologna process, the Faculty has changed its curriculum, approved both by the Belgrade University Council and Ministry of Education and Sport. During these studies' reforms, acadenic and professional titles of students who has completed a certain studies' programme, have changed. Besides, a completely new studies' programmes has been introduced, which resulted in completely new sport professionals' profiles and profesionals in sport' profiles, new professions and titles designated in those profesionals' diplomas. Such university degrees included new sport professionals' competence, which meant nothing but a useless and abstract list of acquired knowledge and skills, because the *Regulations on training personnel requirements and methods for professional sport managemnt* did not exist. Sport organizations in the Republic of Serbia are confused when employing new personnel with new diplomas containing appropriate academic and professional titles. They are not sure which title or pofession have to be given to persons whose titles are not in the nomenclature of 1999, but they are stated in their diplomas. Because of that, a certain number of young professionals, with wider competence than those stated in the *Regulations of nomenclature of sport professions and titles*, do not have one of the fundamental human rights – the right to work, and they are compulsed to wait for the solution of already described legal problem in order to find a job. The described situation does not only prevent individuals from finding jobs and thus have the right to work, but significantly damages the Faculty of Sport and Physical Education's credibility, for the diplommas issued by the Faculty are *de iure* perfectly valid, but *de facto*, useless.

Such situation has been misused by the certain sport associations and legal persons registered for unofficial and ad hoc educational forms in the field of sport, in order to, in the absence of regulations on training personnel requirements and methods for professional sport management, «produce professionals», during short-term courses and seminars; those professionals do not have any problems in finding a job in sport organizations, althoug with incomparably less competence than the persons who graduated from higher education institutions.In this way we have a paradoxical situation where professional jobs in sport and professional jobs in the field of physical instruction are carried out by persons en masse; their diplommas are issued by the organizations which apply informal forms of education, which are not subject to a licencing system or any training capability testing of an appropriate profesional profile.

14) «Official Register of the Republic of Serbia", no. 30/99

Conclusion

Legislation and application of the *Regulations on training personnel requirements and methods for professional sport management* , together with the *Regulations of nomenclature of sport professions and titles,* should contribute to the improvement of professional management in sport, and , indirectly, higer quality curriculums of physical instruction in the Republic of Seria. However, the benefit from the application of these two regulations should not be exaggerated, especially considering the fact that we easier legislate than apply regulations, properly and accordingly. The Regulations should serve solely as a transitional solution, until we legislate new legal acts which are to regulate this field systematically.

In thorough and lasting solution on the previously mentioned problems, specially for improving and modernizing physical instruction as a field of particular importance for the Republic of Serbia and its educational system, a reform needs to be done, both of laws which regulate the field of education and instruction and of numerous rules which regulate, or are to regulate sport and professional managemnt in sport.It is necessary to define by some law or some sublegal acts , which regulates educational and instruction system: what is physical instruction, i.e., what does it include; how should it be performed; which aim should we achieve by physical instruction; which place does it take in educational and instructive system; what is the relation between curriculums and physical instruction programmes, and the field defined by the Law of Sport as school sport; which requirements, in terms of of aquired education and the level of training, shoud have those individuals who perform curriculums and extracurricular activities in physical instruction.

New regulations should answer previously mentioned questions and provide for expecting rules, together with systematic and strategic planning of the process of legal frame reform, which regulates physical instruction, appropriae basis for a long-term development of physical instruction system and improve the quality of professional personnel , involved in physical instruction.

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THE ROLE OF SPORT AND ADAPTED RHYSICAL ACTIVITY FOR PEOPLE WITH DISABILITIES – THE BASICS AND HISTORY, TRENDS AND CONTROVERSIES

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The World Health Organisation estimates that six hundred and fifty million people live with disabilities of various types, and the number is increasing due to the rise of chronic diseases, injuries, car crashes, falls, violence and other causes such as ageing. Of this total, 80% live in low-income countries; most are poor and have limited or no access to basic services, including rehabilitation facilities. Sport can be a low-cost and effective means to foster positive health and well-being, social inclusion and community building for people with a disability.

Sport includes all forms of physical activity and it also includes repetition, exercise, recreation, organized, casual and competitive sport, games that contribute to the physical condition, emotional **wellbeing** and social interaction. Sport for persons with disabilities includes physical education, recreational sport as well as elite sport. To this we may add medical rehabilitation with the elements of sport activities in therapeutic recreation. The aim of physical education and sports for persons with disabilities is that trough the physical movement and activity of natural factors help the development of psychomotor and working abilities, strengthen health, as well as developing positive personality and the fuffilment of social needs. The aforementioned objectives are realized through a series of tasks of physical education that is in this population achieved in the basic physical education. Bearing in mind the importance of sport and physical activities for persons with disabilities as well as their insufficient involvement and specific capabilities a need to adapt sports activities according to the type of disease becomes apparent**.** Basic documents that regulate APA field: UNESCO – charter for 80ies, Charter for sports for all: disabled persons – 1987, Salamanca agreement 1994 – inclusion and Bologna agreement – education system.

Area that this paper focuses on is adjusted or adapted physical activity (Adapted Physical Activity), which is connected with medicine, physiotherapy, rehabilitation, corrective and preventive health activities**.** Over the past three decades, research efforts have developed significantly in the area of disability sport and adapted physical activity. Numerous studies have revealed that physical activity and sport participation result in improved functional status and quality of life among people with selected disabilities. The term Adapted Physical Activity (APA) was introduced in 1973 when Belgian and Canadian Colleagues founded the International Federation of APA (IFAPA). IFAPA held its first international meeting in Quebec in 1977 and its second in Brussels in 1979. The first international attempt to define APA was made at the 9th International Meeting in Berlin in 1989 by Doll and Teppler. They defined APA in a multinational perspective. "APA refers to movement, physical activity and sport in which special emphasis is placed on the interests and capacities of individuals with limiting conditions..."

Adapted physical activity is the profession, the scholarly discipline or field of knowledge, and the service delivery, advocacy and empowerment systems that have been created specifically to make healthy, enjoyable physical activity accessible to all and to assure equal rights to sport instruction, coaching, medicine, recreation, competition and performance of persons with disabilities. According to the International Federation of Adapted Physical Activity (IFAPA), Adapted Physical Activity (APA) means: service-oriented profession, academic specialisation or field of study, cross disciplinary body of knowledge, emerging discipline or subdiscipline, philosophy or set of beliefs that guides practices, attitude of acceptance that predisposes behaviours, dynamic system of interwoven theories and practices, process and a product (i.e. programmes in which adaptation occurs) and advocacy network for disability rights to physical activity of participants with disability.

- Adapted physical education undoubtedly requires a special organization and management. Exposure to possible injuries in comparison with other school subjects is much more distinct, and there is a matter great responsibility of physical education teachers. We encounter many unpredictable situations that are related to sports activities, actors and leader.

Here are a few significant examples that the teachers who lead the adopted physical activity meet and significant problems that they are faced with:

- including in sport activities those with the minimum physical and mental abilities
- maintaining order and discipline, participants who do not comply with the rules obstruct hour exercise, if it is not answered appropriately by the teacher's decisions they bother other teammates

- motivate students to exercise, especially girls

including those who usually just wait, cooperate only when explicitly asked to and stop exercising immediately when the teacher turn their back. They exercise only because of the teachers and fear of possible punishment.

- overcome the feeling of discomfort and fear that during the exercise injuries might accrue or injury related problems with the school board, parents, judiciary for example...
- fair assessment of children's abilities, results and effort
- deciding on a type of evaluation: numerically or descriptive, and does that rating make sense
- accepting the fact credit for the achievements of top athletes as a rule goes to officials and coaches in clubs, and the work of teachers in schools with the students goes unnoticed and forgotten.
- convincing school board that for successful work of school education they should provide sports hall, equipment and teacher training

What adapted physical activity means specifically can be explained by the example of damage to the lower extremities , there are two versions of damage to mobile and immobile pupils and a different approach to exercise.

Damage to the lower extremities

- **pupils that are able to move (mobile):** malformation of parts of the limbs and the entire limbs, paresis, pathological fractures, Morbus Perthes, Morbus Osgood-Schlatter, Morbus Haglund, arthrosis of joints, muscle atrophy, pseudoartrosis etc.

Specific exercises for this group

- Development of joints mobility and joint function of lower extremity: circular, twisting, stretching movements, gradually increasing the pressure on various parts of the body while subject is lying, sitting, standing, squatting, local reeducation of the limbs.
- Development of balance skills: static exercise, endurance in the position of standing on one or both legs, dynamic movements of locomotion, balance on the narrow areas.
- Correction of muscle function and function of the lower extremities: the activation of muscles, strengthening of the tendons in the joints, stretching exercises**,** changes of contractions and relaxation of muscles, muscle extension of the waist, flexing knee and calf muscles, activating the foot and finger mobility, strengthening the lower extremities without weight of the limbs, then gradually overcoming the weight of the limbs, with supplementing weight, strengthening abs, derriere and waist muscle.
- exercising and improving basic locomotion: walking, standing, squatting exercises, foot placing while walking , running step, skipping, movement technique (in front of –behind foot), lower extremity mobility skills (climb, kick ...)
- exercising correct stance :in various positions and while moving , maintaining vertical axis of the body, setting pelvic, knee, ankle, correction of the lower extremities, proper walk, mobility of the lumbar spine, pelvic relaxation exercises

- **Immobile pupils:** in the wheelchair, on the crutches, with partial amputation or amputation of the entire extremity, paraplegia ….

Specific exercises for this group

- Most activities are performed in the wheelchairs, sometimes out of them but in the sitting position, in the lying position, without the crutches.
- Development of the shoulders and body: strengthening exercises with light weight, walking with the ball, strengthening exercises for the back muscles and shoulder.
- Correction of the upper extremity motor skills and body: basic locomotion, height, support, catching, throwing, motion, moving various objects, streching, rotation, head exercise, free exercise.
- practicing respiratory stereotypes: the development of the chest breathing, improving the mobility of the chest, breathing coordination with the movements of the neck and body, strengthening of main and auxiliary respiratory muscles, strengthening of interbone muscles.
- exercising correct stance: maintaining vertical axis of the body and head, symmetry development of right and left side of the body, holding the shoulders in coordination with pelvic, the development of balance while moving and in various positions.
- practicing driving the wheelchair: the rhythm of movement of the wheels, moving forward, backward, turn, obstacles in the way ...

Basic models for teachers education adapted physical activity: ped.-psych. competencies, physical education teachers, special education and special didactics.

Ped.-psych. Competencies:

- Pedagogy, psychology, developmental psychology, sport psychology, sport sociology, philosophy, sports history, law and legislation (including disabilities)

Physical education teachers program

- Biology and medicine discipline (anatomy, exercise physiology….etc.)
- Sports: athletics, swimmining, sports games, summer and winter outdoor activities, etc…

Special education

- tyflopedy
- surdopedy
- somatopedy
- psychopedy etc.

Special didactics

- Physical education - basketball – wheelchair basketball
- Physical education swimming – Halliwick swimming
- Physical education skiing – monoskiing, blind skiing, integration training
- Practice in schools, in centers…

International Council for Health, Physical Education, Recreation, Sport, and Dance (ICHPER•SD)in collaboration with United Nations Educational, Scientific, and Cultural Organization (UNESCO) assemble and articulate the collective voice of professional organizations in the establishing the Standards. Standards represent what children/adolescents ought to know and what they should be able to do as a result of the instructional program. Global standards enable quality physical education curricula in schools, thus, helping insure that every child and adolescent is physically educated. Provide **satisfactory** standards which form the foundation for developing and assessing all school-based physical education curricula. Global Communication, the nature of physical education curricula depicting essential content common to all curricula. Establish operational definitions enabling, implicitly, distinctions and relationships between/among physical education and allied fields (e.g., dance, health, recreation, sport). Establish operational definitions enabling global dialogue, research, understanding, and exchanges among professionals and between professionals and leaders of government agencies.

There is evidence of people with a disability participating in sport as early as the 18th and 19th centuries and sport activities were instrumental in the rehabilitation of people with a disability. The earliest international competition that still exists today was the first International Silent Games held in Paris in 1924. Two men are credited with pioneering the first International Silent Games, Mr Eugene Rubens-Alcais of France and Mr Antoine Dresse of Belgium. Although the name of the games changed periodically, a world games for the deaf was held every fours since that time, except during World War II. Immediately at the end of the war, however, deaf sport quickly resumed and the first winter games took place in 1949 in Seefeld, Austria. World War II had a significant impact on the development of disability sport and during the rehabilitation of injured war veterans, the Paralympic Games were born. In 1944, Sir Ludwig Guttmann organised a sports competition for World War II veterans with spinal cord injury in Stoke Mandeville, England. By 1948 this had quickly developed into the first Stoke Mandeville Games, which were the precursor to the Paralympic Games. In 1976, the games expanded to include other disability groups and the first Paralympic winter games were held in Sweden. In June, 1962 Eunice Kennedy-Shriver started a summer day camp for children and adults with intellectual disabilities at her home. This rapidly developed into the first Special Olympics World Games that took place in 1968 at Soldier Field in Chicago, USA. The first winter games followed in Colorado, USA in 1977. Since the 1970s the concept of organised multi-sport and multi-disability games became popular and a number of regional games for people with a disability also emerged. The three largest international disability sport competitions are the Special Olympics, Paralympic Games and Deaflympics. Special Olympics provide year-round training and competition opportunities for people with intellectual disabilities at all levels. The Paralympic Games provide international competition for six different disability groups including amputee, cerebral palsy, visual impairment, spinal cord injuries, intellectual disability and les autres (those that do not fit into the other groups). The Deaflympics provide competition for athletes who are deaf or hard of hearing. Oceania is the region with the least participation historically, followed by Africa and Asia. Participation in winter games from developing countries is very low, whilst the participation of women in winter sport is even lower and declining with time.

Since the 1970's, there has been a dramatic increase in the number of international organisations and associations serving athletes with disabilities. At the local level, in some countries there are increased opportunities for people with a disability to participate in school-based physical education, clubs and community associations and casual recreation. Whilst there is limited historical and statistical evidence of the

participation of people with a disability in developing countries, in the three largest international competitions – Deaflympics, Paralympic Games and Special Olympics World Games, participation by developing countries has seen the greatest improvement since 1990.

RESEARCH

Sample included the 178 examines (93 men and 85 women). Sample compose 45 individuals which actively occupies it self with the sport, 45 individuals which recreative occupies it self with the sport, 43 individuals which does not occupy it self with the sport and 45 parents which children has invalidity. In view of old ages, 25.8% the examine have less the 20 year, 46.1% the examine has between 20 and 40 year, 28.1% examine has more than the 40 years.

Answers on the question: „Individuals with the invalidity can eqally to participate in sport?"

	yes	no	disabled persons are not for participation in sport
recreation	15.6%	64.4%	20.0%
ansportist	20.9%	48.8%	30.2%
to go in sport/ sporty	8.9%	57.8%	33.3%
parents	8.9%	68.9%	22.2%
totally	13.5%	60.1%	26.4%

Answers on the question: "What do you think about the participation individual with the invalidity in activ sport contests?"

	complete support	have not nothing against	disabled persons are not for participation in the sport
recreation	2.2%	48.9%	48.9%
ansportist	.0%	34.9%	65.1%
to go in sport/ sporty	.0%	26.7%	73.3%
parents	4.4%	44.4%	51.1%
totally	1.7%	38.8%	59.6%

Answers on the question: "Do you think that sports happening and results are less if contens participation individual with the invalidity?"

	yes	surely lose on the rating	no
recreation	86.7%	8.9%	4.4%
ansportist	79.1%	14.0%	7.0%
to go in sport/ sporty	75.6%	17.8%	6.7%
parents	93.3%	6.7%	.0%
totally	83.7%	11.8%	4.5%

Conclusion

To reduce the negative attitudes towards sport activities in which children and adults with disabilities participate in the future first we need to improve awareness of the experts that will work in this area and that can be achieved only by gaining knowledge and skills necessary to work in this area.

Specific recommendations for the successful managing of adopted sports activities. Problems and the importance of the successful implementation of adopted sports activities depend solely on the instructors who must be aware of exceptional integrity of the area and responsibilities that accompany it. Opinion that the work is less demanding as the physical and mental abilities of the participants reduced is wrong and confusing. Rule that applies is, the less mobility demands more teacher attention. Expectations and requirements set for the instructors of adopted sports activities are high.

We will mention some:

- they should know and understand people with special needs, who are involved in the process of exercise
- they should know laws and what is specific about adapted physical activity
- they need to use different methods in solving psychosocial problems
- they need to choose and use work methods, applicable to the different abilities of participants
- they need to know how to motivate participants in group exercise
- they need to know to write and customize exercise programs for people with different abilities
- they need to be skilled at applying methods of perception

Significant problems, which occur while working in the field of adopted sports activities:

1. Instructors master sports profession, as such, not learning specifics about persons with disabilities, their abilities and possibilities of sport adjustment
2. Experts who know the needs and abilities of persons with special needs, but they lack the knowledge of sports profession.

Both of them, the first and the second problem, affect all the actors in the adapted sports activities.

We should look for solution in linking the areas that are cover physical education, sport and recreation and problems of different types of damage, or special needs. professionals who are more or less related to physical activity adapted for people with disabilities are: doctors, physiotherapists, kinesitherapeuts, occupational therapist, sports teachers, a teachers of primary schools, guardians, social workers and defectologist. And only with interdisciplinary work and cooperation of all actors adopted physical activity will be adequate and we will overcome all obstacles to its implementation.

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MOTIVATION AND PERSONALITY TRAITS OF HIGH LEVEL KARATE ATHLETES

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INTRODUCTION

Contemporary approach to sport brings sports achievement the victory, to the fore. Victory is a function of many factors that include complete anthropological characteristics of a human. Nevertheless, the entire activity of a karateist is expressed through implementing the operating in a fight tactics.

The tactics imply being acquainted with the adversary and his or her possible moves during the fight. To these moves we oppose our own characteristics, expressed by our morphological characteristics (especially those in connection with the length of limbs), motional and functional abilities.

Many researches have shown that top athletes, especially those in heavy categories, have very similar characteristics; they are morphologically built alike and have similar physical abilities. That is very often the case among the athletes who attain high ranks in contests. In such cases victory is often a matter of only minute quality differences. In such cases fight tactics have a crucial meaning. And in psychological preparation of a certain athlete lies the power to decide on a performing the adequate tactics. Psychologically well prepared contestant is capable of performing the optimal (winning) tactics, he/she can think logically and realistically while controlling his/her emotions, hide his/her tactical plan, he/she can patiently await the counter-attack and quickly recover from stressful situations.

While doing this we have to keep in mind that the same or similar behaviour of different karateists during the fight does not necessary imply the same psychological characteristics of these individuals. Psychological preparation of an athlete is a complex process present within the structure of sports preparations. It consists of three parts:

- psychodiagnostics
- psychological preparations
- observation of athlete's condition and his/her behaviuour during the training practice

Psychodiagnostics implies diagnostics-establishing psychological characteristics of the athlete, which is, establishing the "initial state" from which we set off on a "journey" of psychological preparation. Competing in the finals, in having its own characteristics and demands to which a karatist has to comply in order to attain his/her goal represents the end of that journey. Although demands are the same or very similar, awareness that not all people have the same psychological characteristics should result in the idea that, likewise, the psychological preparations used with various athletes can not be completely identical. All of the above stated puts in front of a coach, and in front of a psychologist in the team work, the task of observing karateist's condition and behaviour during both practice and contest. These observations will help in establishing the optimal method for psychological preparation of a contestant.

Today, according to Eysenck, moderate, well known variant is predominant in the world:

- an individual is the same as all the others
- an individual is like somebody else
- an individual is like nobody else

The result of this approach is an aspiring to explore all the characteristics of successful athletes, in order to establish a model approach for selection of karatists. That is why the goal of this paper is reduced to the diagnosis of condition of top Croatian karatists within the field of motivation and connative personal traits.

METHODS

Selectors of female and male national teams have singled out 11 male and 7 female members of national team from the group of top Croatian karatists.

Three instruments were used in this research. The test named General achievement motivation (GAM) is an adapted version of the Herman's test of achievement motive (Hermans. 1967); the adaptation was done by Havelka and Lazarević (1980); three scales with a total of 54 items give information on three variables:

1. General achievement motive (GAMM) – expressed in striving for success and recognition in desire for gaining certain degree of successfulness in their primary occupation – school, studies, etc. Number of items related to this motive = 26.
2. Positive emotional engagement (GAMP) – investigates the degree of emotional engagement (excitement) in situations of general achievement. This state can be identified as an emotional control which optimises the state of activation of organism and makes a favourable component in attaining the motivation goals. Number of items related to this variable = 14.
3. Negative emotional reaction (GAMN) – in situations of general achievement manifested as a fear from possible fail. The fear is caused by feeling the threat of the suspense from the issue and its significance. The results on this scale can be identified as a state of emotional instability and inhibition in situations of general achievement. This scale has 14 items.

The test named Sport achievement motivation (SAM) was constructed for the needs of research work "Motivation for Sports" (Lazarević. 1986). The test was made by Havelka – Lazarević with a purpose to measure the tendency for attaining success in a way the sportsman internalised it – as a result of authentic needs or as a result of outer demands and influences. The test consists of three scales, which investigate three variables with a total of 50 items:

1. Sports achievement motive (SAMM) – is investigated through various levels of particular behaviour patterns related to certain successfulness standards in competitions and trainings, or through the relation with the coach, fellow sportsmen, etc. This dimension was investigated with 26 items.
2. Positive emotional engagement (SAMP) – manifested as the level of self-control in situations of sports achievement.
3. Negative emotional reaction (SAMN) – manifested as fear or "avoiding of achievement" in sports situations. Suitable for determining emotional stability and inhibition in behaviour in sports situation. Investigation of this dimension was done with 12 items.

The Eysenck's personality questionnaire (EPQ) (Leon Lojk, 1979) was used here for two reasons. First, because it was supposed by having in mind main characteristics of karate that the personality aspects measured by EPQ are important for successfulness in this sport; and secondly, to determine to what extension these dimensions are connected with the variables from two previous tests.

This test measures four personality dimensions:

1. Psychoticism (EPQP) – measures that dimension of person expressed through strength, rigidity, unpermissiveness (persons with high EPQP); or trough the behaviour characterised with softness and permissiveness – characteristics for persons with low score on this scale.
2. Extraversion – introversion (EPQE) – manifested in a tendency for the contact with other people, love for excitements and risks, changes, amusement, jokes and carelessness, in unnecessary exposure and aggressive reactions (in persons with high score); or in reservedness. restraint, balance, distrustfulness, avoiding of excitements, poor communication, steadiness and better control (with persons with lower "EPQE" score).
3. Neurotism (EPQN) – investigates emotional stability-instability. For the persons with a high score it can be said that they are worried, anxious, often in a bad mood, too emotional, overrreactive, easy to upset and difficult to calm down. In one word, they can be marked as emotionally unstable. Behaviour, which on the PEQN scale is manifested in low score, can be marked as emotionally stable.
4. Sincerity (EPQL) – this scale measures person's sincerity (dissimulation) and expresses at the same time his desire for social acceptance. The application of this scale is connected with a degree of connection with other scales from the EPQ-questionnaire.

The EPQ-questionnaire consists of 90 items 25 of which are related to EPQP, 21 to EPQE, 23 to EPQN and 21 to EPQL.

Data was processed using statistical data processing software "STATISTICA" for Windows 5.0. Since majority of Croatian karate coaches work simultaneously with the athletes of both genders, it was interesting to discover had there been any difference among genders in the observation field. To attain this goal multivariate analysis variance of was used. After that the matrix of intercorrelation was calculated, the goal of what was to determine interacting relations of observed variables.

RESULTS AND DISCUSION

By analysing variance (Table 1) we came to the conclusion that there is no statistically considerable difference in any tested variable among female and male members of Croatian national team.

Table 1. Analyse of variance of male (m) and female (f) karate athletes

	Mean m (n=11)	Mean f (n=7)	$F(df_{1,2})$ 1.16	p-level
GAMM	13.55	14.14	0.08	0.78
GAMP	8.27	10.00	2.55	0.13
GAMN	4.82	5.57	0.34	0.57
SAMM	16.36	15.71	0.15	0.70
SAMP	8.00	7.86	0.02	0.88
SAMN	3.00	3.43	0.25	0.62
EPQP	4.73	3.43	0.92	0.35
EPQE	15.00	17.29	1.89	0.19
EPQN	8.18	10.86	2.98	0.10
EPQL	10.00	7.86	1.01	0.33

Wilk's $\lambda = .339$; Rao's $R = 1.051$; $p < .488$

This figure points to the fact that karate athletes, no matter what gender, can be equally trained in method approach of technical-tactical assignments training.

Matrix of intercorrelation is presented in table 2. It points to the considerable and high level of correlation between motivation for overall achievement level, motivation for sports achievement level (r = .71) and positive emotional engagement (r = .60) in sport situations.

Table 2. Intercorelations of psychological variables

	GAMM	GAMP	GAMN	SAMM	SAMP	SAMN	EPQP	EPQE	EPQN	EPQL
GAMM	1.00	-0.36	0.25	*0.71*	0.60	-0.34	-0.10	0.29	0.08	0.32
GAMP		1.00	0.37	-0.25	-0.23	0.43	0.15	-0.16	*-0.50*	-0.28
GAMN			1.00	0.27	-0.05	*0.52*	-0.01	-0.33	0.46	-0.10
SAMM				1.00	*0.47*	-0.29	-0.24	0.04	-0.23	*0.52*
SAMP					1.00	*-0.71*	-0.18	0.49	-0.05	0.31
SAMN						1.00	0.31	*-0.52*	0.19	-0.43
EPQP							1.00	-0.06	0.11	*-0.60*
EPQE								1.00	0.28	-0.12
EPQN									1.00	-0.38
EPQL										1.00

This information clearly points to the fact that in Croatia karate can be practised only on non-professional level. Since getting the top scores in this sport requires long term investment of hard work, only those individuals that are successful in solving their existential problems (school, studies, work…) can reach high level of achievement (successfulness).

Correlations gotten within the scale of sports achievement motive are equal to those Lazarevic (1984) and Marinovic (1991) got in previous research. These points to the meaning of emotional component in situations of sports achievement. That link is so strong that we could say emotional self-control is a necessary component of sports achievement motive. That is why emotional self-control variable in the situations of sports achievement could be more considered a correlating than an independent variable or personal factor. On one hand these results have their justification in the fact that development and forming of sports achievement motive develops and operates in sports-social contexts that are saturated by emotional tension, and on the other, in the fact that every competing activity demands getting the neuro-physiological condition of an organism to the optimal level of activation, and that means under appropriate self-control.

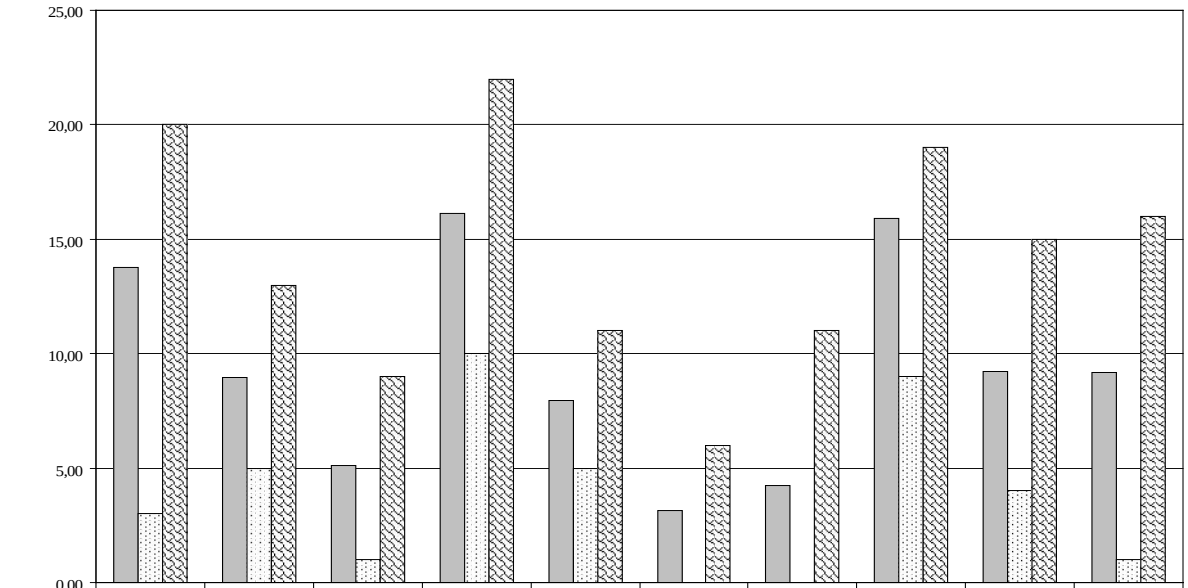
In the same test emotional self-control in the situations of sports achievement (GAMP) has significant and very strong negative correlation with negative emotional reactions (r = -.71). Explanation of this fact lies in realisation that karatists who underwent the testing have high level of sports achievement, which means that they have achieved a level of sports results compatible with their expectations or expectations of their environment. That is why sports situations cause less stress effects in such athletes.

High level of connection between extroversion (EPQE) with positive (r = .49) and negative (r = -.52) emotional engagement in the situations of achievement is also significant. Since EPQE is responsible for vividness of neural system, that is to say for adequate reactions to the repeated changes of situation during the karate fight, this clearly points to the fact that karatists with higher emotional self-control will react more favourably. Also, extroversion has significant, although weak and negative connection with negative emotional reactions (r = -.33) in situations of overall achievement and this only adds to the above-mentioned claim. As extroversion-introversion has almost orthogonal relation towards other variables this points to the fact that high extroversion with expressed emotional self-control is desirable characteristic for a successful karatists.

In the end, there are two more correlation coefficients that point to the significant and fairly high level of connecting. The scale of sincerity has with psychoticism coefficient of correlation r = .60. This points to the fact that rigid persons are in the same time less sincere. Along that, persons highly motivated for sports achievement indicate greater sincerity (r = .52), that is better and clearer communication with outer world, including the coach.

From all the previously stated facts comes the obvious realisation - the best situation in karate sport is when persons that come to train are young people with high level of motivation for overall and sports achievement, high level of emotional self-control, low level of rigidity and neurotism but with high level of extroversy and sincerity in communication. Our experience shows us that people like that exist in sports as in everyday life, however that they are very rare. Most of the people have different characteristics and different projections on particular psychological variables. This diversity of internal values of an individual shows that they will differently react to outer stimulus, that is persons of different psychological characteristics need different psychological approach in learning specific technical-tactical details.

Chart 1. Descriptive statistics of psychological variables (n = 18)



	GAMM	GAMP	GAMN	SAMM	SAMP	SAMN	EPQP	EPQE	EPQN	EPQL
Mean	13,78	8,94	5,11	16,11	7,94	3,17	4,22	15,89	9,22	9,17
Minimum	3	5	1	10	5	0	0	9	4	1
Maximum	20	13	9	22	11	6	11	19	15	16

Chart 1 shows the values obtained during testing. In it we can clearly see differences in projections of particular variables. For example, the average value of motivation level in situations of overall achievement (13.68), although higher than the average in some other sports, still shows that among the top karatists there are those with very high level (20) as well as those with very low level (3) of motivation. Although emotional self-control is an important presumption of success in sport, it is noticeable that among the members of Croatian national team there are karatists who have very low projections on the scale of negative emotional reactions of overall (1) and sports (0) achievement. And again, there and those who have undesirably high level of reactions (9 and 6,

respectively) to the same parameters. High level of extroversion in connection with low level of neurotism is very desirable in top karatists. However, in the observed sample of top Croatian karatists there are typical extroverts (19) as well as those who could be considered introverts (9). In the same time in the sample there are karatists for which we could be sad that they are emotionally stable (EPQN = 4) as well as those in who we can expect high level of anxiety conditions (EPQN = 15) in demanding situations.

CONCLUSION

Sport efficiency in contemporary karate is significantly connected in meaning with the usage of adequate tactics in sports fight. A validity of using tactics is dependent on the level of psychological preparation. Since persons of different psychological characteristic successfully participate in karate, it is necessary to use distinctive approaches in guiding the sports form closely connected with psychological preparations. That is why the activity of psychodiagnostics is necessary in order to determine in due time the characteristics of our athletes and the optimal approach in governing the psychological preparations..

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SESSION 4

PEDAGOGICAL IMPLICATIONS OF REALIZATION OF THE SPORT-TECHNICAL EDUCATION IN ELEMENTARY SCHOOL

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The physical education syllabus is organised around thematic areas, one of which is the so-called sports and technique education. This programme framework is defined by its own educational contents and is based on requirements which concern motor skills at different levels of difficulty.

During their physical education, students gain certain motor skills which are relevant for their everyday life, work or sports and recreation trainings.

The knowledge and skills gained through education hold certain values, sense and importance. This refers to physical education, too. Mastery of motor skills is the backbone of complete physical education. The quality of the skills gained stands in correlation with the students' attitude towards physical trainings and education.

The general assumption is that the level of fulfilment of programme requirements, especially educational ones, determines the quality of physical education at school to a great extent. The quality of sports and technique education at schools can be assessed by means of: quantitative markers (such as the number of fulfiled motor-skill requirements) and qualitative markers (the mastery of the skills gained through education).

A research was conducted concerning the impact of sports and technique education on students' post-academic life and work, the aim of which was to have an insight into its realisation in primary education.

The analysis of the current status and realisation of sports and technique education in primary schools was made based on the questionnaire form filled in by the students of the Faculty of Sports and Physical Education and Teacher Training Faculty in Belgrade.

The data included in the analysis (realisation of educational contents in physical education – sports and technique education in primary schools) were collected by means of a questionnaire.

First year students at both faculties were chosen as the target group. One of the reasons for this was the fact that both faculties train teaching staff in the sphere of physical education.

The initial assumption was that the first year students' memory of the educational process they have been through is still relatively fresh. We assumed that they could still recall their own experience with physical education classes, including motor-skill contents that they were taught at school. This assumption was confirmed by their answers to the question: "How well can you remember the sports practice and physical exercises that you had in primary school within physical education classes?" The answers given show that 187 (out of 192) respondents remember the realisation of their sports and technique education.

The age of respondents and the environment in which the testing was done (regular faculty classes) are additional factors which guarantee that the answers were provided conscientiously. The time that has lapsed from their former physical education till today is not too long.

Because of the presence of both genders among the respondents in the target group, the motor-skill requirements selected for this research were both male- and female-oriented.

The sample of motor-skill requirements taken into consideration for the analysis of the sports and technique education includes: apparatus practice, athletics, handball, volleyball, basketball and dances. The requirements are shown in the table below.

As the physical education syllabus encompasses both indoor classes and outdoor activities, the research also includes other obligatory contents.

Therefore, the following contents were included in the research: field trip, cross country race, individual sports competitions and sports games competitions.

This table shows that the realisation of 26 motor-skill requirements was observed (9 in gymnastics, 9 in athletics, 6 in sports games, folk dances, 'kolo' and swimming).

The respondents had to provide an answer in the questionnaire for each motor-skill requirement and activity. The first questions to be answered were whether the motor-skill requirements were realised during indoor or outdoor activities. Next question was if the necessary conditions for the realisation of a particular requirement were fulfiled. Then followed the question if they had learned how to fulfil the requirement performed during the teaching process. The answers are shown in the table below.

Table 1. Level motor tasks of qestioners

MOTORS TASKS	
GIMNASTICS TASKS	14. hang
1. forward roll	15. straddle jump
2. backwards roll	16. back tecnique high jump
3. forward horizontal stand	17. shot put from standing start
4. handstand without peers supporting	18. shot put-rational technique
5. cartwheel	
6. straddle vault	***SPORTS PLAY***
7. squat vault	19. handball techique (elements)
8. straddle with swing	20. handball play
9. retreat	21. basketball techniaque (eleements)
	22. basketball play
ATLETICS TASKS	23. volleyball technique (elements)
10. technique of steadfast running	24. volleyball play
11. technique of fast running	***DANCES AND SWIMMING***
12. relay race	25. dances-folk dance „kolo“
13. squat long jump	26. swimming

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Table 2. Realizations of gimnastics tasks

motors tasks	„elaboration“ of gymnastics tasks. The task was-not treted in class			
	yes		no	
	n	%	n	%
forward roll	186 (1*)	96,875	6	3,125
backwards roll	181 (2*)	94,270	11	5,729
forward horizontal stand	91 (7*)	47,395	101	52,604
handstand without peers supporting	116 (6*)	60,416	76	39,583
cartwheel	130 (5*)	67,708	62	32,291
„straddle vault“	146 (3*)	76,041	66	34,375
„squat vault“	135 (4*)	70,312	57	29,687
straddle with swing	58 (8*)	30,208	134	69,791
retreat	54 (9*)	28,125	138	71,875

* Level of realization of motor tasks

The above answers show that the most covered requirements were the forward roll and backward roll. Then follow the leap and handspring jumps. 'Cartwheel' and 'handstand' were the next most covered requirements. Straddle split with a rotation and retreat were the least covered requirements.

Table 3. Assessment of condicions for realization of gimnastics motor tasks

Motor tasks	Conditions for realization of motor tasks			
	The conditions existed		The conditions did not exist	
	n	%	n	%
tasks of parters	185	96,354	7	3,645
straddles	166	86,458	26	13,541
retreat	97	50,520	95	49,479

According to the provided answers it is obvious that the conditions for the fulfilment of floor exercises existed. A few cases indicate the lack of conditions for the leap performance, and half of the answers provided indicate that there were no conditions for the fulfilment of the retreat.

Table 4. Realization of atletics tasks

Motor tasks	„elaboration“ of tasks. The task was-not treted in class.“			
	yes		no	
	n	%	n	%
Technique of steadfast running	95 (4*)	49,479	97	50,520
Technique of fast running	135 (2*)	70,312	57	29,687
Relay race	48 (7*)	25,000	144	75,000
Squat long jump	140 (1*)	72,916	52	27,083
hang	70 (6*)	36,458	122	63,541
straddle jump	85 (5*)	44,270	107	55,729
back tecnique high jump	34 (9*)	17,708	158	82,291
Shot put from standing start	96 (3*)	50,000	96	50,000
shot put-„rational“ technique	39 (8*)	15,625	153	79,687

* Level of realization of motor tasks

A high level of coverage is registered in the case of the long jump with double-arm technique and the sprint technique. Glide shot put, track running and straddle technique high jump showed coverage in approximately 50% of the respondents' answers. Relay race, rational technique shot put and flop technique high jump show a low level of coverage. One thing that is obvious in the realisation of athletics requirements is the decrease in the coverage of certain athletics events as the level of their difficulty increases.

Table 5. Assessment of condicions for realization of atletics motor tasks

Motor tasks	Conditions for realization of motor tasks			
	The conditions existed		The conditions did not exist	
	n	%	n	%
Technique of steadfast running	156	81,250	36	18,75
Technique of fast running	163	84,895	31	16,145
Relay race	133	69,270	59	30,729
Long jump	116	60,416	76	39,583
straddle jump	121	63,020	71	36,979
back tecnique high jump	75	39,062	117	60,937
Shot put	115	59,895	77	40,104

Most answers in the above table prove that the best conditions were provided for sprint and track running. Contrary to that, the least favourable conditions were provided for the flop technique high jump. Less than 40% of answers indicate a complete lack of conditions for shot put, straddle technique high jump and relay race. On the whole, a large number of samples indicate the lack of conditions for the realisation of the so-called technique disciplines. If we compare the possibilities for the fulfilment of requirements and their actual fulfilment, we can conclude that the existent conditions were not used to the full extent (in some cases the conditions did exist but there were no motor-skill requirements set).

Table 6. Realization tasks of Sportplays

Motor tasks	„elaboration" of tasks. The task was-not treted in class."			
	yes		no	
	n	%	n	%
Handball techique (elements)	131	68,229	61	31,770
Handball play	104	54,166	88	45,833
Basketball techniaque (eleements)	166	86,458	26	13,541
Basketball play	170	88,541	22	11,458
Volleyball technique (elements)	171	89,062	21	10,937
Volleyball play	150	78,125	42	21,875

The technique itself was best taught in the case of volleyball (89.062%), a little less in basketball (86.458%) and much less in handball (68.229%). According to students' answers, the most practised game was basketball, then follows volleyball, whereas handball was the least realised of all games.

Table 7. Conditions for realization of Sportsplays.

Motor tasks	Conditions for realization of motor tasks			
	The conditions existed		The conditions did not exist	
	n	%	n	%
Handball	167	86,979	25	13,020
Basketball	182	94,791	10	5,208
Volleyball	186	96,875	6	3,125

Most answers show that conditions for the realisation of sports games were existent. A number of answers indicate reduced conditions for the realisation of handball. If we compare the possibilities for the fulfilment of requirements and their actual fulfilment, a certain discrepancy can be noticed in the case of handball.

If the answers showing the fulfilment/non-fulfilment of motor-skill requirements in separate areas are compared with the overall fulfilment/non-fulfilment of requirements, we shall be able to devise the percentage of the requirements fulfiment per thematic areas.

Table 8. Review of owerall realizationn of tasks (gymnastics, athletycs, sportplays)

„Thematic wholes"	Contents are realized		Contents are not realized		Overall	
	Yes		No			
	n	%	n	%	n	%
Gimnastics without roll	730	17,200	634	14,938	1364	32,139
Atletics	742	17,483	986	23,232	1728	40,716
Sportsplay	892	21,017	260	6,126	1152	27,144
Overall	2364	55,70	1880	44,29	4244	100

The above table indicates the realisation of the observed motor-skill requirements of 55.70%, that is, 2364 answers which prove positive realisation out of the total of 4244 positive answers, which is a data we cannot be pleased with.

What is the situation like in the case of dances and swimming?

Table 9. Realization dances-folk and swimming

„Thematic wholes“	„Обрада“ моторичких задатака у настави. Задатак је (није) обрађиван у настави			
	Yes		No	
	n	%	n	%
dances-folk dances e „kolo“	58	30,208	134	69,79
swimming	34	17,70	158	82,29

Obviously, the realisation of dancing contents represents a big problem. The situation is even worse with swimming, where 82.29% answers indicate complete absence of realisation.

A particularly interesting thing is to check how well the target group students mastered the contents they were taught.

Table 10. (Extracurricular activities)

Extracurricular activities	Activity was realized			
	yes		no	
	n	%	n	%
Walking excursion – every year	78	40,625	114	59,375
Each year cross was carried out	143	74,479	49	25,520
Competitions in individual sports	97	50,520	95	49,479
Competitions in sports games	133	69,270	59	30,729

The situation concerning the realisation of extracurricular activities cannot be considered satisfactory. Cross country race is the most realised activity, as well as sports games competitions. Field trips and individual sports competitions are insufficiently realised. On the whole, the level of extracurricular activities realisation proves to be low. Consequently, their effects are also much reduced.

This slightly liberal approach to the research of physical education syllabus realisation included one key question:

Should one consider themselves damaged if they had no opportunity to master the movements, sports and other contents included in the physical education syllabus?

The answer to the above question resulted in the following: 155 respondents or 80.729% of them consider themselves damaged for not being given an opportunity to master all the syllabus-based contents in physical education which they had at school. 19.27%, i.e. 37 respondents do not consider themselves damaged because of the non-realisation of the physical education programme contents.

This is the main consequence of the failure in the realisation of thematic areas within the overall physical education programme: sports and technique education and its application in extracurricular activities.

The conducted research imposes the need for certain consideration.

The physical education syllabus in general (which encompasses both regular classes and extracurricular activities), and regular classes in particular, are overloaded with motor-skill requirements. From the “historical” point of view, the number of physical education lessons in primary school has not changed. Initially, there are 3 lessons of physical training per week, and then 2+1 lessons. Today, the physical education syllabus is realised through 2 lessons per week from the fourth to the eighth grade of primary education. The subject itself is divided into two sub-subjects: “physical education” (2 lessons per week) and “physical education – “optional sport” (one lesson per week). This practically means that a great many motor-skill requirements such as: apparatus practice, athletics, sports games, rhythmic and sports gymnastics and dance, have to be realised in two lessons of physical education per week. This form of curriculum was not followed by the rationalisation of the programme contents in the “sports and technique education” thematic area. Perhaps this must be taken into consideration in further stages of syllabus improvement.

The research indicates that many parts of the country lack adequate conditions for the realisation of all the motor-skill requirements, especially in the sphere of gymnastics and in some elements of athletics programme.

An insight into the data collected shows that some of the requirements were not fulfilled despite the existence of adequate conditions. We can assume that the reason for this can be sought in the personal factor – i.e. teacher's inconsistency in the programme realisation.

Successful training results from those situations where teaching and practice are adequately realised. Most students master the motor-skill forms they are taught, which proves that efforts oriented towards consistent realisation of sports and technique education do pay.

With regard to sports games programme contents, a negative ratio has been noticed between teaching the technique and the game itself, since the game is applied without systematic teaching of the technique in many cases.

In the domain of gymnastics, the greatest level of realisation of motor-skill requirements is noticed in the practice on the floor and of the vaulting horse leap. The realisation of requirements seems to decrease as the level of the requirement difficulty increases. Consequently, easier requirements are realised in a higher percentage.

In the realisation of athletics requirements, complex motor-skill requirements are less taught. Insufficient attention is paid to track running and relay race. Realisation proves to be poor even where the conditions for the requirements fulfilment are good.

The highest level of content realisation is present in sports games. The second best are athletics contents, and then come gymnastics and dances. Teachers should pay special attention to this fact, since these are contents that students cannot master on their own.

The main orientation in education should be directed to the minimal educational requirements that are particularly emphasised in the physical education syllabus.

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SECULAR ACCELERATION OF GROWTH AND DEVELOPMENT OF CHILDREN AT EARLY SCHOOL AGE

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1. INTRODUCTION

In the last 150 years, especially in the first half of the twentieth century, a general tendency was noticed of acceleration of somatic development and physiological maturation of children and youth – denominated acceleration. The notion is considered „a big riddle of the 20th century" by many, and it was identified not only in physical anthropology but also in pedagogy, sports and forensic medicine, pediatry, physiology and other sciences (Ivanovic, 1996).

The term acceleration was introduced in literature in the 30-ties of the 20th century a German scientist E.B. Koch who published the first data on acceleration of somatic development (Ivanovic, 1996). In time the notion of acceleration has been extended. Today, it denotes both accelerated growth and formation of psycho-somatic qualities of an individual and their intensification – greater terminal growth, greater terminal human intelligence throughout decades.

Sarvan, Veljkovic, Vasic, (1971) underline that acceleration also denotes one of the laws of individual growth, increase of growth of some children when compared to other children (*space acceleration*) and increase of growth of children of one generation when compared with the children from previous generations (*time acceleration).*

Course of acceleration is characterized by periods of accelerated development and periods of slowed development (*deceleration)*, the so called *"acceleration cycles ".* The process of acceleration is not synchronous, or in a straight line and it also does not flow successively (Bunak, 1968 - as stated by Ivanovic,1996), demonstrates that by monitoring the average body height of grown-ups in Europe and Asia in the last hundred years.

The real reason (cause) of acceleration is not known. The possible causes are divided into exogenous (which affect each new generation) and endogenous (related to changes of inheritance). However, neither of the familiar factors can fully explain all the problems of acceleration. Current presumption is that today there are less factors which inhibit growth and development. Better nutrition, more intense growth, emotional activity, sanitary habits, primary child care (immunization), less chronic diseases leading to earlier maturation, later aging and life extension (Karasaevskaja, 1970).

2. NOTION OF SECULAR TREND

The literature also encounters a widely used term of "***secular trend of growth and development***" ("century-old tradition"), denoting not only acceleration of development of coming generations, but also changes in development of the grow-ups for a longer period. The second term for denoting such a tendency is "epochal increase". Epochal increase is followed-up by comparison of data on growth and development with the analogous materials from the past epochs. In that case one should start from comparable data. It is necessary to know which instruments were used to obtain the data, the social-economic position of the people and their ethnic affiliation (Ivanovic,1996). In such a context, *secular* means measured *during a longer period.* The recent papers of foreign authors, contain more and more a term „***secular acceleration***". A negative tendency was noticed at times and immediately after economic crises and wars. Therefore, the past decades in our territories feature very unfavourable life conditions both for the grown-ups and the youth, but also for the youngest ones still developing. Difficult economic crisis, war in the neighbouring countries, probably influenced normal growth and development of children and the youth in Serbia. These are the reasons for a more detailed examination of this phenomenon..

However, the results of some researches indicate stagnation of values of body height and other growth indices, in economically very developed environments (Scandinavian countries, the Netherlands, Great Britain and the USA). These phenomena can induce an assumption that influence of exogenous factors in these environments reached its "peak". In that sense, Tanner (1962) also expresses a dilemma: If in certain population, there are no differences in height, after an interval of several years, the question remains whether it is caused by reached "genetic maximum " or that is the consequence of "levelling of environmental factors *"?*

On the other side a question can be made: ***Are the phenomena of earlier sex maturation, of greater juvenile and definitive values of morphological features considered quality and advantage, if they are not followed by a corresponding level of functional, sanitary, cognitive, socio-emotional, motor and labour-productive potentials*** (remark of the author)***?***

The recent researches have been based on different monitoring parameters (longitudinal dimensionality, body mass, birth and mortality rate, menarche, socio-economic conditions etc.).

Portuguese researcher C. Padez compared, by using the data from 1904 and 2000, the following indices for determination of life standard: health (birth rate, age distribution, mortality of mothers and infants), economic (percentage of occurrence of population in three economic branches – agriculture, industry and services), housing conditions (running water, sanitary facilities, sewerage system), data on overall energetic intake (consumption of calories per day).

In Mexico, secular changes were analyzed with appearance of the first menachre, in time interval between 1978 and 2000 in population of rural community Zapotek, of Oaxasa, in southern Mexico, by using retrospective methods (R.M. Malina, E.Pina, Reyes, Swee Kheng Tan and P.H. Little 2004)**.**

Virani, N. tried to compose a pattern of growth and secular trend in the course of four decades, with regard to body height of Indian boys and girls in the province of Sri Aurobindo Ashram, based on the following indices: medical and nutritive conditions in which the boys and the girls grow and physical activity and its influence on growth.

In Turkey F. Simsek, B. Ulucol, Gulnar and Baskan (2005) determined, based on socio-economic conditions of life, specific age and gender features of children of school age, for the period from 1993-2003, following body height and mass.

In the city of Sendai, Japan, pursuant to researches, an acceleration of growth was noted in children of school age, based on the indicators of longitudinal dimensionality. **(**Haruo Nakatsuka, Hiroshi Saton and Masayki Ikeda, 1998).

3. SUBJECT, AIM AND METHODS OF RESEARCHES

The subject of this paper refers to studies of changes in the dynamics of growth and development of children at early school age. This research was aimed at determining a secular trend of physical development and motor abilities in two generations of pupils of the fourth grade with a time distance of 22 years.

3.1. Sample of subjects

The sample of subjects consisted of the 4th grade schoolchildren of the following elementary schools in Belgrade: „Sveti Sava"; „Milica Pavlovic" and „Filip Kljajic -Fica", included in measurement in 1984 and in 1995 and the schoolchildren of elementary school „Djordje Krstic" tested in 2006. Since this school is slightly farther from the city center, when compared to elementary school „Filip Kljajic -Fica" (around 1km), with similar conditions and schoolchildren population, we think that, with certain reserves in conclusions, it is possible to compare the obtained results.

Due to dropping out of subjects during measurement, as well as in order to comply with the conditions that all the subjects must have all data, for final statistic elaboration, the following subsamples were formed: 146 boys and 155 girls enrolled in the 4th grade in academic 1983/84 **;** 138 boys and 172 girls enrolled in the 4th grade in 1994/95; and 47 boys and 42 girls enrolled in the 4th grade in school 2005/06. The samples were of the same chronological age (plus – minus 6 months).

3.2. Sample of variables

For assessment of level of ***physical development*** in this research, **height** (AVIS) **and body mass** (AMAS) were measured. For assessment of certain segments of ***anthropomotoric*** space the following 10 tests were used:

1. For **dynamic balance –** Standing on a reversed balance bench (MSKOK),
2. For **precision of object throwing at target –** aiming at horizontal target with a ball (MGLC),
3. For **coordination of movements** – Coordination with a stick (MKOP),
4. For **segmetnary speed -** Hand tapping (MTAP),
5. For **explosive power of leg extensors–** Standing long jump (MSDM),
6. For **static power of arm and shoulder girdle muscles –** hang with elbows bent (MVIS),
7. For **agility** - Running 4 x 10 м (M4x10),
8. For **repetitive muscle power of flexors in hip joint** – Body lifting on a bench (MPTK),
9. For **flexibility in hip joint and loins of spinal column** – Deep bending forward on a small bench (MDPK)
10. For **speed power - "starting acceleration " –** 20-meter running with high start (M20V).

3.3. Conditions and measurement technique

Anthropometric and athropomotoric variables were mostly measured in regular P.E. classes. Anthropometric measurements were carried out following the recommendations of the International biological program (J. Weiner, J. Lourie, 1969). The anthropometric tests were carried out according to the description and instructions in the monograph of Kurelic et al. – *Structure and development of morphological and motor dimensions of the youth*, Belgrade, 1975.

3.4. Statistic data elaboration

For statistic data elaboration, standard procedures of transformation and condensation of information from the space of descriptive and comparative statistics were applied. From descriptive statistic parameters for each variable, an arithmetic mean (M), standard deviation (SD), variation coefficient (V%), variation width (VS), minimal and maximal result (Min-max) and frequency distribution (DF) were calculated. Asymmetry of the curve of the result distribution with regard to the normal distribution was determined based on the level of curvature - kurtosis (KS) and level of inclination – skewness (SK). Statistical significance of differences of arithmetic means of relative variables between two generation of boys and girls of the 4th grade with time lapse of 22 years was assessed based on the Student's T-test for great independent samples.

The full statistical data elaboration was carried out at the Faculty of Sport and Physical education, University of Belgrade. Apple PC, type "Macintoch LC" was used for elaboration together with the use of application statistic program "Stat-View 512 tm".

4. ANALYSIS OF THE RESULTS OF THE RESEARCH WITH DISCUSSION

Statistical significance of differences of arithmetic means of relevant variables between two generations of 4th grade schoolboys with the time lapse of 22 years is displayed in Table **1**. Based on the presented research results, it can be observed that in both parameters of physical development – body height (AVIS) and body mass (AMAS) a significant difference was obtained in favour of generation 2006 schoolchildren, meaning that ***positive secular trend*** was obtained, i.e. *acceleration of growth and development* was noted**.** Numerically observed, younger generation of schoolchildren is taller for 3,1 cm and heavier for 3,6 kg.

In motor space a statistically significant difference was obtained in variables: precision of throwing of object at target (MGLC), explosive power of leg extensors (MSDM), static power of arm and shoulder girdle muscles (MVIS) and agility (M4x10) in favour of boys of 1984 generation , which indicates ***negative secular trend***, i.e. ***deceleration***. In other motor variables no statistically significant difference was obtained.

Statistically significant difference of arithmetic means of relevant variables between two generations of 4th grade schoolgirls with the time lapse of 22 years is displayed in Table **2**. Based on the presented research results it can be observed that in body height (AVIS) and body mass (AMAS) no statistically significant difference was obtained. Therefore, *stagnation* of growth and development was noted.

In motor space significant difference was obtained in majority of the observed variables, except in the test of coordination (MKOP), where difference was not statistically significant. Only in variable of dynamic balance (MSOK) the 4th grade schoolgirls, of generation 2006 were better than the schoolgirls of generation 1984. Therefore, a ***positive secular trend*** was obtained, i.e. *development acceleration* was noted**.** In variables of precision of object throwing at target (MGLC), segmentary speed (MTAP), explosive power of leg extensors (MSDM), static power of arm and shoulder girdle muscles (MVIS), agility (M4x10), repetitive **muscle power of body flexors** (MPTK), flexibility (MDPK) and speed power (M20V) girls of generation 1984 scored better results, meaning that a *negative secular trend* was obtained, or ***deceleration*** of development of motor abilities was noted.

Table 1. Significance of differences of arithmetic means (t-test for small independent samples) of anthropometric and motor variables of sample of schoolboys of 4th grade of generation 1984. (N=301)

No.	VARIABLE	BOYS 1984. r		BOYS 2006. r		Difference	t	p	Sec. trend
		M	SD 1	M	SD 2				
1.	AVIS, cm	145,5	6,8	148,6	7,6	- 3,1	- 2,7	0,0085	+
2.	AMAS, kg	37,2	6,9	40,8	10,2	- 3,6	- 2,8	0,0059	+
3.	MSOK, sec	4,8	2,3	5,3	2,5	0,5	- 1,2	0,2427	+
4.	MGLC, point	15,7	6,6	10,1	7,3	5,6	4,9	0,0001	-

5.	MKOP, sec	11,6	2,5	11,7	2,0	- 0,1	- 0,3	0,7713	-
6.	MTAP, no.of rep	34,1	3,9	33,1	4,8	1,0	1,5	0,1409	-
7.	MSDM, cm	158,2	18,6	141,5	20,2	16,7	5,2	0,0001	-
8.	MVIS, sec	37,7	25,0	18,0	13,1	19,7	5,0	0,0001	-
9.	M4x10, sec	13,0	0,9	13,5	1,2	- 0,5	- 3,2	0,0017	-
10.	MPTK, no.of rep	4,6	5,2	4,2	4,1	0,4	0,5	0,6383	-
11.	MDPK, cm	20,5	6,3	19,7	5,8	0,8	0,8	0,4241	-
12.	M20V, sec	4,2	0,3	4,3	0,4	- 0,1	- 1,9	0,0626	-

Note: Statistically significant differences are shaded.
Marks „+“ or „-“ indicate whether positive or negative secular trend was obtained

Table 2. Significance of differences of arithmetic means (t-test for small independent samples) of anthropometric and motor variables of sample of schoolgirls of 4th grade of generation 1984 and 2006 (n = 197)

No.	VARIABLE	GIRLS	1984. r	GIRLS	2006. r	Difference	t	P	Sec. trend
		M	SD 1	M	SD 2				
1.	AVIS, cm	147,1	7,0	148,8	7,7	- 1,7	- 1,3	0,1799	+
2.	AMAS, kg	38,3	7,4	39,9	8,9	1,6	- 1,2	0,1185	+
3.	MSOK, sec	4,3	2,3	5,1	2,1	- 0,8	- 2,0	0,0422	+
4.	MGLC, point	10,7	5,5	8,5	5,2	2,2	2,4	0,0164	-
5.	MKOP, sec	11,8	2,6	11,4	1,9	0,4	0,8	0,4136	-
6.	MTAP, no.of rep	35,0	3,3	32,6	4,4	2,4	3,9	0,0001	-
7.	MSDM, cm	148,5	20,0	133,2	16,9	15,3	4,5	0,0001	-
8.	MVIS, sec	21,7	16,5	13,2	11,4	8,5	3,1	0,0021	-
9.	M4x10, sec	13,5	1,0	14,5	0,9	- 1,0	- 5,7	0,0001	-
10.	MPTK, no.of rep	4,9	4,9	2,0	2,4	2,9	3,7	0,0003	-
11.	MDPK, cm	27,6	5,9	24,4	5,9	3,2	3,1	0,0021	-
12.	M20V, sec	4,3	0,3	4,6	0,3	- 0,3	- 5,5	0,0001	-

Note: Statistically significant differences are shaded.
Marks „+“ or „-“ indicate whether positive or negative secular trend was obtained

6. CONCLUSIONS

The following conclusions can be made based on the presented results of the research:

- Secular trend of growth and development of morphological features and anthropomotoric abilities indicate specificities of two generations of the 4th grade schoolchildren of elementary schools in Belgrade with time lapse of 22 years.
- **BOYS** of generations 2006 had higher results in body height and body mass, which means that in indices of physical development, *positive secular trend* was obtained, i.e. *acceleration* of *growth and development* was noted. Numerically observed, younger generation of boys was taller for 3,1 cm and heavier for 3,6 kg.
- In motor space a statistically significant difference was obtained in variables: precision of throwing of object at target, explosive power of leg extensors, static power of arm and shoulder girdle muscles and agility in favour of boys of 1984 generation , which indicates ***negative secular trend***, i.e. ***deceleration***. In other motor variables no statistically significant difference was obtained.
- The last two decades on our territory have been characterized by very unfavourable living conditions, both for grown ups and the youth but even more for the youngest ones who are still developing. Hard economic crisis, wars in the country and in surrounding countries, have probably influenced normal growth and development of children and youth in Serbia. Social turmoils and struggle of

trade unions of employees in education and medical field, resulting in frequent and long work stoppages, surely affected the reduced stimulating influence of systematic physical education in school population.

- The data obtained in this research indicate that in the indices of physical development there was an increase of body height and body mass in the schoolboys of younger generation, but that in the majority of indices of motor development their results were worse then in the generation enrolled in the 4th grade, 22 years ago.
- In schoolgirls, the changes in variables of body height and mass were not at the level of statistical significance, while the in the majority of indices of motor development (except in variable of dynamic body balance) lower values were obtained in younger generation.
- in **GIRLS** no statistically significant difference was obtained in indices of physical development (body height and body mass). Therefore, *stagnation* of growth and development was noted.
- In motor space significant difference was obtained in majority of the observed variables, except in the test of coordination, where difference was not statistically significant. Only in variable of dynamic balance the 4th grade schoolgirls, of generation 2006 were better than the schoolgirls of generation 1984. Therefore, a ***positive secular trend*** was obtained, i.e. *development acceleration* was noted**.** In variables of precision of object throwing at target, segmentary speed, explosive power of leg extensors, static power of arm and shoulder girdle muscles, agility, repetitive muscle power of body flexors, flexibility and speed power, girls of generation 1984 scored better results, meaning that a *negative secular trend* was obtained, or ***deceleration*** of development of motor abilities was noted.
- Theoretical importance of this research would be to clear up problems for assessment of level, development dynamics and secular trend of morphological characteristics and athropomotoric abilities in children of younger school age. Practical significance would reflect in usage of the results and findings which were reached in this research. The data can be significant for P.E. teachers/ professors i.e. classroom teachers of the schools where the research was carried out but also for all the interested, in order to comprehend the existing conditions, development dynamics and influence of secular trend on morphologic features and motor abilities of elementary school pupils. This research could serve as a starting point of a new, more complex and more comprehensive (according to the number of subjects) research, with extended follow-up period, until the period of definitive growth and development.

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PROGRAMMING OF PHYSICAL EDUCATION ACTIVITIES IN KINDERGARTENS

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DEFINITIONS OF CONCEPTS

The discourse on any kind of problem starts with the definitions of the concepts that are discussed in it. Therefore, general definitions of curriculum and its realization we can find in pedagogic encyclopedias and foreign word lexicons. The analysis of these definitions shows program in its totality as the most general category of human activities made of **planned and organized guidance of human activities** in order to achieve better quality of work and it points out reverse connection, mutual interdependence of curriculum, individual or group in different human activities. From pedagogic aspect it is possible to set the basis of curriculums in all institutions that organize educational work – preschool institutions, primary schools, secondary schools, higher education institutions. This kind of education system allows forming of special curriculums that represent central aspect of educational process. The concept of educational program in preschool institutions was taken from school terminology and its origin can be found in the word – curriculum. Analyzing the papers of number of pedagogues who dealt with this problem, three types of program definition can be noticed – curriculum, defined as the set of the contents of individual school subject (range, depth and sequence of teaching contents), curriculum based upon behaviorist theory of learning and development as the set of the goals (effects) of learning - knowledge, skills, habits that pupils should acquire through teaching contents during one school year and processing type of program – education as the process which is defined with the principles of action (learning and teaching strategies), not the contents or the products of education. (Pesic,1987). Pedagogic theory, state laws on primary and secondary education consider curriculum to be a document which states:

- School subjects that will be taught at particular school
- Their sequence during the period of education
- Number of classes (hours) during one week for each subject

Para simony of given definitions of curriculum in the system of primary and secondary education (until the beginning of the process of primary school system reform in 2002) leads us to the conclusion that **curriculum represents set of defined and organized concepts (knowledge), their sequence over the period of time (content teaching) as well as knowledge transmission.**

Program(ming) and plan(ning) in kindergarten is based upon program basis from 1996. and 2006. This work observes it as developmental, dynamic process directly connected to educational practice which precedes and directs pedagogic action, but is also preconditioned with it and comes after it. Planning, as preschool teacher professional duty, is represented as creative process which respects educational requirements set by official (national) program, but it also takes special conditions under which the program is realized into account. Thus, preschool teacher places curriculum in real context and rationalizes and transforms his/her work and **re-creates** it again. We can say that **preschool teacher programs educational curriculum in kindergartens applying developmental planning.** This concept of developmental planning and programming in research work is based upon the postulates of action research and it followed spiral cycle of observation, planning, action and evaluation and it had following characteristics:

- Planning directed at the process – learning and teaching strategies
- It starts with child's inner motivation to learn
- It is based upon the method of integrated learning
- Children's interests, needs and developmental possibilities are the basis of planning
- It is based upon systematic observation and monitoring of children
- It is based upon preschool teacher self-evaluation
- It involves parents and other adults
- It is flexible and it reflects real and mutual life of a group

POSITION AND STATUS OF PHYSICAL EDUCATION IN GENERAL BASIS OF THE CURRICULUM

Basis of preschool education curriculum for children aged three to seven were defined in 1996. (as well as general basis of preschool program of preparing children for school in 2006.). They were defined more as an approach, guidelines and some kind of philosophy of education, not as a recipe according to which the program should be realized. Starting point of the curriculum is child as physical, social, cognitive and affective being who is actively involved in the process of education. Conception of the basis of preschool education curriculum is based upon humanistic idea of child's nature and development which respects child as a human being and the bearer of positive developmental potentials as well as the factor of self-development and education. Two models of the basis of the curriculum - Model A and Model B can be noticed in this conception of the basis of curriculum based upon the idea of a child as an active, interactive and creative being. Choice between **Model A – as the basis of further development of curriculum within a group and Model B – which represents already structured and developed curriculum**, can be made according to each object, group or preschool institution according to preschool teacher's (or team of preschool teachers) professional choice. If actual training practice was analyzed two approaches would be noticed. The first approach is based upon the concept of Model B, or only upon one segment of this model – planning and programming, neglecting starting points of curriculum, principles and general education goal as well. Pedagogues and psychologists label this approach as traditional. It is identified with Model B and its basis in training practice which cannot be theoretically done. In traditional approach preschool teacher represents a person who "has" knowledge, presents it to children in the previously defined way (he/she mostly uses pedagogic documentation that is being used over period of time), and child is expected to fulfill certain tasks by drills, training and system of reward. Working atmosphere based upon this approach is preschool teacher centered and it is based upon explicit instruction which apply "jug and mug" system. (Kirsten, 2001). This approach assumes that the concepts child is trying to acquire do not have their origin in child itself, but they must be presented to child so that it could acquire them later, which has certain similarities to the concepts of psychological movement – behaviorism. Thus, in some recently published references this approach is labeled as behavior approach.

"Modern approach", being completely different approach, is applied at most countries. It is based upon developmental theories of J. Piaget and L.C.Wigotsky. This approach is similar to the conception of Model A and it is called developmental approach or child-centered approach. According to Kirsten (2001) if this approach is applied, children:

- Actively learn and constantly acquire knowledge about the world that surrounds them while they play
- Go through known developmental phases
- Depend on other people with whom they socially interact in their emotional and cognitive development
- See themselves as individuals who develop at different pace

Physical Education represents interactive segment in the system of preschool education, educational field built into basis of preschool education curriculum. Its status as an educational field is defined with the basis of preschool education curriculum, i.e. with their principles and goals which are realized in mutually planned activities typical of physical education in Model A: sport-recreation, play activities and guided (motor) activities, morning exercises and recreation break in model B.

The analysis of Physical Education status in Model B shows results that connect physical education to the **goals of physical development** which imply goals of body, perceptive and health activities.

However, in Model A (even though the author of this text does not approve the label sport-recreational activities because he thinks that label physical and health activities is much more proper), physical education positively influences all fields of child's development and it is not separated from cognitive, social and emotional development. Thus, it creates conditions and stimuli equally important as it is finding out about mathematical concepts, environmental education or speech development at achieving these educational goals at the education of preschool children.

According to the author important differences between educational approach of Model A and traditional model (applied in educational practice) can be systematically presented as it is done in Table 1.

Table 1. Educational procedure in Physical Education

Traditional approach	Modern approach (Model A)
Educational procedure is planned in advance	Educational procedure is not planned in advance, it is adjusted to children's interests, needs and cognitive level
Developmental level of motor forms and abilities of each child is not taken into account	Developmental level of motor status is starting point in the creation of educational process of physical education
Basic goal is acquiring of motor forms, abilities and habits	Basic goal is to positively influence integral development of a person, movement is the source of cognition
Direct intervention of preschool teacher is the most effective	Preschool teacher's basic role is of a mediator and the one who helps children and indirectly creates conditions for individual engagement of every child
Universal "confirmed" approach for all children is applied	Individual approach
Situations and time sequences of exercises are set in advance	Meaningful use and integration of motor forms, skills and habits as means of solving real life problems is the most effective
Curriculum is set in advance with precisely defined fields of body, perceptive, health and hygiene activities	Cognitive process in Physical Education is integrated with other fields so that planned activities in the field of Physical Education are integrated with cognitive programs of other educational fields.

PLANNING OF PHYSICAL EDUCATION ACTIVITIES

Starting point for Physical Education activities planning is made of:

- Preschool education curriculum basis
- Anthropological status of a child – cognitive, affective and motorpsychological
- Developmental level of child's motor status
- Resources – material, technical, climate and geographical

Effective and efficient macro or micro planning of Physical Education Activities implies choice of motor contents (movement tasks), learning and teaching strategies (developmental tasks creation), evaluation and assessment of children's achievements, program implementing under different conditions. The author of this paper thinks that planning should be continuing developing process. Thus, preschool teacher or professional associate should follow spiral cycle in Physical Education activities planning:

- observation - getting familiar with children in order to be able to understand them in different real life situations connected with specific goals of education, scheme formation and his/her own concepts formation while gathering this information
- planning - practitioners define and plan their actions in particular contexts taking observed and evaluated details into account
- action – preschool teacher's direct and indirect interventions as well as testing of planned interventions
- monitoring and evaluation of the effects – assessment of appropriateness and efficiency of actions which represents starting point for further planning

Dynamics of four segments of planning in week plan structuring and day schedule of activites in educational practice represented the basis of educational procedure planning during five months experimental treatment. Research work represents interpretative and emancipating form of action researh applied in experimental group E which comprised 56 entities, whereas model B represented starting point for Physical Education programming and planning in control group K which comprised 49 entities. Analysis of actual situation at initial and final measurements at both groups considered: observation of motor status of preschool children aged 5 to 6 (applying 15 motor tests which define six hypothetic spaces of motor abilities and 9 motor variables which are expected to be present in second thematic field (sport-technical education) of Physical Education curriculum for the first and second grades of primary school, which define motor skills of senior preschool group aged 5 to 6. Basic dimensions of planning and programming in action research in experimental group are based upon the program basis set in 1996. and 2006, children's interests and needs, actual «real life topics» and educational goals (**independence, health care, improvement of children's body development, creativity, emotinal stability, self-consciousness, knowledge and skills acquiring** – according to Ivic, Pavlovska, 1997.), applying of a protocols of observation in the form of check lists, questionnaire for the parents and professional advice of preschool teacher or physical education accociate. Theoretic approach

based upon teaching methods to planning and programming of Physical Education of preschool children does not represent the system within which children are allowed to do whatever they want, but the main point is that **pedagogic moment of Physical Education should be moved to the contents that are children familiar with**. This kind of environment enables preschool teacher to deal with integrated topics since the learning process implies the process of mutual exchange of knowledge, ideas, skills formed at high motivational level. Learning becomes active construction of knowledge, and existing knowledge and skills become means for achieving higher levels of child's behavior and understanding. In order to justify important statistic difference between the levels of motor abilities in group E at final measurement in comparison to inital measurement, i. e. higher level of motor abilities at final measurement in group E in comparison to inital measurement, opposite to the results of motor tests in control group at initial and final measurements we have applied T-test for these specimen.(Table 2 and Table 3).

Table 2. Developmental level differences of motor abilities at initial and final measurements in experimental group

Paired Samples Test		mean	t	Sig. (2-tailed)
Pair 1	Long jump EI– long jump EF	-8.68421	-12.5	**.000**
Pair 2	Hanging on high bars EI – hanging on high bars EF	-2.63702	-6.57	**.000**
Pair 3	Sit-ups EI – sit-ups EF	-2.31579	-12.9	**.000**
Pair 4	Moving forward on inclined plane EI– moving forward on inclined plane EF	.09772	1.38	.173
Pair 5	Throwing medicine ball EI – throwing medicine ball EF	-23.15789	-15.6	**.000**
Pair 6	Arm tapping EI – arm tapping EF	-1.21053	-5.31	**.000**
Pair 7	Winding run EI – Winding run EF	.39737	4.72	**.000**
Pair 8	30 m run EI- 30 m run EF	.07719	1.94	.057
Pair 9	10 m run EI – 10 m run EF	.07789	4.37	**.000**
Pair 10	Forward bent EI– Forward bent EF	-1.96491	-4.92	**.000**
Pair 11	Walking on the balance beam EI- Walking on the balance beam EF	3.98175	7.23	**.000**
Pair 12	Throwing the ball at the wall EI – throwing the ball at the wall EF	-2.05263	-9.38	**.000**
Pair 13	Rolling the ball around the hoop EI - rolling the ball around the hoop EF	.76158	2.96	.004
Pair 14	Throwing the hoop onto the stick EI - throwing the hoop onto the stick EF	-.10526	-.903	.370
Pair 15	Rolling the ball under the chair EI - rolling the ball under the chair EF	.05263	.402	.690

Obtained results show statistically important difference between the results of motor tests of experimental group at initial and final measurements at the level p=0,01 which was noticed in the following motor tests: **long jump, hanging on high bars, sit-ups in 20 seconds, throwing the medicine ball, arm tapping, winding run, 10 metres run, forward bent on the bench, walking over Swedish bench, throwing the ball at the wall.** In comparison to these results, data from the Table 3 show statistically important difference between initial and final measurements in control group at only two measurements: **long jump and throwing the medicine ball.**

Table 3. Differences at developmental level of motor abilities at initial and final measurements in control group

Paired Samples Test		mean	t	Sig. (2-tailed)
Pair 1	Long jump KI – long jump KF	-2.081	-3,66	0.01
Pair 5	Throwing the medicine ball медицинке KI– throwing the medicine ball KF	-4.20	-4,44	0.00

Results presented at the Tables 4 and 5 show that statistically important differences (at the level of significance of 0,01) can be noticed between control and experimental group at initial measurements at the results that define motor abilities: forward roll, in comparison to final measurement when statistically important differences were stated between control and experimental group at following abilities: moving left and right hanging on high bars, cat's hop, small scale, high jump and elevation jump. Statistically important differences at the level of significance of 0,05 were noticed at final measurement in the results of motor forms – walking on the balance beam, 180° turn and hop down.

Table 4. Differences at the level of adoption of motor skills in control and experimental groups at initial measurement

Independent Samples Test	F	t	Sig. (2-tailed)
Forward roll -mark 1	.585	4.791	.000

Table 5. Differences at the level of adoption of motor skills in control and experimental groups at final measurement

Independent Samples Test	F	t	**Sig. (2-tailed)**
Hanging on high bars - mark 2	1.029	-3.967	.000
Forward roll – mark 2	.361	-2.238	.027
Children's hop – mark 2	.063	-1.226	.223
Cat's hop-mark 2	7.808	-8.904	.000
Small scale – mark 2	.297	-4.738	.000
Walking – turn – hop down (balance beam)-mark 2	2.210	-3.183	.002
Ball dribbling – mark 2	.180	2.397	.018
High jump-mark 2	.826	-4.360	.000
Elevation jump –mark 2	.007	-4.005	.000

END NOTES

Different kinds of debates and discussions on mutual relations between Models A and B and Physical Education curriculums have always been present in media and scientific conferences when improvement of education system of the Republic of Serbia has been discussed. Confrontation of different approaches and ideas, as well as different points of view and arguments which form Physical Education curriculum should enable better insight into cognitive process, as well as problem realization and solving, reconciliation of differences, critical questioning, consciousness about individual knowledge in both theory and practice of preschool education. However, professional discourse usually tends to assure pedagogic public that one model is predominant, better and the right one. The author of this paper thinks that accepted conception of the program points out that this debate about one or two models is not necessary and that solution can be found in mutual standards and basis of the program that ensure quality of life in kindergartens, diversity of working models, as well as in the possibility that each institution has its own authentic model which is **actively developed in real action.** The nature of this solution points at action method, research that enables authentic model development and improvement. System of Physical and Health Education as pedagogic field (of both models), in entire educational work, planning and programming within monthly, weekly or daily planning, with its structure and dynamics of physical activities as generic act, should enable children to find out more about themselves, their skills and abilities, as well as to discover the world around them and acquire knowledge about it applying practical activities and previous experience. Thus, it is confirmed that modern concept of Physical Education at preschool age is not based only upon body, perceptive and health hygiene development, but also upon acquiring of new motor forms, skills and habits, as well as upon improvement of children's morpho-functional abilities and upon physical education, motor activity as **generic act, way of finding out more about the world**, but also upon **motor activity that does not represent the goal in itself,** but the basis of children's integral development.

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PARENTS' LEVEL OF EDUCATION AS A FACTOR OF DEVELOPMENT OF MORPHOLOGICAL DIMENSIONS AND MOTOR SKILLS IN SEVEN-YEAR-OLD CHILDREN

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Introducing the problem

Family as a community of parents and children is an important factor in all developmental stages of a child. The multiple attachment between family members, and especially strong emotional attachment makes the influence of a parent on the child's development particularly strong, especially in preschool age. The influence of the socio-economic status of the family on the child's development has been more thoroughly researched since the fifties, and it started a little later in our environment. Many researchers of this area in developed countries of western Europe and America agree that socio-economic status does not show the same influence in different developmental stages of a child. They have found that socio-economic status shows a much lower influence in the child's prenatal period and in the first six months of life. Later, this influence grows significantly till the sixth year of age (Horvat, 1986, 46).

Researches indicate the influence of the family socio-economic status on the development of intelligence, while there is scarce, if any, empirical research on the influence of the family socio-economic status on the physical and physical skills development of children of preschool and school age.

The problem of the role of the social environment in the child's psychical development has been relatively well researched in our country as well. The influence of the socio-economic status on the psychical development of the child and its school achievements has been researched in our country by I. Tolicic, E. Kamenov, B. Stanojlovic, I. Ivic, L. Horvat, R. Nikolic and others.

The studies which look into the population of seven-year-olds in respect of the influence of the socio-economic status on the child's physical and motor-skill development are empirically insufficient although to-date theoretical researches show that there are great differences in the cultural level of families and that these differences have a great impact on the development of psychical and physical capacities of a child, i.e. that they affect the complete personality development. The importance of socio-economic conditions influence on the man has also been recognised by the World Health Organisation defining health as a state of psychical, physical and material well-being. The physical and psychical development does not only depend on the heritage (biological factors) and learning, but also on the social and economic environment in which an individual and the whole community exist. All changes in the social and economic environment of an individual, family or a nation have impact on a child's health and its physical development. The social and economic influences cause significant changes in an individual's health, which can be easily determined and measured. It is known that health is born and developed in the breadth of social relationships and is specifically marked depending on them. The favourable influence of the family economic status on the increase in morphological characteristics of children, especially in their bodily height and weight was proved by Zelner, who observed children from Wrozlaw, divided in three groups based on the economic status all the way back in 1925. A lot of researches show that socio-economic conditions, observed nation-wide, affect children's physical growth at the time of warfare. The longitudinal researches of Russian authors, mentioned by Ugarkovic, are interesting. They observed a social community (the village of Gluhovo in Moscow area) for almost 70 years and reached the conclusion that morphofunctional characteristics of children imporved with the improvement of the life standard. This research led into later generally accepted theory of the "developmental acceleration" of the human race (1996, 21-2).

As many research results show, the developmental characteristics of children are changeable depending on the overall influence of the environment which they grow in, and especially on the child care and upbringing. The findings show that on average, today's six-year-old children are 7cm taller and 3kg heavier that their peers 40 years ago. The phenomenon of the faster development (acceleration) is noticeable not only in the sphere of physical development, but in psychical and especially mental development as well (Vagner and Muhina, according to: Kamenov, 1997, 23). On the other hand, the phenomenon of acceleration in morphologically-somatic respect can result in a reduced level of motor skills. The results obtained in the research of S. Ivanic

indicate differences in morphological and motor development. Namely, he found a great connection between certain morphological and motor indicators in both genders, but with a negative influence, which suggests a disproportion between the levels of physical development and the level of motor skills in some observation phases. He also noticed that the respondents of young school age, who had high results in the primary indicators of physical development, have poorer results in motor tests, which proves that the growth acceleration is not a sufficient quality in itself if it is not followed by a corresponding motor, psychical and social level of development (1997, 327-8).

According to the research by Dorothy Rogers, physical development and special motor activities influence cognitive and social development (Mandic, 1988, 456), so based on this interrelation we can conclude that better socio-economic conditions in a family have a positive influence on the growth and development of children in general and their motor skills development. However, for this influence to be determined, it has to be measured and compared.

RESEARCH

Subject of research

The subject of the research is the relations between the indicators of family social status and of the physical development in seven-year-olds (morphological dimensions and motor skills). Therefore, the research was primarily supposed to estimate the physical development of seven-year-olds based on morphological and motor indicators and to answer the question whether and to what extent the parents' level of education influences the physical development of seven-year-old children.

Research aims, tasks and hypotheses

The aim of the research was to collect scientific data that would help in the following:

To estimate the physical development of seven-year-old children based on the researched indicators of morhological dimensions and motor skills.

To determine if and how much the parent's level of education as a developmental factor influences the development of morphological dimensions and motor skills in seven-year-old children.

The concretisation of the aims of the research led to the following research tasks:

Data collecting by measuring:

- anthropometric dimensions – indicators of morphological growth: bodily height, weight and corporal composition components (osteomuscular and fatty tissue);
- motor skills – indicators of speed, trimness, arms strength, legs strength and general strength;

Collecting data on the parents' level of education as a factor supposed to influence the physical and motor-skill development of seven-year-olds.

Hypotheses

Based on the defined subject of this paper, the following hypotheses have been offered:

It is assumed that morphological dimensions and motor skills in seven-year-olds are an important component of their physical development.

It is assumed that there is an interrelation bitween the indicators of morphological dimensions and motor skills in seven-year-olds (i.e. their components) and the parents' level of education.

Research methods, techniques and instruments

The following kinesiological research techniques were applied:

- morphological status assessment technique (anthropometric measuring of morphological dimensions were done based on the method recommended by the International biological programme (J. Njeiner, J. Lourie, 1969) and the measuring and assessment of corporal composition according to Mateika, which includes the measuring of 16 anthropometric parameters for the calculation of indirect variables of corporal composition (osteomuscular and fatty tissue, fat-free component and the residiuum)
- motor status assessment techniques – a battery of motor-skill tests was applied for the age from 5 to 7 years, according to the description and instructions of S.Ivanic's methodology (1996, 81-85). The battery contains five motor-skill requirements for the assessment of: leg muscles explosive strength, upper extremities strength and endurance; general strength; trimness and general speed capacity.

- In the stage of data collection in relation to the parents' level of education as a factor of the physical development of seven-year-olds, a questionnaire was applied.

Respondents sample

The population which the research sample was taken from were seven-year-old children. The research included healthy children without physical anomalies, 141 children in all. The number of boys and girls included in the sample was approximately the same.

Data treatment mode

The data collected through the research (with the mentioned instruments) were treated by means of a computer. The research results are shown in table format. The complete statistical data treatment was done in a PC using the SPSS programme.

RESULTS OF THE RESEARCH

Interpretation, analysis and discussion of the indicators of morphological dimensions and motor skills in seven-year-old children

Table 1. Descriptive statistical indicators of morphological dimensions in seven-year-old children

Morphol dimensions	No. of respon.	M	δ	SK	KU	Min. value	Max. value
BH (cm)	141	124,07	4,95	-0,006	0,542	108,00	139,30
BW (kg)	141	23,550	3,85	1,061	1,514	16,00	36,50
O (r)	141	4951,51	682,70	0,339	0,274	3406,67	7159,19
O (%)	141	21,16	1,78	-0,042	0,196	16,93	25,38
D (r)	141	4129,68	1952,03	1,870	3,694	1936,35	12538,86
D (%)	141	16,98	5,30	1,420	2,536	8,84	39,80
M (r)	141	9555,61	1643,31	0,719	0,970	6127,12	14877,65
M (%)	141	40,61	2,93	-1,861	11,766	22,00	49,43
LBM (r)	141	19403,27	2552,72	0,962	3,133	13764,22	31448,86
LBM (%)	141	82,91	5,37	-1,369	2,257	60,20	91,16
R (r)	141	4896,00	1245,80	1,339	9,263	625,40	11464,68

Table 2. Presence of corporal composition components in seven-year-old children in percentages

Tissues	Boys (%)	Girls (%)
Osseous tissue	21.56	20.76
Fatty tissue	16.17	17.76
Muscular tissue	40.24	40.97
Residiuum	21.72	19.86
Total	99.69	99.35

The study of the developmental level of the morphological status of children before they start school, which was done based on the analysis of the numerical indicators of bodily height, weight, osteomuscular and fatty tissue, shows average results of the researched parameters (table 1) within an expected range of values, i.e. the average values do not deviate significantly from the results in previous similar researches, both in our or foreign literature. However, in the sample itself there are certain discrepancies in average values of certain morphological parameters, which are evident. With the indicators of fatty tissue and muscular tissue, a great range of the found average skewness and kurtosis values indicate that the target group is rather heterogeneous in these values. We shall attempt to explain the results found. The found average fatty tissue value of 16.98%,

and the fact that as many as 126 (89.4%) children belong to the group of the average or above the average indicates that children are adipose in their composition. Such situation in the percentage of the fatty tissue has also affected the percentage of the muscular tissue and the children's heterogeneity according to the percentage of this tissue. This phenomenon can be explained, among other things by the estimation and measuring of both fatty and muscular tissues. Due to the insufficient differentiation between these types of tissues as a result of the maturing developmental characteristics, it was difficult to make clear distinction between the two kinds of tissue despite the fact that the measuring process was performed by an expert anthropologist.

The average values of all researched values of morphological status dimensions provide important information on the morphological status of the tested seven-year-old children. The research has resulted in the average values in the children of the a.m. age, so that the data from the analysis of the corporal composition of seven-year-old children are now made publicly known for the first time (no similar research is familiar in the literature).

Thus the researched urban children of seven years of age show the following average values:

- heights 124,07 cm
- weight 23,55 kg and they have
- 4951,51 g of osseous tissue or 21,16%
- 9555,61 g of muscular tissue or 40,61 %
- 4129,68 g of fatty tissue or 16,98 %

Based on the average values found we can conclude that the researched morphological characteristics in the tested sample are mainly average and above average, and that seven-year-old children are morphologically mature and physically developed.

The results of the descriptive indicators of motor-skill parameters are shown in table 3.

Table 3. Descriptive statistical indicators of motor skills in seven-year-old children

Motor skills	No. of respondents	M	δ	SK	KU	Min. value	Max. value
Flop high jump Max. 120s.	141	16,90	13,67	1,586	2,260	0,10	61,00
Double-arm long jump	141	109,93	17,04	-0,210	0,130	60,00	157,00
1kg medicine ball shot	141	199,92	49,97	1,032	2,622	90,00	400,00
Bench press	140	21,08	5,90	0,078	0,099	6,00	39,00
30m flying start running	141	7,51	1,03	0,902	1,814	5,60	11,10

The estimation of the motor status developmental level in seven-year-old children was made by means of five requirements based on which elementary motor skills were assessed in the tested children. They include: the upper and lower extremities strength; general strength; trimness and speed. Analysing the results that we found and the statistical indicators of each separate motor characteristic, we can conclude that there are marked differences in some of the average values (table 3).

The measured strength of upper extremities (arms and shoulders) gives us the right to state that the results achieved in this requirement are rather poor.

The strength of lower extremities is well developed in the researched children, according to the values found and statistical indicators analysed.

General strength as an essential physical feature is well developed in the researched children.

The average values found in respect of trimness and elasticity enable us to state that they are well developed and manifested in most researched children.

The motor-skill requirement of 30m flying start running helped us estimate the speed of the tested children and based on the analysed statistical data, we can say that speed as an essential physical capacity corresponds on average to the highest age level.

Family social status and the indicators of morphological dimensions and motor skills in seven-year-old children

The problem analysed as a social status indicator was based on the parents' level of education.

Parents' sample structure according to the mother's educational qualifications

Educational qualifications	No.	%
Certif. of primary education	8	5.7
Certif. of secondary education	100	70.9
Vocational of academic degree	33	23.4
Total	141	100

Parents' sample structure according to the father's educational qualifications

Educational qualifications	No.	%
Certif. of primary education	8	5.7
Certif. of secondary education	98	69.5
Vocational of academic degree	32	22.7
Total	138	100

Table 4: Educational qualifications of the mother and morphological dimensions of seven-year-olds

Morphological dimensions	Mother's qualificat. (school)	No. of respond.	M	δ	F-test	Redund.	Delta gravity
Bodily height	основна	8	119.71	4.71	3427	2	0.035
	средња	100	124.26	5.12			
	виша и висока	33	124.53	4.04		138	
Bodily weight	основна	8	20.81	1.75	2502	2	0.086
	средња	100	23.57	4.00			
	виша и висока	33	24.16	3.50		138	
Osseous tissue	основна	8	21.13	1.54	0.383	2	0.682
	средња	100	21.23	1.83			
	виша и висока	33	20.33	1.70		138	
Fatty tissue	основна	8	17.87	3.40	1092	2	0.339
	средња	100	16.56	5.14			
	виша и висока	33	18.04	6.05		138	
Muscular tissue	основна	8	39.66	4.39	0.579	2	0.562
	средња	100	40.60	2.96			
	виша и висока	33	40.90	2.45		138	
Fat-free component	основна	8	80.37	4.54	1.913	2	0.152
	средња	100	83.43	5.14			
	виша и висока	33	81.95	6.05		138	
Residiuum	основна	8	4045.06	1272.21	2.931	2	0.056
	средња	100	5014.76	1260.30			
	виша и висока	33	4742.42	1128.09		138	

The results of the research (table 4) indicate that the educational level of the mother as a separate variable of the socio-economic status of the family has influence on some parameters of growth and development of seven-year-old children. The variance analysis showed that the differences between the mother's educational level groups and the parameters of bodily height and the residiuum – the components of the corporal composition, are not accidental but rather significant. The F-test values of the bodily height F=3427 with 2 degrees of redundancy between the groups and 138 degrees of redundancy within the groups and the п=0.035 and the F-test values of the residiuum F=2931 with 2 degrees of redundancy between the groups and 138 degrees of redundancy within the groups and the п=0.056 indicate a difference which is statistically important. Close to the statistical importance are also the F-test values of the parameter of bodily weight F=2502 with two degrees of redundancy between the groups and 138 degrees of redundancy within the groups and the п=0.08, which indicates a difference between the groups, i.e. that the educational level of the mother is in a certain sense connected with the childs bodily weight.

The influence of the father's educational level on the development of the morphological dimensions in seven-year-olds was not found, which means that there is no significant interrelation in respect of the father's educational level and morphological dimensions.

Table 5: Educational qualifications of the mother and motor-skill dimensions of seven-year-olds

Motor dimensions	Mother's qualificat. (school)	No. of respond.	M	δ	F-test	Redund.	Delta gravity
Flop high jump	primary	8	10.47	6.45	1679	2	0.190
	secondary	100	18.10	14.25			
	college and academy	33	14.78	12.69			
Double-arm long jump	primary	8	93.12	9.74	4824	2	0.009
	secondary	100	111.75	17.13			
	college and academy	33	108.51	16.08			
Medicine ball shot	primary	8	167.5	48.91	2029	2	0.135
	secondary	100	200.25	46.66			
	college and academy	33	206.81	57.91			
Bench press	primary	8	22.37	5.97	0.381	2	0.684
	secondary	100	20.82	6.07			
	college and academy	33	21.54	5.47			
30 m running	primary	8	7.66	0.92	1003	2	0.370
	secondary	100	7.43	1.08			
	college and academy	33	7.41	0.87			

Table 6: Educational qualifications of the father and motor-skill dimensions of seven-year-olds

Motor dimensions	Father's qualificat. (school)	No. of respond.	M	δ	F-test	Redund.	Delta gravity
Flop high jump	primary	8	16.02	13.75	1.343	2	0.264
	secondary	98	16.20	12.69			
	college and academy	32	20.55	16.51			
Double-arm long jump	primary	8	106.87	13.01	3.384	2	0.037
	secondary	98	107.81	16.63			
	college and academy	32	116.59	18.40			
Medicine ball shot	primary	8	200.12	61.67	0.072	2	0.931
	secondary	98	198.92	47.23			
	college and academy	32	202.34	57.22			
Bench press	primary	8	19.50	6.88	0.303	2	0.739
	secondary	98	20.93	6.09			
	college and academy	32	21.20	5.37			
30 m running	primary	8	7.23	0.58	0.352	2	0.704
	secondary	98	7.46	1.04			
	college and academy	32	7.56	0.89			

The research results (Tables 5 and 6) show that the educational level of the mother and father is connected with the development of some motor skills in children. It was found that the strength of the lower extremities is determined according to the educational level of both mother and father. The difference at the level of 0.009 is significant for the double-arm long jump motor requirement. It is important to point out that the difference between the first and the second groups is at the level of 0.006, whereas between the first and the third groups it is at the level of 0.04 in favour of mothers with college or academic degree. The influence of the father's educational level in respect of the same motor requirement results indicates a significant difference at the level of 0.05 in favour of college and academic degree.

Conclusions

The presented results, their analysis and discussion lead to the most important conclusions.

The data collected by the estimation of the morphological status in seven-year-old children proved to be similar to the results found in previous similar researches on the samples chosen in the population of our and foreign children in respect of bodily height and weight indicators. When the corporal composition components are concerned, such as: osteomuscular and fatty tissues (whose values are researched for the first time at the age of 7), the values found contribute to the evaluation of the children's morphological status.

When the estimation of **motor skills** in children is concerned, which includes the upper and lower extremities strength, general strength, trimness and speed, the results show that there are significant differences between their indicators. The upper extremities strength of the tested children is fairly poor, the general strength and speed are average, while the testing of their trimness and elasticity showed good results.

When the family educational level is concerned as a factor of morphological dimensions and motor skills development, the problem which appeared during the research was the fact that, due to the general poverty of our society, the educational level of parents as a social status indicator is less reliable than in other countries where the social status is more dependant on the educational level. However, it can be assumed that the parents' education in itself partly determines their behaviour towards the children, i.e. the success of the parenthood in respect of the contribution to children's growth and development. What is particularly interesting in our findings is the fact that unlike with the father's educational level, where there is no connection with the morphological development indicators, this interrelation was found in the case of mothers, i.e. the bodily height and the residiuum, and partly the bodily weight, too, are dependant upon the mother's level of education.

With reference to motor skills, the findings show that the strength of lower extremities is connected with the educational level of the mother and the father. Speculating on the results found, all that remains is to assume that the mother's educational level is more connected with the physical development indicators in children because mothers, in general, take more care of children in our culture, especially in connection with children's nutrition, care, hygiene, health and other categories, which undoubtfully have impact on the physical growth and development. This assumption found its statistical confirmation in the comparison between the growth indicators and the mother's educational level. It seems logical, then, to assume that mothers with higher degrees of education take better care of the mentioned children's needs, which certainly calls for yet another research.

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THE RELATION BETWEEN CLASSROOM FURNITURE AND BODY HEIGHT IN OLDER SCHOOLCHILDREN

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INTRODUCTION

Studying living conditions, especially schooling conditions, in which a child spends most of his/her day, is what many authors are focused on. Their research is mostly aimed at studying the design of school furniture – ergonomics, i.e. at studying the relation between the height of a student and the height of classroom furniture, well-designed, anatomically adjustable furniture that by all means has a great effect on formation of a proper body posture, as it certainly affects the occurrence of a bad posture and back pain (2).
In most cases adolescent population experiencing back or neck pain, or shoulder tension come from the families whose members have similar symptoms. This is often ascribed to the influence of stress or modern lifestyles, or as it is frequently stated, to the type of job people have. However, the study that dealt with the analysis of 400 magazines addressing this problem gave the results which assert that the root of the problem above all lies in the fact that children spend too much of their time sitting (6). They also see a chance for overcoming the problems caused by bad posture by bringing the initiative back to schools.

Ergonomists, physiotherapists and health workers are very well aware of the fact that improving the posture at an early age is essential for proper and healthy development of muscles and a skeleton. Furthermore, they strongly emphasize that dimensions of classroom furniture which the children of different heights are supposed to use for sitting haven't been changed in the last 30 years.

Back pain symptoms can be the consequence of different factors. The research conducted on a sample including 1269 adolescents was designed to determine the relation between different back pain symptoms, as well as the correlation between anthropometric dimensions of adolescents and the *dimensions* of classroom furniture. It was assumed that students who were too tall or too short for the standard classroom furniture would have a higher level of incidence when compared to students who are perfectly fit for the furniture as far as their height is concerned. The results showed that classroom furniture suited most the students who were classified as the shortest ones. The examinees experiencing the reported back pain belonged to a group of tall students (3).

What is ergonomics? The word *ergonomics* derives from two Greek words: *ergon*, meaning work, and *nomoi*, meaning natural laws. Combined they create a word ergonomics that is defined as the science of work and a person's relationship to that work. Ergonomics is a discipline whose application is focused on making products comfortable and efficient for the user. It is sometimes defined as the science of adjusting the work to the user instead of forcing the user to adjust to the work. However this is more a primary ergonomic principle rather than a definition (1).

The fact that ergonomics plays an important role and is widely applied to designing classroom furniture that fits students is supported by the study carried out in Taiwan addressing the ergonomic designing of desks and chairs for elementary school students on the basis of anthropometric characteristics of students (5). The study shows that based on the anthropometric characteristics of students in Taiwan different body types among student were determined. 10 types of desks and 5 types of chairs of different area and height were determined that every school should have. Three groups were established: "extreme design", intended to be used in cases of extreme body types, such as extremely overweight, underweight, tall and short; "average population and adjustable design" intended for normal population which in fact does not exist; "design for average population" who do not feel comfortable in extreme or adjustable design. The authors recommend an ideal desks and chairs design, along with the way to use them at all ages and in all schools. The furniture is easy to combine and adjust to all ages and different programs and working activities. This study might be an indicator of how to combine ergonomics and anthropometric characteristics in designing and production of classroom furniture.

The level of comfort the students have in classes refers not only to the ergonomics of classroom furniture, but also to the ergonomics of the entire classroom: temperature, noise, light, but also the dimensions of chairs considering the anthropometric measurements (4). The results of this research carried out in Brazil, show that school chairs do not meet the technical s*tandards* prescribed by the *Brazilian Association* of Technical *Standards, and therefore do not fit the* anthropometric measures of students. 82.54% examinees were found to

have one or more types of pain localized in the area of cervical spine (35.71%) and in the area of lumbar spine (35.24%). The examinees feeling pain (60.32%) said that it was caused by extracurricular activities. The authors conclude that a school chair is the main factor in the analyzed reasons for discomfort and that the influence of other factors is not particularly significant (light, temperature and noise) for the classroom comfort.

METHOD

The object of this paper is the transversal analysis of relation between the body height of a student and the height of a chair, as well as the assessment of relation between the height of a school desk and that of a school chair which provides proper sitting for the students.

The aim of the research was to determine the ergonomics of classroom furniture, in other words to decide whether the height of a school desk and that of a school chair at/in which students spend most of their time actually fits their body height.

While sitting in classes students should keep their feet flat on the floor. They should be sitting at a *90° angle* to the chair. Hence, in order for a chair to perfectly fit a student (ergonomics), its height should be equal to the length of the student's shinbone, - knees should be no higher than hips - i.e. the height of a chair should amount to 28% of a student's height. This way good relation is established between the segments of the body, so that body posture is in a proper position.

Proper sitting is also determined by the distance between the edge of the seat and the inner side of a school desk (difference). When sitting in a proper position, the angle between the main body and the thigh should be 110°. Hunched back, the body slumped forward, shoulders bent forward (rounded shoulders), a slouching position are all the characteristics of a bigger or smaller differences.

The sample examinees were students of both genders, 72 girls and 57 boys from Novi Sad, aged 12.5. The variables selected in this paper were as follows:

- Body height
- Ergonomics (height) of a chair
- Difference between the height of a school desk and of a chair.

Body height of students was measured by means of anthropometry in PE classes. The assessment of the seat height and the relation between the height of a school desk and of a chair was done visually, using 0, 1 and 2 as marks for the assessment, done in regular classes. Observing and assessing the angles between certain body segments (thigh to calf; thigh to the main body), it was determined whether the student sat in a proper position with respect to the height of a chair and differences between the height of a school desk and of a chair.

The height of a school chair was determined in a following manner:

- mark 0 – stands for a chair that fits student's needs; the angle between the thigh and a calf is 90°, which indicates that the calf stands vertically to the floor; feet are kept flat on the floor;
- mark 1 - stands for a chair that is too deep: the angle between the thigh and calf is less than 90 degrees when the calf is positioned vertically to the floor;
- mark 2 - stands for a chair that is too high: the angle between the thigh and calf exceeds 90 degrees when the calf is positioned vertically to the floor; feet are not kept flat on the floor.

The difference between the height of a school desk and of a chair was assessed in the following manner:

- mark 0 – indicates a good difference: the angle between the thigh and the main body is 110 degrees approximately; the student easily leans on his hands and a lower part of the forearms;
- mark 1 – indicates a bad, small difference: the angle between the thigh and the main body is less 110 degrees; the body slouches, bends forward;
- mark 2 – indicates a bad, big difference; shoulders are raised, forearms are set apart and are not vertical to the desk.

The estimation of the ergonomics of classroom furniture was done on the basis of variable frequency, descriptive characteristics of the variables. In order to determine the differences in arithmetic means between the ergonomic categories of a school chair based on the body height, a univariate analysis of variance (ANOVA) was used.

RESULTS AND DISCUSSION

The table 1 shows the variable frequency - ergonomics (height) of a chair. The students were classified into three categories based on whether the height of a chair fitted them (0), whether it was too deep (1) or too tall (2). The results show that the height of a chair fitted half of the examinees. Among the examinees, the number of those that found the height of a chair ill-fitting was 52.7%, out of which 46.5% said the chair was too short whereas 6.2% found the chair too high.

Table 1. The variable frequency - ergonomics (height) of a chair

Category	Mark	Frequency	Percentage
Fits	0	61	47.3
A short chair	1	60	46.5
A high chair	2	8	6.2
Total		129	100.0

The fact that students at this age are facing a critical period of their growth and development when it is specifically important to take care of proper sitting in classes, for half of the students this is an impossible thing to do because they are hindered by the height of a chair. Apart from this, classroom furniture is badly designed, unadjustable and very old. Under such circumstances where half of the students spend most of their day sitting in the classroom using school furniture that does not fit them, it is impossible to expect full and constant participation from them in classes.

The table 2 shows the difference between the height of a school desk and of a chair. The results indicate that for most of the students (59.7%) this is a good difference. However, the percentage of those who find it unsuitable (small or big) is high (40.3%). A small difference was found with 36.4% of the students, which means they do not keep their body in a proper sitting position, but in a bent forward position, which causes rounded shoulders, kyphotic posture or rounded back. This kind of bad posture is also very tiring and causes back, leg and shoulder pain, as well as poor blood circulation. All of this, naturally, influences changes in the development of internal organs.

A big difference between the height of a school desk and of a chair occurred in case of 3.9% of the students. They sit with their shoulders raised, with the forearms not *close* and parallel to *one another* and not in a vertical position. This position is rather exhausting, it impairs concentration and causes back and shoulder pain.

Table 2. The variable frequency – difference

Category	Mark	Frequency	Percentage
A good difference	0	77	59.7
A small difference (bad)	1	47	36.4
A big difference (bad)	2	5	3.9
Total		129	100.0

Table 3 shows the basic statistics of the height of the examinees. The results show that at this age, within this sample of the examinees, the difference in height is considerably big. The shortest examinee is 134.00 cm tall, whereas the tallest one is 183.00 cm tall. The average height of the examined population is 154.00 cm. Most students are 155.00 cm tall.

Table 3. The basic statistics of the height of the examinees

Number of the examinees	129
Arithmetic mean	154.00
Median	155.00
Mode	155.00
Minimum	134.00
Maximum	183.00

Median - the "middle" value in the height variable; Mode - the value that occurs most often; Minimum – the lowest value; Maximum - the highest value.

Table 4. The results of the univariate analysis of the variance for the variables: the ergonomics of a chair and body height

Category	N	AS	MAX
A good chair	61	150.14	164.00
A low chair	60	159.03	183.00
A high chair	8	145.75	168.00
Total	129	154.00	183.00

F=26,543 p=0.00

Table 4 shows the results that describe the relation between the body height (arithmetic mean) of an examinee and the height of a chair. The criterion used to form the groups was the assessment of the seat height (ergonomics), based on which three groups were formed: a good, short and high chair. For data processing the univariate analysis of the variance was used. There is statistically significant difference at the significance level of p=0.00 between the mean values of the body height among the students who do not find the chair suitable, those who sit on a high chair and those who sit on a short chair. The results indicate that the most fortunate students are those who fall within the group of average height because they sit on a chair that fits them. Chairs do not fit tall students, i.e. the chairs are too low for these students who represent half of the total number of students. A chair is too high for 8 students only.

The fact that half of the students sit in chairs that do not fit them implies the need for introducing changes based on anthropometric characteristics of the students. Of course, there is a solution and it is to be found in at least three different dimensions of a chair (according to the ISO standard), for one dimension (higher and lower).

CONCLUSION

The fact that other countries also face and have to deal with the problem of inadequate classroom furniture has been proved by the researches on ergonomics and their design. Based on the results of overall researches, on a state level some countries manage to actively participate in bringing about the changes in standards regarding the introduction of newly designed and adjustable furniture into classrooms.

Based on the evidence presented here as a result of this research, the population of the twelve-year-olds is where we find extremely tall (183.00 cm) and extremely short (134.00) students and therefore, it comes as no surprise that a substantial degree of mismatch between the students' bodily dimensions and the classroom furniture was found here. Owing to the prolonged periods spent seated during school, students are forced to sit in chairs with seats that are too high or too deep. Furthermore, the desk/chair combination, i.e. desk and seat heights are inadequate for half of the students who are, thus, forced to use improper sitting posture. This, naturally, has detrimental effects on healthy growth and development of students as well as on bad posture, which is becoming increasingly evident. Bringing chairs and desks of different dimensions into one class would be a short-term solution, but in our conditions it may be the only one.

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THE REALIZATION OF PHYSICAL EDUCATION IN THE CLASSROOM

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Introduction

The existence of sport halls for realization of physical activities in schools has great significance, while almost half of classes' total number realizes in them. Condition regarding presence of these objects in school practice on the territory of the Republic of Serbia varies. In author's (*Nikolić S. 2002*) research, regarding sample of 926 elementary and secondary schools in the territory of the Republic of Serbia, the results have shown that 31,43% of schools did not have any sport halls. Thereof, 12,20% realize physical practice in classrooms, adapted rooms or hired objects.

Observing schools both in city and rural areas, in average, there are more favourable conditions for practice in town schools than in schools in rural areas. In rural areas, around 43% of schools have no adequate conditions for work, 13% of them realize physical practice in the classrooms, and around 4% of schools realize their physical practice in adapted rooms. In town areas, about 3% of schools use classrooms for realizing physical practice, while 0,7% of them use adapted room as a place for realization of physical education.

Last few years has been activating on investment and improvement of working conditions in schools. Within projects ratified by National Investment Plan, there are also projects for building, adaptation and reconstruction of school objects for physical education. Those assets in year 2006 had amounted 1.000,16 thousand dinars, while in 2007 had been assigned the assets of 4.030,80 thousand dinars.

If continues this kind of investment trend in the future, material conditions in physical education will improve obviously. However, so far as all necessary conditions do not fulfill, many schools will furthermore work in meager conditions (as they worked till now). Agreeable with that, such state should accept only as a mommentary necessity, while in future period we have to seek for solutions which would give better results in the practice.

1. Content of physical education and possibility of its realization in the classroom

It is certain that major professors meet in their practice with realization of physical activity in the classroom, whether temporary or constantly. In regard to previous research, there are two types of classrooms in which physical activities realize most often:

- *Classrooms in which realize physical education among other educational activities.* Such rooms are totally non-adjusted and require of pedagogues and pupils to engage additionally before beginning of the class to create adequate conditions, i.e. to adjust the room to the class requirements;
- *Classrooms which use exclusively for realization of physical education.* Such room is partly adjusted to needs of physical activities within there are some of equipment and requisites which can use in those conditions. Those classrooms are often adapted, and hardly bigger than standard classrooms.

It is known that teacher, in such conditions, has to plan adequate work organization by selecting content in regard to disposable room and other conditions (number of children, requisites etc.). Which contents and working forms will teacher use, depends mostly on current circumstances and also his/her skill.

With children of younger ages, the selection of program content, which realization can adjust to necessary conditions of classroom work, is wider. *(Table 1.a. and Table 1.b).*

Table 1.a. Programme content in elementary schools

Elementary school	I grade	II grade	III grade	IV grade
Possible realization of programme contents	Walking, jumping, jumping over, throwing and catching, raising and carrying, pushing and pulling, pulling and climbing, exercises with requisites, balance practices, rhythmic practices and national dance.	Walking, jumping, jumping over, throwing and catching, raising and carrying, pushing and pulling, pulling and climbing, exercises with requisites, balance practices, rhythmic practices and national dance.	Jumping, jumping over, practices on the floor, throwing, raising and carrying, pushing and pulling, pulling through, climbing, exercises with requisites, balance exercises, rhythmic gymnastics, national dance.	Rhythmic gymnastics, national dance
Partial realization of programme contents	Elementary practice, exercises on the floor.	Elementary practice, exercises on the floor.	Elementary practice, exercises on the floor.	Exercises on the floor
Impossible realization of programme contents	More (sport bar), running (sprint)	More (sport bar), running (sprint)	Athletics, exercises on various devices, team games.	Athletics, exercises on various devices, team games.

Table 1.b. Programme content in elementary schools

Elementary school	V grade	VI grade	VII grade	VIII grade
Possible realization of programme contents	Dance, exercises on the floor.	Dance, exercises on the floor	Rhythmic exercises, dance.	Rhythmic exercises, dance.
Partial realization of programme contents	Rhythmic gymnastics.	Rhythmic gymnastics.	Exercises on the floor.	Exercises on the floor.
Impossible realization of programme contents	Exercises on various devices, sports games.	Exercises on various devices, sports games.	Exercises on various devices, sports games.	Exercises on various devices, sports games.

With secondary school students, as for their ages, as well as for education requirements, the possibilities for realization of school activities are modest *(Table 2.)*.

Table 2. The programme content in secondary schools

Secondary school	I grade	II grade	III grade	IV grade
Possible realization of programme contents.	/	/	/	/
Partial realization of programme contents	Sports and rhythmic gymnastics	Sports and rhythmic gymnastics	Sports and rhythmic gymnastics	Exercises on the floor, dance, aerobics.
Impossible realization of programme contents	Sports games, athletics, exercises on various devices.	Sports games, athletics, exercises on various devices.	Sports games, athletics, practice on various devices.	Sports games, athletics, practice on various devices.

Analyzing the tables, we can see that it is impossible to realize minimal educational requirements set in physical education. This problem especially reflects in higher grades in elementary school and education of secondary students. Among these notices, it is very important for physical education to realize through adjusted activities, until necessary material conditions do not provide, which will enable the realization of anticipated contents.

2. Suggestions for practice

Physical education in the classroom faces numerous difficulties, which prefers also application of some special work accesses in heavy conditions. Furthermore, we will give few examples which could inspire the pedagogues to think in that direction during planning the physical education in the classroom:

- Each school possesses desk or bench. They mainly use for pupils to sit on it, so about their possibilities in physical activities realization there is almost no discussion. Using mentioned devices, the pupils can do different step up – step down exercises *(Picture 1),* jumping over *(Picture 2),* pulling through *(Picture 3),* strengthening exercises *(Picture 4),* stretching out *(Picture 5),* balance exercises *(Picture 6)* etc.

Picture 1.

Picture 2.

Picture 3.

Picture 4.

Picture 5.

Picture 6.

- The possibilities of bench are various, depending how we use it during physical education. In accordance to that, the exercises can realize in several ways, or on:
  - Horizontally placed bench,
  - Vertically placed bench,
  - Bottom up placed bench,
  - Two benches placed in parallel position,
  - Two or more benches placed one on other, or one beside other.

- During realization of physical education in the classrooms, in which are school desks and chairs, should think how to use shaping exercises resulting from specific working conditions *(Picture 7-9).* In such conditions should observe school desks and chairs as equipment useful in physical activity realization.

Picture 7.

Picture 8.

Picture 9.

- If it is about content of physical education in the classroom, it is inevitable to mention the possibility of realization of corrective exercises for the pupils. It is important to mention that, for realization of such class, we do not need a lot – couple of mattress and one ripstol in the classroom, and as a handy device, we can use school desk or chair.
- The possibility of using drafts, graphics, photographs, sets for video and mobility training, video-shots and other modern technical means, will contribute to research of attractive contents linked to sport activities, which by provides that students inegrate their education by newest achievements in this field. Wider utilization of these methods enables that training, as well as teaching process, turn into comprehensive intelectual activity. This aproach to modern teaching should be adjusted to the level of intelectual age (maturity) and knowledge, which pupils had attained in other teaching matters. Enlarging the theoretical knowledge would enable the inegration of physical education, which realizes insufficiently, according to bad material conditions.

Considering the existence of decidedly meager conditions, there should tend to content all class phases in realization of physical education. Besides common realization of appropriate methodical requirements, there should undertake additional measurements, too:

- motivation of the pupils,
- assistance (helping),
- adequate hygiene,
- general organization of work.

Conclusion

Considering the lack of necessary material conditions, physical activity, whenever it is possible, should realize in open playgrounds. If teaching has to be in closed spaces, then it is the best to be realized in adapted classrooms, intended for physical education. As a final solution, we could accept a classical classroom.

The classroom, as a working place, should observe as a necessity and accept it in such a way. For pupils and teachers, the classroom represents, for sure, a specific working place. It refers apriori to ambience, the possibility to choose the content and teaching organization. To realize such teaching, it is necessary to:

- choose the content correctly,
- enable the classroom for physical activity (arrange the furniture),
- prepare all necessary requisites and tools,
- prepare the pupils, i.e. to warn on particularity of task, which run from specific working conditions.

The work in those conditions will inevitably slow down educational process. Therefore, the teacher has to strive to keep up teaching continuity, to plan regular selection of content and working method, which will surely influence positively on the pupils. Physical education in the classroom should adjust to special and hygienic conditions. Besides, the teacher must take care of age and number of pupils, disposable requisites, position of the school furniture in the classroom.

Existence of optimal rooms for physical education in every school is an imperative, but there is no excuse for absolutely exclusion of physical activities due to bad spatial conditions and their trimness.

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ACTUAL POSITION OF PROGRAMS IN NATURE WITHIN ELEMENTARY AND HIGHSCHOOL EDUCATION IN SERBIA

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1. Introduction

The term Activities in nature could easily confuse less informed people, because it represents wide aspect of extreme sports, both single and team sports and games in nature and in the open, educational and recreational actions from different aspects and professions in the widest sense of physical culture. Here, the authors are dealing with issues within Physical and health education class for elementary and high school students in the Republic of Serbia. Activities in nature are: OUTINGS (of different lengths, as well as program assignments), SUMMER CAMPS - SUMMER HOLIDAYS (with up to date programs), WINTER CAMPS / WINTER HOLIDAYS (with up to date programs), and school, programs where physical education pedagogues take place, we should also mention RECREATIONAL INSTRUCTION and EXCURSIONS.

It is known that mentioned activities are treated and carried out differently within schools in Serbia, and that it depends on material conditions of the school and parents, physical education pedagogue competence, logistics, interests, and even tradition. In years to come, because our country is in a time of transition and on going crisis, there won't be any major improvements in the educational system and therefore no investment in building new sport stadiums and other structures in the open, but it doesn't mean we should only complain about bad conditions and poverty. Our basic motives for this is a message, mainly to our younger colleagues, to use what they have learned during their studies and carry it out with children, as most grateful participants, and we hope, futures' most significant factor for nature preservation.

2. Up to date research

Many authors have dealt with issues of Activities in nature and at first they gave many examples or their practical experience. For example, Nišavić, M. (games in the nature), Ivančević S. (organisation of the water camp), Tomic, D. And Nemec P. (games in the nature). They were followed by theoretical and metodical values and significance of the Activities in nature as an extracurriculum for students and teachers. (Sepa, M, Matic, M, Arunovic, D.) Bokan, B., has done one of the first and more serious reasearches in his PhD. Work, and Miletic M., in his M.A. work (organisation of excursions), Galic, M. (organisation of recreational curriculum). Others who have dealt with this issue are Zdanski, I., Visnjic, D., Vuckovic, S., Savic, Z., Novakovic, M., Dabovic, M. And others.

Miletic's works, with his a associates, about realization of Activities in nature program were most significant for this one (camps, summer and winter holidays, recreational pedagogy, excursions, etc.). On this project more than 50 schools and over 2000 examinees in Serbia were questioned, and we came to an exact opinion, mostly students', but also parents', and teachers', about this issue. Significant results were acquired form the students of Faculty of physical education in Nis, Dabovic and associates gave opinion of the students from Belgrade faculty, and from Radosav S. M.A. work from Novi Sad abut camping issues.

3. Today's condition

Today's condition in realization of the Activities in nature is not as expected, and it defers from school to school. These are the general facts for the whole country:

- Majority of students likes all Activities in nature programs
- Most realized programs are outings, then excursions, summer holidays, and winter holidays. Recreational activities are mostly for students of lower classes from small number of schools
- For the majority of students, summer and winter holidays are not an option, mainly because of material status of their parents, as well as other factors / schools, sport societies, non-government organizations etc. /

- High school students prefer excursions abroad, winter holidays (mostly male population), outings and summer holidays. Outings, which are obligatory, are not carried out in all schools, and summer and winter holidays are for students which parents can afford it. We can conclude that excursions, even those more expensive, a satisfactory number of students attend.
- Even though outings are obligatory for the students, it is not carried out equally in all schools and in some schools not at all. They differ depending on location, season, number of students etc. Some are just routine, some cover main event (i.e. school cross, or finals in some sport), and majority of students are merely passive observers of the event.
- Most of the physical education pedagogues is of opinion that organization and participation in every part of Activities in nature is serious and responsible part of the work, with many problems, and most important are: control of students, dangers and inexperience of students in nature, inadequate acknowledgement for their efforts and responsibilities, also, inadequate knowledge of orientation in nature, camp life or new interesting things for the young.
- There are not enough outings with teachers from different classes (biology, history, geography etc.) which could be more interesting, and could also ease organization.
- Physical education pedagogues are not engaged enough with the realization of the excursions, and also recreational classes and summer holidays in the lower classes of elementary schools.
- Students wishes about new activities are mostly realizable (mounting biking, rafting, free climbing, roller skating, fishing, etc.), but there are also ones that students see in the media (extreme sports on water, cliffs, snow, and training grounds in nature, which mostly are in need of expensive equipment, complex training and organizing special training grounds and instructors.) and for most of them will not be accessible.
- Besides all the problems, mostly material, there are other obstacles for greater involvement of schools in activities in nature, and some of the greatest are: unique standard for organization of all nature outings (excursions), program which is acceptable for majority of schools, vocational meetings of physical education pedagogues with organizations and professionals that could help (hiking associations, scouts, extreme sport instructors, biking, rowing, kayak clubs, fishing associations, "Sport for everyone" association, etc.) better cooperation with parents, sponsors, non-government organizations, understanding, etc.

These conclusions we made, are obligatory to all, starting from students and their parents, through school managements, physical education pedagogues association, school boards, sports societies, tourist agencies, local government, and the ministry of education, to see the issues and to make an expertise wits solutions how to better conditions. Before we give our improvement suggestions for Activities in nature program, we need to give some facts: According to the research taken in Serbia in 2001 (Novakovic, S.), 291 (31,43%) out of 926 elementary and high schools do not have a gym, in 12,2% of those is conducted in adapted classrooms, and schools rent only 3,1% of adequate objects (sport centers, gyms, …). Closed space objects usage in the cities is much better than in the country, where 42,9% of schools has no proper conditions for work in closed objects. On the other hand, it is the opposite with the open space sports objects, mainly because of the lack of building space in the cities.

We are assured the situation hasn't improved much in the last period. Population in the country has been dropping in the last decades, many villages have no residents at all, and in many of them number of children has decreased to the point where schools are closed or work with a minimum number of children in no working condition. Migration of population from the country to the cities is obvious, which leads to increasing number of students in some schools and decreasing in others which are not so attractive to children, even though these schools have fair conditions for work. There are regions in Serbia where birth rate is decreasing, even in the city areas, mostly related to the economic factor, and therefore number of students in elementary schools is decreasing too, even though these schools have fair conditions for work, and it could turn out that some schools would have better work conditions without any investment.

General conclusion is that significant number of schools in Serbia does not have fair conditions for physical education class, and any solution to this must be applied to them. So we pledge that the actual Activities in nature program is fulfilled fully, and that students have two outings through the school year (spring and autumn), at least one summer (summer camp) and winter holiday, as well as excursions, and we give one possible solution for this, knowing that this could not be easily achieved.

4. Suggestions for improvement:

Actual Physical education program within Activities in nature should be modernized and expended on the national level (with the approval of the experts, colleagues who carry it out, terms and wishes of children and of course the legislator).

Activities in nature program for state faculties / Belgrade, Novi Sad, Nis, Leposavic, Novi Pazar / must be evened and equaled with the Physical education program for elementary and high schools.

A renowned center should be built in the most favorable part of Serbia, with the help of the founders of the faculties, where all students could come to summer camps once in two months (July - August), in shifts, to do the general program, 7 days in duration, and special program, 7 days more, for those who chose this subject as optional. Teachers and associates from all faculties should be engaged in this, for better organization and economy, according to their specialties. Vocational seminars should be organized for colleagues from Serbia according to the Program, or it would be specialized for some particular ones (surfing, rafting, free climbing, water skiing, mountain biking, tracking).

Every state faculty should have their "personal training ground", the nearest mountain, for practical exercises in outing activities, for Belgrade – Avala, Novi Sad – Fruska Gora, Nis – Suva Planina, Leposavic – Kopaonik, Novi Pazar – Golija. It is expected at least one outing for students that gravitate to these mountains, which already have proper objects and mountain houses, and from Faculty stuff, professional help for carrying out these actions.

For lower classes, schools which organize recreational instruction should expend to destinations other than specialized ones (Divcibare, Goc, Tara, Fruska Gora, Rudnik, Rajac, Zlatar…), which have optimal conditions and are not more than 100 km away from their residence.

Schools which have no conditions for Physical education should increase number of outings in a year, to a minimum of one outing a month, namely 8. (In Belgrade there were some high schools which had 2 outings per month, because institution which was obligated to pay renting for adequate objects had no founds for it.)

Question of better engagement physical education pedagogues and students, location selection, adequate program which will not be monotonous, and material expenses should be brought up. Because of the time limit we will give a suggestion – ideas which would be more interesting to students according to their age and capabilities, aware that they are not systematized. Our suggestions are:

Theme outings: With regard to their age, class, and in relevance with other classes it could be: Know the most significant historical monuments and land marks of your area, Know the spiritual monuments of your area (monasteries, churches, chapels, etc.). or Get to know the hydrographic system of your area (springs, wells, waterworks, bridges, rivers, lakes etc.), Medical herbs gathering (with adequate professional help), or Getting to know flora of your area and making a herbaria, Photo-safari of fauna (photographing birds and other animals), Ecological outing - familiarizing children with negative actions and other factors in every day's life, which can be seen everywhere (smog, noise, dumps, pollution of water, uncontrolled use of fire, erosion, uncontrolled wood cutting, etc.). There could be various **themes**, depending on our colleagues ideas, children's and parent's interests, but one we strongly recommend should be a whole day or two-day outing: Visit to the country - city, where pupils of the lower classes could get to know life in the country - city (animals, agricultural work, food, objects, use of fire, tools, etc., as to traffic in the city, museums, land marks, culture centers, sport events, etc.). These kinds of outings need a good preparation and organization, especially if they would to be longer, because of the food and bed, but with smaller groups (one class) it would give a real picture about life in the country - city.

Water outings: With this kind of outing we need to be careful and well prepared with adequate equipment, children should be taught swimming and attention should be given to what season it is. Possible themes: Fishing, usage of different equipment (boats, motor boats, rafts, etc.), rafting in big rubber boats. Rafting has become very popular in Serbia, such as rafting tours on Lim, Drina, Ibar, Morava, Nisava, Kolubara, and there are many more rivers where we can learn about this interesting activity (Mlava, Pek, Tamis, Studenica, Raska, Gradac, Jablanica, Moravica, etc.), games on the river bank, water games.

Orienteering: For students of the higher classes we recommend outings where main activity would be to find their bearings in nature, but firs tuition with professionals of how to use map and binnacle, and then all sorts of fun and recreational assignments for small groups (teams), with problem solving on check points, to individual problem solving, bearing, tracking and orienteering. In time, if children become interested, competitions with mountain bikes and Nordic skiing could be arranged.

Means of travel: First outings are the easiest and students should go by foot, and afterwards it should be combined; transportation to a certain point and then by foot. Some outings should be arranged to go on not only by foot but also Nordic skies (even with small amount of snow), roller skates, mountain bikes, or any other combination.

Summer and winter holidays: We already stated that summer and winter holidays should be obligatory for elementary and high school students. The fact is that material factor is the main reason for it not being fulfilled completely. Until the State take this obligation in its hands, other means of founding should be acquired for the most endangered students, such as donations, sponsors, foundations, non-government organizations, charities, etc. Basic skiing should be taught on winter holidays, and also students should be familiarized with other activities too (snowboarding, skating, games on snow, winter activities). To lessen the expenses, it would be better to go to the smaller mountains, cheaper resorts with more rooms or places which are a bit away from the center. Other than Kopaonik, there are many mountains where winter holiday with basic skiing can be taught, such as: Stara planina, Suva planina, Zlatibor, Tara, Zlatar, Divcibare, Golija, Jastrebac, Goc, Rudnik, Rajac, and many others where mobile ski-elevator could be brought for one day outing. Besides beauty and value of the skiing, we think there are better conditions for Nordic skiing, which is cheaper, and can be practiced with small amount of snow.

Considering political and economic situation, and the fact that Serbia does not have sea side, vacations for the years to come will be turned to our own country. It would be wise to take advantage of our own potentials and capabilities. Summer holidays should also be obligatory, at least once during schooling, and students should be obliged to learn swimming. State should regulate this problem by making standards and building summer holiday centers for children. There already are some well established resorts (Palic, Srebrno jezero, Divcibare, Mitrovac, Goc, Fruska Gora, Borsko jezero, Kladovo, Percac , but there sure are locations for building modest camps in every region of our country. As a transit solution we should use experience from some schools, especially form Vojvodina, which have organized relatively cheap camping in mountains of central and north-west Serbia, where they rent schools with big yards, electricity, water, dining halls in small villages, or even abandoned schools, with a permission of local authorities and Ministry of education. (i.e. on Tara, schools in Rastiste, Solotusa, Djuricima, Raca, Zaovina, are used for that porpoise).

It is known that in this line of business in order to make something work, students should be properly motivated, explained the essence of outings, its challenges, good and bad sides, dangers and expectations. This process should also be taken gradually, from easier to harder, closer to further, simple to complicated, but no one should be left with a feeling of being neglected, to give its maximum to the society (team), because it is the only way we can expect positive results of all Activities in nature.

In the end we should remind what the advantages of Activities in nature to classic school are: lesser expenses for building, fixing of objects, equipment and requisites. Nature gives us great possibilities for creating everything from most basic to the most complex movements and activities, non-polluted environment, especially in the national parks, and a positive influence of nature (sun, water, wind, motion).

Everything else is left to the physical education pedagogues, because it is them who make everything run. Their agility, competence, sense for improvisation in nature and organizational abilities for marketing and rewarding, is what will make things go forward. Interest and wishes of the students should not worry us, for they are a mobile generation.

5. Conclusion

Activities in nature within Physical education program have a significant spot, for their values. Obligatory activities (outings, summer and winter holidays, excursions) are realized differently depending on region, financial capabilities of parents, habits or larger community. This situation won't be overcome in time to come, mainly for material reasons. Serbia has a potential and locations for executing the program, and current situation could be improved by: modernizing the program, accepting and equaling the program on state faculties, forming training grounds for outings, building summer and winter camps for students of elementary and high schools, constant perfection and education of pedagogues, and also personal initiative, team work and cooperation with all relevant factors could give opportunities for improvement of today's state.

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PROBLEMS IN GYMNASTIC APPARATUS AND FLOOR EXERCISES PROGRAM APPLICATION IN ELEMENTARY AND HIGH SCHOOLS IN SMEDEREVO

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1. INTRODUCTION

When discussing the importance and complexity of implementing school gymnastic exercises, i.e. apparatus and floor exercises in regular educational system of physical education for elementary and high schools among the PE and sports skilled staff circles, for a long period of years there have always been current and similar doubts – "whether the program Apparatus and floor exercises is difficult for students, whether the teachers have enough strength to successfully carry out the mentioned part of the program, especially taking into account the working conditions peculiarities, whether there is enough support by the society, school and parents, whether they are sufficiently skilled, whether the students are interested in practicing gymnastics and similar problems.

The arguments for the importance of practicing school gymnastics are not questioned, since the most important part of social engagement in the field of physical culture is firstly the health care and proper physical development of children and young people, this kind of exercise is, as a basic part of overall practice, considered necessary and irreplaceable prevention for a person in the most important part of life. If taken into account that PE, with its possibilities for planned and systematical engagement of the whole young population in educational process, is represented by almost a fifth of the amount of educational content in apparatus and floor exercises, from the first grade of elementary to the third grade of high school.

In the *aims* of PE "to contribute to integral development of student's personality, development of motoric abilities, acquisition, improvement and implementation of motoric skills, habits, and necessary theoretical knowledge in everyday life by versatile and systematical motoric activities..." as well as in *tasks* to inspire "growth, development and influence on proper body posture, the development and improvement of motoric abilities, acquiring motoric skills (contents determined by PE program) and acquisition of theoretical knowledge indispensable for their acquiring, adopting knowledge for understanding importance and substance of PE." we recognize all the seriousness of social tendencies for this area of schooling system to be necessary to young people with all its significance and usefulness. PE teachers, as the realizers of PE plan and program, are expected to fulfill the mentioned expectancies responsibly and seriously with all their professionalism.

PE program is realized through wide range of sport disciplines and activities, basic, affirmative and popular, recreational, optional… A part of the program comprises apparatus and floor exercises – gymnastic school contents, for skilled staff "necessary, but complex, both for students and for PE pedagogues". The aim of research in this paper is the difficulties that PE school teachers have in realizing only – or the average, twenty or so lessons of the whole sum in one of many communities in Serbia.

2. APPROACH TO THE RESEARCH

The problems of actual apparatus and floor exercises program implementation are known to PE pedagogues. For years there has been mention, above all, the lack of material basis for realizing the program, such as the lack of apparatus and even of the closed space. If there are both apparatus and space, it is often clearly significant insufficient engagement of teachers in realizing the program. It can be caused by problems that arouse because of disconnection between realizing PE and program realization in lower grades of elementary school. Therefore, responsible teachers begin the realization of program in the fifth grade by covering the content for the first grade, which is followed by problems in completion of late motor tasks. Skilled educational level needed for apparatus and floor exercises program is something that realizers – teachers in the lower grades of elementary schools usually do not have. In recent years there has been increased students' interest for sport games, since the realization of program is easier to accomplish, as well as because of media and parents' support etc. Thus, the realization of apparatus and floor exercises program in all elementary and high schools in the municipality of Smederevo have been analyzed from the angle of this and a certain number of other problems.

Topicality of mentioned and several other problems have initiated sufficiently serious reasons for institutions and persons responsible to be involved in research by analyzing the theory and practice of this subject, attempting to make this complex issue better and eliminate defects. There is also a fact that recently, realizing the obstacles in school physical education, a team of experts has been made out of a group of elementary and high school teachers, as well as of the representatives from The Faculty of Sport and Physical Education in Belgrade, with the support of skilled consultants. This team makes efforts to develop PE *Educational Standards* based on experience from other countries. The point is that education and learning can be improved by Standards, since they define students' knowledge and skills that should be developed during educational process, and help schools and teachers to estimate obtained level of their students in comparison with the national standards./1/

The authors have been motivated to conduct this research by the idea to examine the standpoints of teachers about the problems in realization of Apparatus and floor exercises program using a pilot research on a certain location and to check the applied instrument – a questionnaire in practice. This pilot research has been used for previous implementation on a smaller number of research units, with the aim to check the validity of the questionnaire contents that enabled the forming of the latest version. Namely, such a research is to be conducted on a large sample on the territory of Serbia during the following period – on all the participants during the seminar "A permanent improvement of PE teachers for realizing Apparatus and floor exercises program in accordance with changes in PE program". All city elementary and high schools in Smederevo have been chosen as a sample, since Smederevo with its school facilities have relatively been known to authors, and the cooperation with PE teachers had previously been made, so the process of respective research has been efficient and rational.

The subject of research is related to the actual issue which has been stated theoretically and confirmed by a certain number of partial investigations, and these are problems in realizing apparatus and floor exercises program in elementary and high schools in Smederevo. According to overall aim of research, to identity key problems in apparatus and floor exercises education with the help of teachers' standpoints, individual goals and tasks have been established on the basis of special aspects (variables) that are supposed to influence considerably the following problems: general working conditions, facility conditions, quality[1)] of apparatus equipment, PE teachers, students, cooperation and support of headmaster and colleague teachers, complexity and volume of program contents, the quality of education etc. The sample of examinees is representative and complete, intentional – mixed, all PE teachers of all city elementary schools from 5^{th} to 8^{th} grade and all PE high school teachers (the complete sample of all units of research). The questionnaire has been made to investigate the opinion of teachers – realizers, taking into account their knowledge and experience in respective problems, and it contains open and closed type questions which are direct, clear and not suggestible. (Attachment no.1)

3. RESULTS

I EDUCATION

In six city elementary schools (100%) out of 23 teachers who realize Apparatus exercises program 19 (82.60%) teachers have been questioned, while in four city high schools (100%) out of 16 teachers – realizers of the program, 14 (87.50%) have been questioned. The response of the colleagues to participate in the research fulfilled the expectations. According to the answers of the questioned teachers about the staff that realize apparatus exercises program (in the following text AEP), elementary school education in the grades 5^{th} to 8^{th}, as well as in high schools is covered by skilled staff (100%), which cannot be said for realization in lower grades of primary schools, from 1^{st} to 4^{th} grade, since there are PE teachers in only 3 schools in few classes. In such cases it cannot be expected that consultive role of teachers shall be efficient because it is not permanent, but occasional and for certain programs only.

In each and every school there has been teachers who made comments about the situation in their school sincerely, estimating that AEP has not been realized in all classes as it is expected by PE program – 12 teachers in elementary schools (63.16%), 8 teachers in high schools (57.15%), which implies that there is a serious problem in teachers' relation to their working demands. It is noted that there are open critical standpoints that in some schools, probably for a longer period of time, there is insufficient quality of program realization (perimeter and contents), namely, in lower grades of elementary schools 42.10%, in higher grades of elementary schools 21.05%, and in high schools 35.71%. The answers were related to the condition in their own schools, as well as to the condition in previous levels of education. We cannot neglect the number of questioned teachers who did not answer (42.10% in elementary and 35.71% in high schools). The most often reasons for poor quality realization of AEP are the insufficiency of skilled staff in lower grades of elementary schools (6 questioned teachers or 31.58%), and working conditions (7 or 36.84%), while questioned teachers

1) Because of the space limitation the Questionnaire shall not be presented in Appendix, but shall be available if asked for. The interpretation of the results shall be presented by processing of 31 questions through given topics.

in high schools stated working conditions (42.86%). It is also a worrying fact that there is a lack of motivated teachers in primary schools – 15.79%, and in high schools 21.43%.

In a small number of schools the teachers are dissatisfied with the headmaster's support, (approximately 15%), but, according to the teachers questioned, there is a lack in colleagues' support in 26.32% of elementary and 35.71% of high schools, thus, the number of such schools is not a small one.

II STAFF

Open standpoints concerning reciprocal estimation of colleagues' commitment they work with in the same school are not encouraging; the situation is worse in elementary schools (7 teachers questioned find their colleagues are not committed enough – 36.84%) than in high schools (7.14%). However, the answers "I do not wish to state my standpoint" can be considered partially unsatisfactory, in elementary schools 21.05%, in high schools 35.71%. As for the commitment of class teachers in grades 1st to 4th in primary schools in AEP , the situation is completely unsatisfactory (57.89%, and there are 31.58% reserved in answers).

Mutual cooperation among colleagues in higher grades of elementary schools, as well as in high schools, the questioned find satisfactory or well (weak in 21.05% in elementary schools and 14.28% in high schools); however, there is a complete lack of cooperation with elementary school class teachers (57.89%), so that this is a worrying fact.

When asked to estimate the colleagues' motivation, the questioned have a fault-finding view of 42.10% in elementary schools. Perhaps this view is confirmed by the answer to the question to estimate their skill and qualifications by themselves for program implementation, when the most colleagues do not have their attitude (68.42% in elementary and 100% in high schools). This could be interpreted by observed indifference of our colleagues caused by, among greater number of problems in realization (conditions, years of service, uninterested students, program too difficult to students) and by life problems, above all, by standard, i.e. salary.

III CONDITIONS

Elementary school teachers estimate their overall working conditions fairly satisfactory (68.42%) and well (10.53%), and that is the result of recently built sport halls in two schools, as well as "older but good" facilities in remaining schools. Among high schools, there are three that have averagely good standard conditions (50% realizers think the conditions are weak), while the indexes are in average weaker for all high schools, because one of them has an old improper apparatus room of small dimensions, without any facilities and equipment. Space conditions are estimated slightly better compared to general conditions.

The average estimation of overall equipment for elementary school is better (two thirds of teachers find it satisfactory – 11 teachers or 57.89%, and well for two realizers or 10.53%), than in high schools (9 find it weak – 64.29%, almost a third of all questioned, Appendix 1, table 1).

By checking the inventory of apparatus and equipment we stated that the schools are averagely well equipped for: floor (schools have the average of approximately 10 to 11 mattresses); they are fairly well equipped for vault (there is the average of one to two bucks and one to two spring boards); partially for hangs – grasps (the average of 0.3 to 0.5 parallel bars, bars, stationary rings, pommel horses per school) and satisfactory for balances (the average of 0.6 beams, 1 – 2 low beams and 1 – 4 benches per school). The overall impression is that there are conditions in each school, i.e. apparatus that enable the realization of a part of AE program by their quality (Appendix 1, table 1). Therefore, with the exception of one school, in all schools it is possible to train gymnastics. The apparatus quality is fairly well for floor, vault and balance, while the quality of the remaining elements is weaker.

IV PROGRAM

The program is estimated as satisfactory (in elementary schools – 15 teachers of 78.95% and in high school 8, that is 57.14%); about one third of teachers estimate that the program is complex for realization (30 – 35%, Appendix 1, table 1), while as common problems for both elementary and high schools the results are: a smaller number of exercises is difficult to be realized (about 15%), there is a complexity in organizing assistance and help (36.84%), a considerable number of exercises is difficult to students (21.05% in elementary and 28.57% in high schools) that can be associated with numerous reasons: body overweight, tendency and interest in sport games, bad conditions – the quality of apparatus (21 to 28%). The program is estimated too extensive and detailed for existing number of lessons (15 to 21%).

V STUDENTS

There is an overwhelming fact that three thirds of all teachers carry out AEP with unmotivated students (in higher grades of elementary schools 21.05% of realizers find that students are not motivated, in high schools

only 1 or 7.14%). 13 of all inquired in primary schools (68.42%) and 9 in high schools (64.29%) find the causes for this problem in education, but not only in gymnastics: unskilled and scarce work in the lower grades of primary school, accompanied by fear of being injured, poor treatment of gymnastics in the society (the lack of popularization), the emphasis on sport games, poor physical fitness, poor previous knowledge brought from elementary schools, poor working conditions.

A half of realizers find that students' cooperation is "so and so" during a lesson, which can be associated, among other things, with lesson organization and teacher's activities. However, there is not much use of the students' cooperation, since the level of previous knowledge brought from lower grades of elementary schools or brought from elementary schools is estimated as poor (a great number of teachers, 15 or 78.95% in elementary and 11 or 78.57%, Appendix 1, table 2). It is connected with the problem of covering lessons that are related to previous knowledge; because they are the basis for new contents that is to be realized (teachers are forced to realize it successfully) which makes the remaining number of lessons scheduled for AEP smaller. In elementary schools, 21% of teachers estimate that students do not cover the program in lower grades, in high schools only one teacher.

Having analyzed the contents of AEP that are difficult to students (Appendix 1, table 2), on the basis of experts' estimation, the following conclusions have been imposed: students do not master skills on previous levels, appropriate contents is not trained in the proper age (when it is much easier to accomplish), and that can be connected with the fear of injuries; however, this fear could directly be caused by improper methodological approach, and the lack of taking measures for assistance and help, so it is estimated that, in certain number of cases, teachers do not work regularly and do not have the complete number of lessons. It is also noted that teachers are not well informed about the current changes in PE program, that is, teachers are not informed about the programs accepted from 2003 – 2008, from the first to the sixth grade of elementary school, which has been noticed in one of seminars.

VI VIEWS AND PROPOSALS

Teachers have been given the opportunity, in the open part of the questionnaire, to indicate certain problems that have not been mentioned, but these are the problems that have been named before – that there is no parents' support, that there is a lack of time for extra curricular activities (Appendix 1, table 2). The first on the list of problems is bad conditions (36%).

After the question "how the organization of AE program realization could be improved" we notice self-criticism and wish for improving present conditions. Following measures have been offered: better teachers' participation, attending seminars, new equipment, beginning practicing gymnastics in pre-school age, popularization of gymnastics through media, introducing PE teachers in pre-school age, more supervision during carrying out the program (supervisory board), and others.

4. CONCLUSIONS

PE teachers still recognize the significance of realizing sport educational program of apparatus and floor exercises, so that it is still applied in all grades in elementary and high schools, except for the fourth grade of high school. However, the problems in actual application of the program are well known. Material fundamentals, such as the lack of apparatus, as well as closed space are often mentioned. Whether there are both apparatus and space, it is often the lack of teachers' commitment to carry out the program, which is in direct relation to the problem of weak or complete absence of connection in program realization between higher and lower grades of elementary schools. Instead of carrying out the program for the fourth or the fifth grade, PE teachers are forced to carry out the program for previous grades. It is an enormous problem, because for the realization of Apparatus and floor exercises program skilled educational level needed is something that realizers – teachers in the lower grades of elementary schools usually do not have.

Finally, there is an impression that, in severe working conditions, with the lack of support from the society, headmasters, colleague teachers, parents, with weaker physical and motoric status of the majority of students and their lack of interest for physical exercises, most of PE teachers still try to carry out gymnastics program and they feel that at the end of the eighth grade they manage to compensate what has been neglected in the lower grades and make school age child fit to the sufficient level of skills and knowledge. Therefore, appropriate social, institutional and skilled factors should define a *strategy* to solve respectful problematic aspects, for instance, social involvement, school environment, skilled staff, parents, program corrections.

On the basis of confirmed overall assumption that a low level and bad quality of certain, in this paper named conditions and circumstances generate specific problems in Apparatus and floor exercises program realization, dominant problems should be solved systematically in the first place, and these are: to engage skilled PE teachers from the first grade of primary school, to enable better space conditions and to equip

them with new gymnastics apparatus, to work on permanent teachers' training program through seminars, to insist on higher level of teachers' commitment with continuous superintendence, to reorganize, i.e. correct the existing apparatus exercises program (according to existing conditions, the reduction of certain program items in accordance with the planned number of lessons for realization, etc.), to make gymnastics more popular through media, and others.

APPENDIX 1 TABLE INTERPRETATION

Table 1

ELEMENTARY SCHOOLS			HIGH SCHOOLS		
ES „DR Jovan Cvijić" ES „Branko Radičević" ES „Dositej Obradović" ES „Branislav Nušić" ES „J.J. Zmaj" ES „D. Davidović"			Grammar school Smederevo Technical-metallurgical high school Commercial-trades high school Textiles - technology and agriculture high school		
APPARATUS EQUIPMENT IN HALLS – teachers' estimation					
Elementary school	No.	%	High school	No.	%
good satisfactory weak	2 11 6	10.53 57.89 31.58	good satisfactory weak	4 1 9	28.57 7.14 64.29
APPARATUS EQUIPMENT IN SCHOOLS					
Elementary school			High school		
Mattresses: all schools, 6 – 15 pieces Spring board: all, 1 – 2 pieces buck: all schools, 1 – 2 pieces vaulting horse: 3 schools bar: 3 schools parallel bars: 4 schools uneven bars: 2 schools stationary rings: 4 schools pommel horse: 2 schools beam: 4 schools low beam: all schools have them, 1 – 2 pieces box: all schools have them, 1 – 4 pieces			one school without any equipment Mattresses: 3 schools have, 8 – 12 pieces Spring board: all, 2 pieces each Buck: all, 1 – 2 pieces vaulting horse: 2 schools bar: 2 schools parallel bars: 2 schools uneven bars: 2 schools stationary rings: 2 schools pommel horse: 2 schools beam: 3 schools have low beam: 3 schools have them, 1 – 2 pieces box: 3 schools have them, 3 – 4 pieces		
TEACHERS' OPINION ABOUT APPARATUS EXERCISES PROGRAM					
Elementary school	No.	%	High school	No.	%
good satisfactory there are weak points	1 15 3	5.26 78.95 15.79	good satisfactory there are weak points	5 8 1	35.71 57.14 7.14
TEACHERS' OPINION ABOUT COMPLEXITY OF PROGRAM REALIZATION					
Elementary school	No.	%	High school	No.	%
Complex-difficult Not complex-difficult	6 13	31.58 68.42	Complex-difficult Not complex-difficult	5 9	35.71 64.29

Table 2

ESTIMATION OF PREVIOUS LEVEL OF TRAINING IN STUDENTS' SKILLS DURING TRANSFER FROM LOWER TO HIGHER GRADES					
Elementary school	No.	%	High school	No.	%
good	3	15.79	good		
satisfactory	1	5.26	satisfactory	3	21.43
weak	15	78.95	weak	11	78.57
EXERCISES SPECIALLY DIFFICULT TO STUDENTS					
Elementary school			High school		
Floor exercises: side flip, handstand, handspring on the floor, backward roll (w), long-fly to forward roll on the floor; vaults: handspring on the horse, squat vault, flank vault; hangs-supports: straight inverted hang, straight reverse hang, reverse hang, stag jump; ballance exercises: turns, walk on high beam, ballances and exercises for advanced level			Floor exercises: side flip, somersault, handspring, handstand, long-fly to forward roll on the floor; vaults: handspring on the horse, squat vault, flank vault, rear vault; hangs-supports: swing on the parallel bars, piked reverse hang, upstart on the bar, crucifix on the rings, straight reverse hang; ballance exercises: 360^0 turns, turns on high beam		
PROBLEM IDENTIFICATION IN REALISATION OF AE PROGRAM					
Elementary school			High school		
worn out condition and lack of apparatus unskilled and insufficient work in the lower grades unmotivated students lack of interest for exercises obesity no parents' support weak physical training			poor working conditions in elementary schools students come from elementary schools without sufficient knowledge a small number of lessons for AEP program too difficult for students fear of injuries poor physical status few free periods for gymnastics		

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NOVELTIES IN METHODS OF TEACHING CHESS TO YOUNGER SCHOOLCHILDREN

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Novelties in methods of teaching chess to younger schoolchildren discussed in this paper are practically inseparable from the process of introducing Chess as an elective subject into the Serbian School System. On September 5, 2006 Serbian National Board of Education greenlighted the project based on broader considerations which take into account civilizational importance of chess and the socio-historical context. It is necessary to elaborate the context in more detail to gain a comprehensive insight into the concrete teaching methods that have purposefully been introduced to meet the existing need with the support of Serbian academic institutions in charge of the future teachers training program.

Historical data on the beginnings of chess are often intertwined with the myth, yet there exists "a 6th century AD document of Chinese origin which proves that chess was born in China in 569 AD as an astrological technique for divination of events of major importance, and sometimes even outcomes of military conflicts" (Bidev, 1972: 18). A brief overview of the civilizational importance of the royal game whose vitality and widespread popularity defy centuries and turns of civilizations and historical epochs is offered in the foreword to the first issue of the Serbian chess revue "Mat" ("Checkmate"), which ends in an open question, rather than conclusion: "What has secured such an extraordinary historical destiny for that game, what has drawn to it people from such different epochs and social statuses, why have so many famous scientists, artists, military leaders and politicians, but also ordinary people, elderly men and children spent so much time on it?" (Pašić, 1969: 1).

The official FIDE[1)] Chess in Schools Committee handbook "Why Teach Chess in Schools?" discusses five different, yet complementary aspects of chess: play, sport, logical-mathematical expression, artistic expression, and teaching tool (Blanco, 1998: 31), and all of them are important for the process of education and upbringing. In support of reforms in new South American republics, in 1825 Simón Bolívar wrote in the Decree on Public Education: "Games and recreations are as necessary to children as food, their physical and moral state requires so (…) as useful and honest games are deemed ball games (…) and chess" (Blanco, 1998: 80). According to the classification suggested by Roger Caillois, chess as a game belongs to the realms of "agon" (i.e. competition), and "ludus", which deals with conventions, structure are rules (Caillois, 1965: 40-42, 59). The connection between chess and sports has by now become obvious, but professor Blanco goes even further to summarize the nature of sports (and chess) as follows: 1) universal accessibility, 2) entertaining character of a game, 3) emphasis on performance, 4) governed by rules, 5) organized as competitions, 6) existence of a worldwide organization with a well-defined system of rules and regulations, 7) international character, and 8) association with physical activity (Blanco, 1998: 41-46). The official confirmation can be found in the FIDE Magazine issued during the World Chess Championship Finals in 1998 (p. 9-14) which reports that by 1998 chess had been recognized as sport in 100 countries and became a member of the National Olympic Committee in 65 countries worldwide (Blanco, 1998: 49). International Olympic Committee (IOC) thus officially recognized chess as sport in 1999, and chess was eventually among the main events at the 1st World Mind Sports Games held in Beijing in 2008 after the Summer Olympics, following several adjustments made by FIDE in attempt to comply with the IOC's regulations.

The connection between chess and sports is especially significant if we want to properly understand how chess finds the ways to secure the resources for its funding and generating broader social support. Chess cannot by itself create any profit, so it has to almost exclusively rely on funding and support generated as a response to outstanding performances of leading chess players and teams, which is often followed by more or less obvious political marketing. The absolute post-war dominance of Soviet chessplayers (before the emergence of Robert Fischer and his crowning in 1972, all the World Champions and their challengers were from Soviet Union, both men and women alike) was based on stable support from their government, and quite a number of their distinguished players were decorated and awarded for their accomplishments (Golombek, 1980: 296). With a heavy Cold War feel, the World Championship Match between Fischer (USA, the challenger) and Spassky (USSR, the reigning Champion) held in Reykjavík in 1972 was unprecedented both in terms of political tension

1) FIDE - ***Fédération*** Internationale des Échecs – World Chess Federation

and hitherto unimaginable public attention: "No match in the history of the game received more world-wide publicity and chess playing was given a tremendous impetus everywhere" (Hooper & Whyld, 1984: 116). American anthropologist Michael Spangler wrote about the social functions of chess in the United States before and after this turning point, and what's even more interesting compared it with the former Yugoslav model, with all social implications. The socio-political context deeply rooted in nationalist and patriotic colors dominates his view of chess community in former Yugoslavia (Spangler, 1978: 2-3), whereas the state of chess in American society "reveals the recreational interests of the American people, their stress on physical sports, and the small interest of educational institutions in chess" (Spangler, 1978: 4).

When it comes to the state of chess culture in Yugoslavia during the seventies, Spangler considers it more developed than in the USA, where successful individuals, such as grandmaster Svetozar Gligorić, became symbols of Yugoslav chess and paved the way for its broader social recognition (Spangler, 1978: 5). National team's successes were also one of the pillars of the popularity of chess in Yugoslavia with repeated medal performances in Chess Olympiads ("In the history of Chess Olympiads Yugoslavia has secured a place of honor.") and European Championships where they were always among the top teams, although never quite able to challenge the dominance of the ever too strong Soviet squad (Golombek, 1980: 119). Spangler also discusses the way in which chess returns the favor to the state and the society, as "chess activities support the Yugoslav social structure by being organized into mass-oriented groups. All students are exposed to chess in school and in the Young Pioneers. Youth tournaments may sometimes reach limits of one thousand participants" (Spangler, 1978: 4).

The first cycle of the "Chess in the Schools" campaign was organized in 1974 by the Center for Advancement of Chess, and its main goal was to *"gather as many children around chess"* (Stegić, 1997: 288-289, our italics). This campaign was running "in all primary schools and child care facilities whose work programs were aimed at schoolchildren" in Serbia and all the other republics and provinces (Stegić, 1997: 289). The competitions were organized on the school-, municipal-, city-, regional and republic level, and the Center for Improvement of Chess, as the campaign's founder and coordinator provided full financial, logistic and organizational support in all stages of the campaign, including instruction and training, which comprised opening of experimental chess schools, the correspondence chess school, school for the selected children, publication of the textbooks, methodology instructions, organization of seminars, courses, lectures, panels, etc. (Stegić, 1997: 289).

The Belgrade School of Chess for Children was founded in 1975, as a part of the broader concept that has never fully been realized: the Republic of Serbia was to set up a high school for chess, and the Yugoslav Federation – the faculty! (Sokolov, 1997: 301-302). National master Vladimir Sokolov was appointed the first headmaster of the school, and the classes were held in the premises of the Belgrade Chess Federation, although "a number of extra-mural classes were added to the School – one at the school for visually impaired children "Veljko Ramadanović"in Zemun, another one at the Youth and Pioneers' Center Voždovac, a third one in the Pioneer's Center "Savski Venac", and in a large number of primary schools" (Sokolov, 1997: 302). At the beginning, the school had only three grades, but its number eventually increased to six. The timetable was set at four classes a week, with the annual total of 128 theoretical (the following subjects were studied: openings, strategy, tactics, the history of chess, organization of chess competitions and tournament ethics) and 64 practical classes. In 1978, the Sports Association of Belgrade and the Belgrade Chess Federation have come up with a joint public statement defining their vision and mission. They focused their efforts on teaching gifted children, hoping that their systematical theoretical and practical work would result in *emergence of the new wave of youngsters that should replace the best Belgrade chessplayers* in the years to come (Sokolov, 1997: 303, our italics). Apart from gaining theoretical and practical chess knowledge accompanied by lessons in chess ethics, *their chess work was structured and programmed in such way to leave the pupils enough time and energy for their regular schooling* for future professions, as well as for social and sporting activities, recreation and leisure (Sokolov, 1997: 304, our italics).

The next step followed, and the Center for Advancement of Chess decided to publish its textbook for teaching chess in schools "Priručnik za nastavu šaha u školama", which was basically an adaptation of the original Croatian material that had previously been used for chess instructors' training. It is stated in the Foreword that the original idea was to teach chess instructors how to organize and stimulate the growth of chess life in the first place, and to train them to spread basic knowledge of chess to new generations of chess lovers (Rabar et al., 1983: 2). In the general methodology section the authors also claim that *"chess is full of abstract concepts that are uninteresting and inaccessible to children before the age of 10"* (Rabar et al., 1983: 74, our italics). Those years also brought two extraordinary chess primers, offering hours of joy for many chess newcomers to come: Borislav Ivkov's "Škola šaha I-IV"("Chess School I-IV") and Dragoslav Andrić's "Igra miliona" ("The Game of the Millions").

In the course of the seventies and eighties many important scientific works had been published based on multiyear research work with schoolchildren and high school children proving numerous positive effects

of chess as a teaching tool (Frank, 1972; Christiaen, 1976; Ferguson, 1983). Former U.S. Secretary of Education Terrell Bell offered an interesting view in his book "Your Child's Intellect", where he actually encouraged some knowledge of chess as a way to develop a preschooler's intellect and academic readiness (Bell, 1982: 178-179). Bernard Schmith published his course outline on teaching chess in public schools in 1982 (Schmith, 1982), and in 1983 Cor van Wijgerden and Rob Brunia began their "Step-by-Step" 25-year project of teaching Dutch schoolchildren the fundamentals of chess (this program is approved by the Dutch Chess Federation). The most ambitious project ("The Chess Project") was implemented in Venezuela in 1984 as a part of the broader program "Learning to Think", where a staggering figure of 100,000 schoolteachers were trained to teach thinking skills. Based on accumulated positive experiences and benefits of chess, in 1984 FIDE published guidelines and prepared the documents "in order to persuade governments to introduce chess in schools" (FIDE Report, 1984: 74), and in 1985 the FIDE Chess in Schools Committee was finally founded.

Scientific works that followed had only reinforced the belief in the importance and the benefits of chess (Horgan et al., 1986; Ferguson, 1988; Margulies, 1990, etc.), so the school year of 1988/89 marked a beginning of teaching chess as a subject in all primary schools in Venezuela (Linder, 1990: 165), and by 1990 chess had become a *"part of the curriculum of hundreds of schools in over 30 countries around the world"* (Linder, 1990: 164, our italics). Summation of 20th century experiences and a myriad of proven benefits of teaching chess in schools can be found in the works of Ferguson (1993) and Dauvergne (2000).

The official web site of the Serbian Chess Federation brings a fascinating quote from the archives of International Master Nikola Karaklajić. On April 30, 1935, the future President of the Assembly of the Kingdom of Yugoslavia, the President of the Yugoslav Chess Federation (and a strong chess master at the time) Stevan Ćirić, the Minister of Education in the Bogoljub Jeftić's Government, announced the following decree: "I herewith decree that the Ministry of Education has to maintain the relationship with the Yugoslav Chess Federation and take care of the introduction and advancement of chess in the Kingdom of Yugoslavia. These affairs will be in charge of the Department for People's Education." (Karaklajić, 2007). When we take into account these early initiatives aimed at interconnecting chess and the educational system, followed by the well-established social status of chess in the years after the Second World War, a conclusion that chess has missed many opportunities to find its place in Serbian schools over the years should not surprise anyone. On September 5, 2006, Serbian National Board of Education approved the introduction of chess into the school curriculum, and its syllabus and the accompanying documentation were officially published in Službeni Glasnik, the official state bulletin in Serbia (Prosvetni glasnik, 15/06: 1-9). The first generation of Serbian primary school pupils has been learning chess as an elective subject since September 2007. The reform of the Serbian school system has made it possible to include chess as a part of the curriculum in the first four grades, soon followed by its expansion to the next four grades. Such an ambitious project was based both on foreign and domestic experiences, with the addition of some novel ideas based on comprehensive critical considerations and compiled in the officially submitted proposal. These novelties are firmly grounded in the broader socio-historical context, covering a number of issues comparatively presented in the Table 1.

Several items from Table 1 require thorough analysis, and we shall now focus on the ideal age to start learning chess. Most recommendations suggest that the best age is between 9 and 10 (see Blanco, 1998: 62), whereas in former Yugoslav countries the instruction starts even later: chess as an elective subject is taught in Slovenia and Montenegro from the seventh grade, although Montenegrian schools offer a possibility to start learning chess as a facultative subject from the fourth grade (i.e. at the age of 10); one should also mention the recommendation from the 1983 issue of the Serbian textbook for the instructors, which advocates the age between 10 and 13 (Rabar et al., 1983: 74). However, there are several inconsistencies that demand our attention. The official textbook in Slovenia is "Šah za začetnike" ("Chess for Beginners"), which is a Slovenian translation of the book by Nicola Palladino, former Chairman of the FIDE Chess in Schools Committee. The introductory part of the book deals with the *advantages of teaching chess to children at the age of 6-8*; those children had reached the level of 9-10 year-olds in concrete logic, and could even match 10-11 year-olds in abstract logic, alongside with other benefits in terms of knowledge, skills and levels of understanding (Palladino, 1999: 4, our italics). In his FIDE recommended book "Why Teach Chess in Schools?" professor Blanco quotes Piaget's work, which claims that children of age 9-10 have established some basic notions at the stadium of "concrete operational thought", and are in the process of consolidating others (Blanco, 1998: 62-63).

If we compare it to the Christiaen's pioneering work (cf. Christiaen, 1976: 26), which follows Piaget's original concept, the stadium of concrete operational thought takes place between the age of 6 and 11, and that it is none other than Christiaen himself quoting the seminal work "Psychology in Chess" by Nikolai Krogius (Krogius, 1969: 234-243) that *the ideal age for learning chess is about 7* (Christiaen, 1976: 6, our italics)[2]. Coupled with Bell's conclusion that even preschoolers (i.e. at the age of 6) should start learning chess (Bell, 1982: 178-179), it seems more likely that a new subject (in our case – chess) should be introduced with the beginning of the new phase of a child's cognitive development – between 6 and 7 years (preschoolers/first grade).

2) Christiaen misquoted "(Puig, 1971)", the latter being the Spanish translator of Krogius' work (Krogius, N.V. (1968): *La Psicología del Ajedrez,* Traducción directa del original en ruso por Agustín Puig, Colección Escaques).

We should also add the following: coming to school a child is faced with so many requirements to fulfill in new and unfamiliar surroundings. The appeal of chess as a game might help a child in mastering life's valuable lessons without even noticing it, which will in turn facilitate his adjustment to fulfilling his scholar duties and responsibilities within the time frame, he will eventually become more tidy and organized and he will also learn to respect other pupils' rights, etc. Grading is descriptive in the first grade, but even later chess grades will not affect a pupil's academic average, which comes as a relief, and a child can thus free his imagination and fully appreciate and enjoy the game of chess. The imperative of success, which is often strongly felt both in schools and in competitive chess, is thus reduced to an acceptable level. Our wish as the team behind this project was to help the new schoolchildren who chose chess as an elective subject to enjoy their classes and continue their chess education in the years to follow (Marković et al., 2006: 2).

The syllabi and the recommendations for its implementation, the textbooks and workbooks were written with an important goal in mind: "to fully intertwine educational and upbringing components of the learning process. Chess becomes a simulation of life, and the logic of the game stimulates and rewards the right solutions." (Marković et al., 2006: 5). An example is given in the lesson "Chess clock": "Remember what it's like on zebra crossing: when the pedestrian's light is red, it's the cars' turn to move and you have to wait. Your move is when the light turns green – it's your turn to cross the street!" (Vuksanović & Marković, 2007: 21). "Setting your pieces on the chessboard teaches organization and tidiness, which makes the adjustment to some unpopular everyday's duties, such as placing one's school items in the locker, mush easier." (Marković et al., 2006: 5).

Correlations with other subjects permeate the entire chess syllabus. At the very beginning children have to learn about the chessboard and its squares, ranks, lines, diagonals, the center and the flanks (kingside and queenside), which broadens their understanding of geometry. At the same time they observe analogous spatial relations in 2-D (diagrams in books, on the computer screen, or as an image projected onto a canvas projection screen) or 3-D space (chess set – chessboard and pieces). After they become familiar with the pieces and their movement, comes the time to understand the relative value of the pieces (pawn = 1, knight or bishop = 3, rook = 5, and queen = 10). Resulting relations of exchanging and capturing chess pieces can be expressed as equations and inequations, which means that they are in direct correlation with some of the most difficult mathematical lessons. The authors have closely

Table 1. Comparative view of the old and new approach to teaching chess in Serbia

PREVIOUS EXPERIENCES IN SERBIA	**NOVELTIES**
♦ Organization of chess training was lead by Center for Advancement of Chess and Chess Federations.	♦ Ministry of Education and the Institute for Improvement of Education and Upbringing are in charge of the project of introducing chess in schools.
♦ Teaching chess has never been a part of the school system.	♦ Chess as an elective subject is a part of the school system.
♦ Training was a part of the "Chess in schools" campaign.	♦ Chess is a part of the school curriculum.
♦ Chess was taught in schools in after-school extra-mural programs, or sometimes as an experimental facultative subject.	♦ Chess as an elective subject in Serbian primary schools from 1st to 8th grade.
♦ Organizers and lecturers were chessplayers from local clubs, and/or teachers – chess amateurs.	♦ Teachers must have both academic and pedagogic background, and chess titles or categories (at least first category or women's candidate master).
♦ Instructors were trained in brief seminars where they studied only chess, without any mention of pedagogy, psychology or biopsychosocial characteristics of schoolchildren. School teachers were not familiar with specific chess teaching methods.	♦ Chess teachers are taught at the Teachers Training Faculty (elective courses: Chess I, II and III) and the Faculty of Sport and Physical Education in Belgrade (elective course: Chess). Ministry of Education has authorized the Institute for Improvement of Education and Upbringing to carry out the official instruction program for chess teachers. There are also two licensed seminars for the first year of teaching chess in schools.
♦ Children were taught chess regardless of their age.	♦ Chess teaching systematically begins from the first grade.
♦ Instruction was aimed at the most successful individuals or school teams.	♦ Chess classes are available to everyone, aimed at helping the children to adjust more easily to the new requirements at school. Multiple correlations with other subjects make chess an integral part of the process of education and upbringing. Selection of gifted children is encouraged, too.

♦ The textbooks used for instruction (often without proper reviews) were not based on course syllabi, and teachers often had to improvise.	♦ Two officially approved textbooks for the first grade of primary school are completely in accordance with the syllabus and other recommendations. Additional books are also recommended.
♦ Textbooks were written for the instructors (i.e. adults).	♦ Primers and workbooks are written for schoolchildren in an entertaining manner, so that the children can learn on their own, or with the help from adults. Teachers are using the books as didactic tools.
♦ Textbooks were not appropriate for children. Design was monotonous with chess content only.	♦ New primers, textbooks and workbooks are consistent with cognitive-connative characteristics of schoolchildren. The contents and illustrations are playful and challenging.
♦ Chess sets and demonstration boards were almost exclusive teaching tools.	♦ Apart form standard equipment, teachers are using personal computers with chess software and access to chess servers, interactive "SMART" boards, etc.
♦ The "Chess in Schools" campaign relied on mass turnout.	♦ Introducing chess in schools will eventually result in a gradual increase in the number of active schoolchildren and participating schools.
♦ Chess training was supposed to reach out to new generations and create the next echelon of chessplayers that would follow in the footsteps of our best players.	♦ By supporting the educational and upbringing system in Serbia chess teaching becomes a part of the broader picture.

followed the other subjects' syllabi for proper timing, as it was very important that the children acquire some fundamental knowledge and skills (especially in Serbian language and mathematics) before they are able to deal with a certain chess content.

Chess notation (reading and writing chess moves) is by all means of great importance: these lessons are extremely complex for pupils in the first grade, because it is necessary for a child to upgrade his reading and writing skills and spatial understanding to the level where he/she can fully comprehend the basic logic of a 2-D coordinate system. Understanding of coordinate systems is a step-by-step process, and it requires gradual progress: first come the concepts of horizontality and verticality, followed by discrimination of lateralization (e.g. proper orientation of the chessboard – each player has a black square on his left, the queens are placed on the squares of the same color, and the kings on the squares of the opposite color, etc.). Chess squares are often "houses", and their addresses consist of a street name (line) and the house number (rank), but sometimes even names (lines) and surnames (ranks) can be a helpful bridge to understanding chess notation. Before they start learning how to write chess moves, children first learn how to play the board game of submarines. Original chess notation is written in Latin (Serbian schoolchildren learn Cyrillic letters first), which means that the children have to learn six additional Latin letters (letters "A" and "E" are the same in both Cyrillic and Latin; other letters are phonetically spelled before children fully adopt them), which eventually comes handy when they face Latin keyboards on their personal computers. At the end of the first semester children can relax and enjoy the lessons "Fun Pages" and "Cool Stuff", where they can test their knowledge in a playful manner. Writing chess moves is taught at the beginning of the second semester, when the first-graders are expected to have mastered the entire alphabet, and are familiar with the numbers from 1 to 10.

Most of the above mentioned examples are from the textbook (or workbook) "3, 4, pozor – šah!" (3, 4, Get Set – Chess!") written by Sanja Vuksanović and Ivan Marković (cf. Bokan & Dekić, 2007). The textbook is a mix of the archetypal and contemporary content, and for that purpose the original "Chess Fairy Tale" has been introduced as a structural framework and the cohesive element in all lessons, which opens a window of opportunity for the archetypal power and universal appeal of the chess game to capture a child's attention. Children are invited to use their imagination and reinvent the game of chess ("Chess Fairy Tale" is even offered in the form of a short theatrical piece in the second edition of the workbook) while being immersed in the main characters' attempts to master the game of chess, which is a necessary prerequisite to win The Great Tournament. The educational value of the fairy tale lies in its clear distinction between the hero (Prince Phillip) and his arch-rival (the Black Knight), so the children can identify with the good prince and the way he acts. Children learn the basics of chess hand in hand with the main characters, and the girls get as much attention as the boys (the game of chess is, quite unjustly, generally perceived as more masculine than feminine, and our goal was to make a balanced approach). In the era of global aggression, our mission is more than ever to preserve warmth and the human touch, and we firmly believe that chess can help us to promote those values. If the children gradually learn to love chess and enjoy reading their books, a teacher's job becomes much easier, and their work with the pupils turns into a joyous experience for both sides.

Introductory lessons are generally easier, and their content is reduced to a functional minimum, but later both the structure and the contents become more complex and demanding, never exceeding the attention span of five visual units per one page. There were several cases where it was necessary to abandon the conventional

left-to-right organization of the presented content, and the authors had to resort to colored boxes that signify structural units. Separate subthemes within a lesson are marked with diagram frames of different colors, and the red, yellow and green squares and arrows in diagrams always have the same meaning (the only exception from the rule is the first lesson, where colors simply mark different areas of the chessboard). Green means that a move is good or possible, or that a square is vacant or adequately controlled, red means danger, or stands for forbidden, whereas yellow occurs in situations where one move precedes another. Most of the key topics simultaneously address various aspects of a child's perception in order to stimulate the activity of his/her brain. In the above discussed book the basic text is enriched with diagrams, caricatural drawings and even with some "nursery" rhymes, in the attempt to capture a child's attention and to spark an interest for the topics presented in the book[3)].

The order of introduction of important chess terms, such as piece movement, attack, capture and protection is consistent with the intrinsic logic of chess. For instance, the lesson „Rook" mentions only piece movement and capturing enemy pieces, the next lesson („Bishop") moves one step further with concepts of attacking enemy pieces and checking the opponent's king, whereas „Queen" introduces square control and protection of one's own pieces, etc. The first mention of "check" is nothing more than a mere explanation of the concept, the lessons that follow offer more details, and "mate" as the final check and the ultimate goal of the game eventually completes the information (Vuksanović & Marković, 2007: 10-15, 25).

The lack of teaching time (36 classes per year) limits the opportunities for practical play. The initial child's impulse is to play the game, and postponing it may result in dissatisfaction and demoralization to the point when they refuse to cooperate. Elementary games and "playing-out" positions (Vuksanović & Marković, 2007: 26) come in handy to prevent such an unfortunate outcome, and children can start practicing as soon as they learn the movement of pawns: they can start with nothing but pawns, and add new pieces as they move on. However, it is important to notice that this game has a different goal than ordinary chess: a side can win either by promoting one of its pawns, or by capturing all enemy pieces; playing these positions out is an important part of chess training. Children also enjoy elementary games, such as relay races, where teams may compete in many ways: they can hustle to arrange the pieces, or play a game of chess (or according to the rules of "playing-out positions") where each pupil plays a single move (a chess clock can conveniently be introduced after a while, or even a score sheet for writing down the moves of the game), otherwise acting in accordance with the rules of relay racing.

Competitive aspect of chess can cause even more problems: most recommendations discourage organizing tournaments among pupils, especially during classes. Winners may take it too seriously, but it is losing that can be particularly painful for schoolchildren. Less successful may lose their interest (sometimes due to a lack of previous knowledge, which can be a serious handicap at the very beginning) and leave without ever coming back. Fortunately, there are several new teaching methods that strike at the core of the problem and offer creative solutions. Canadian chess teacher Bruce Alberston has created a beautiful educational game called "Chess Mazes", and what is more important – children find it very entertaining. In those exercises the alternation of moves rule has been suspended, and only white gets to make the moves, usually with a single piece (there are also some more difficult examples with several white pieces and additional stipulations), which moves and captures just the same. The maze piece (or pieces) cannot be placed on a square where it is subject to capture by an enemy unit, and it has to move in the most efficient manner (i.e. in the shortest possible way: the goal has to be achieved with the fewest of moves) to accomplish the goal of the game: to place the black king in check or mate (Alberston, 2005: 1-2). These chess "katas" (the analogy with karate is quite obvious) are performed without any hindrance or interference from the opponent, and the solver's maneuvering has to be carried through with utmost precision and economy of forces. In such way a child can be undisturbed during practice and develop visualization and planning skills (moving and capturing, avoiding dangerous squares, finding a pathway to the opponent's king, etc.), yet realize at the same time that each move counts.

Several recent works deal with computers and their place in chess education of younger schoolchildren. Playing chess against each other with computer assistance, or playing against computers often requires specialized software, but introducing the element of play seems to yield positive results (Poloudin, 2007: 21-23), as opposed to some older views on the matter (cf. Suhin, 2004). Specialized software developed by the Russian author is not widely available, which means that his methodology is of limited use for the time being, although it seems quite promising. An alternative solution may actually be close at hand: commercially available software from "ChessBase" (German-based software publishers), such as newer versions of "Fritz", "Junior", "Shredder", "Hiarcs" or "Rybka", has an extremely useful option "Handicap and Fun". This menu offers several levels of adjustment of computer engine's playing strength; e.g. Fritz 11 has a range from 1300 to 2433 FIDE rating-points on Acer Aspire 7520 (AMD Athlon 64 x2 Dual Core processor, TK-55 (1,8 GHz, 2 x 256 kB L2 cache) with 2GB DDR2 of RAM memory). However, other options are even more interesting, and the user is allowed to adjust multiple parameters according to his preferences: blunder range, king's attack,

3) For instance, the lesson "Pawn" is an example of multiple variations of the difficult "en passant" theme, which is an exception to the previously explained rule of capturing enemy pieces (Vuksanović & Marković, 2007: 18).

king's defense, piece placement, pawn structure, mobility, center control, piece trading, variety, piece play, etc.). There are several predefined levels as well (patzer, careless, desperado, etc.), and the teacher can start by setting levels with blunder range 10 where computer often blunders its pieces. It is also important to notice that computer resigns the game if the opponent is way ahead in material, which is particularly useful since pupils can focus on capturing pieces instead of aiming at mate, which is a more complex goal (sometimes a child gets frustrated if he/she is incapable of mating the opponent due to inability to coordinate his/her pieces; if computer program resigns before that happens, a child feels that he/she is awarded for capturing computer's pieces and learns to pay attention to that important element of the game of chess). Teacher gradually changes the parameters in order to improve computer's resistance and secure the improvement (and motivation) of his pupils. In that way children compete and play, and they feel no ill-effects of unhealthy competition among themselves[4]. The final lesson in the book "Chess is more than a game – think about it!" probably sums up the philosophy of the entire project (Vuksanović & Marković, 2007: 95): chess becomes a permanent didactic tool in a broader social picture and gets its "place in the sun" in the Serbian educational system. The Institute for Education and Upbringing has published official data for the school year 2007/08: chess as an elective subject was taught to 2404 younger schoolchildren in 66 Serbian schools. The effects of the novel approach (increase in the number of participating schools and their children, chess teachers' satisfaction and the growing interest in the neighboring countries) indicate the growth trend, which leads to the conclusion that the process should be closely followed in the upcoming period.

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4) Children from Belgrade primary school "Kreativno pero" have been providing positive feedback to playing against personalized levels of computer strength. They have quickly mastered the necessary skills for adjusting various parameters to their playing preferences. Identification with personalized levels made them feel as if they were playing against human opposition, and from that moment on their motivation sky-rocketed: pupils have eventually become their own coaches in terms of programming their training. Of course, there were too little schoolchildren involved in the experiment to draw any relevant conclusions. (September – November, 2008)

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KYPHOTIC BAD BODY POSITION DURING A SCHOOL YEAR

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INTRODUCTION

According to the studies related to postural and body deformities at primary school children, we can confirm that the number of the children with these deformities is constantly rising.

Reduced range of physical activities which is caused by urban life style, as well as inadequate exercises at PE classes cause the muscle region weakening, and therefore, the spine muscle region. These changes lead to bad body position, certain postural deformities and finally body deformities.

The studies that have been carried out till now show worrying percent of these deformities and thus a special corrective or medical treatment is needed to prevent children from these deformities. If not reacted properly and in time, these problems could lead to many others, not only for a separate individual only but for the society as a whole.

PAPER SUBJECT

The subject of this study is to determine the number of the 5th grade school children who do not have postural kyphotic bad body position.

After the number of these children is determined at the initial measuring, another measuring should be done at the end of the school year half term and one more after the school year end. This is necessary if our aim is to monitor the occurrence of the mentioned deformities during this period.

Based on these indicators as well as on the true picture of having or not having these deformities, some proper guidelines should be given for PE syllabus.

METHODOLOGY OF WORK

Complete program was carried out in Kragujevac and this study included 434 5th grade pupils from different city and country schools.

In order to establish the bad body position deformities the somatoscopy and measuring methods were used, and instruments like plumb-bob, the ruler and dermograph.

It was necessary to measure the kyphotic curve by positioning the rope in a way in which it gently touches thorax and then the distance between the rope and vertebrae prominens was measured. The results were written down into the pupils' personal files .

The average value of mild criterion was taken for the study. All the subjects whose value was larger than 35mm were registered as those with kyphotic bad body position. Those subjects whose value was 35mm or less, were referred to as the ones without the kyphotic bad body deformity.

AIM AND TASKS

At the school year beginning the number of pupils with (and without) kyphotic bad body position should be determined.

This should be determined according to the pupils' sex.

At the end of the school year half term as well as at the very and of the school year, a number of pupils with kyphotic bad body position should be determined among the children who did not have this deformity at the initial measuring.

KYPHOTIC BAD BODY POSITION CLINICAL PICTURE

Kyphosis is an extra apparent anteroposterioral spinal column or its part curve . It is seen from the sagittal plane, and clinically observed, the picture of misbalanced posture is as it follows:

-head bent towards the frontal side, in front of the vertical line

- shoulders moved toward the frontal side
- apparent hunchbacking
- pulled-in chests
- distinguished scapulae, set apart from the spine
- soft and flabby abdomen
- bent knees, moved toward the frontal side
- very often insufficient feet

According to the origin, there are two types of kyphosis: congenital and acquired .

Congenital kyphosis is the one that someone was born with. Some deformities existed before the birth, intrauterine. They might be found in the structure,ie.in the thorax,where the deformity occurs.This can cause other vital organs malfunctioning, like the ones of respiratory and cardiovascular system.

Acquired kyphosis occurs later, during the growth and development process,and is mostly the result of bad body position. School chairs and desks,inpropriate for the pupils' ages, can influence the thorax curve . Beside the muscle tonus deformities, ligaments and joints are also endangered. The final result is fastened spine column,kyphosis,which is deformed into the fan shape,as it is seen in the X-rays.Intervertebral discs change their shape ,and,as the time passes, the vertebrae are changed,too.

Morbus Bechterew is a form of acquired kyphosis which results in kyphotic body position along the whole spinal column.

Acquired kyphosis can be caused by bad eye sight, chronic pains, uncomfortable position while lying, some illness and traumatic states.

RESULTS

Chart 1: Number of pupils with kyphotic bad body position

Number of pupils: 434	Kyphosis	%
Initial measuring (school year beginning)	194	44,7
The second measuring (school year half term end)	175	40,32
The third measuring	118	27,18
removed deformities	76	39,17

This chart shows the number of pupils with kyphotic bad body position present at the three mentioned measuring. At the initial measuring, there were 194 pupils(44.7%) with kyphotic bad body position; at the second measuring this number was 175 (40.32%),and at the third measuring there were 118 (27.18%) pupils with kyphotic bad body position. The reason for this bad body position reduction was a programmed corrective exercising of the subjects.

Graph 1. Number of pupils with kyphotic bad body position

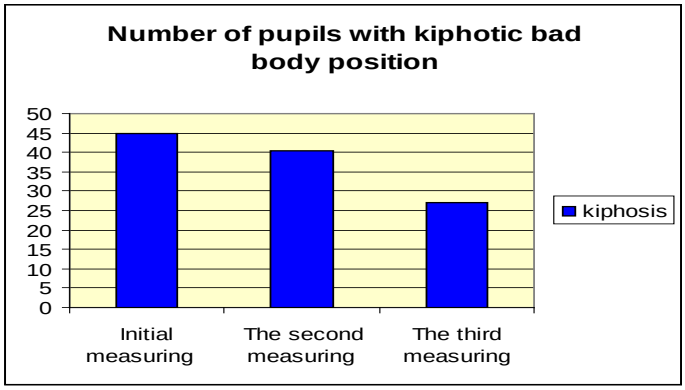

Chart 2: The number of pupils without kyphotic bad body position

Number of pupils 434	Without kyphotic bad body position	%
The first measuring	240	55,29
The second measuring	184	42,39
The third measuring	148	34,1
The number of new deformities	92	38,33

The number of pupils without the kyphotic bad body position at the initial measuring was 240 (55.29%). At the second measuring (half term end) this number was 184 (42.39%), and this number was reduced at the third measuring (school year end) to 148 pupils (34.1%).

Graph 2. The number of pupils without kyphotic bad body position

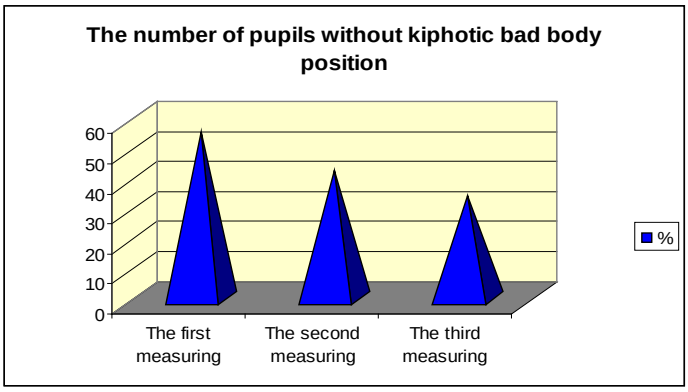

Chart 3: The number of pupils with new kyphotic body deformities

The number of pupils 240	K - 240	%
The second measuring	56	23,33
The third measuring	36	15
The total number of pupils with new body deformities	92	38,33

This chart shows the number of deformities at the control and final measuring (38.33%) of 240 subjects who did not have bad body position at the initial measuring. As you can see, there were 56 new deformities (23.33%) at the second measuring, and 36 new deformities (15%) at the third measuring. After the initial measuring, there were 92 (38.33%) pupils with new deformities at the school year end.

Graph 3. The number of pupils with new kyphotic body deformities

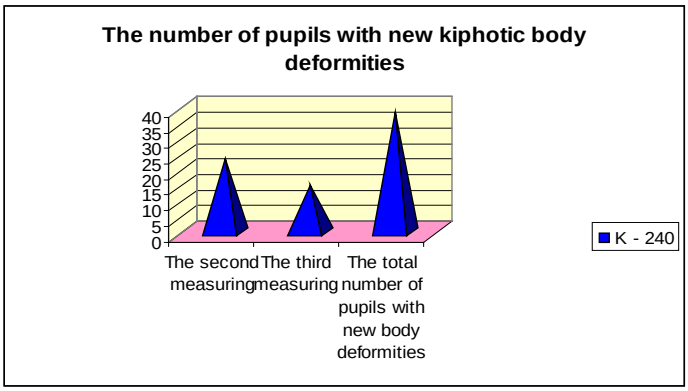

Chart 4: The number of female and male pupils with kyphotic bad body position

Number of pupils 434	Without deformities kyphosis -male	%	Without deformities kyphosis –female	%
The first measuring	89	20,5	151	34,79
The second measuring	57	13,13	127	29,26
The third measuring	43	9,9	105	24,19
The number of new deformities	46	51,68	46	30,46

We analyze kyphotic bad body position at the subjects depending on the sex. There were 89 (20.5%) male pupils without the kyphotic bad body position at the initial measuring. This number was 57 (13.13%) at the second measuring, and 43 (9.9%) at the final measuring.

At female pupils , there were 151 (34.79%) of them without the kyphotic bad body position at the initial measuring. At the second measuring this number was 127 (29.26%), and at the final measuring there were 105 (24.19%) female pupils without the kyphotic body deformity.

The number of male subject with kyphotic bad body position was 46 (51.68%) and the number of female subject with kyphotic bad body position was 46 (30.46%).

Graph 4. The number of female and male pupils with kyphotic bad body position

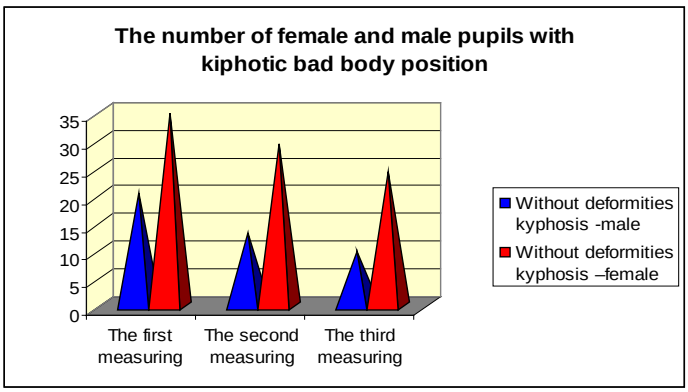

Chart 5: The number of pupils with new kyphotic bad body position Kyph./male subjects- kyphosis/ female subjects

The number of pupils 240	Without kyphosis-male subjects - 89	%	Without kyphosis-female subjects - 151	%
The second measuring	32	35.95	24	15.89
The third measuring	14	15.73	22	14.56
The total number of subjects with new deformities	46	51.68	46	30.46

We observe the number of pupils-male and female subjects- who were without the kyphotic bad body position at the initial measuring.

At the male subject, the number of pupils with kyphotic bad body position increased (51.68%).At the second measuring, there were 32 (35.95%) subjects with this deformity, and at the third measuring there were 14 (15.73%) male subject with this deformity.

As for the female subjects, there were 30.46% of them with this deformity at the initial measuring, then,24 (15.89%)girls at the second measuring and 22 (14.56%) girls with this deformity at the final measuring.

It is obvious that bad body position is more common at the male subjects (51.68%) than it is at the female subjects (30.46%)

CONCLUSION

According to this results analyses, it can be concluded that those pupils who had kyphotic bad body position at the initial measuring and later were involved in a special corrective exercises program during the PE classes, showed a certain progress, and there was a reduction of this deformity at 39.17%.

If we analyze the group of subjects who were without the deformity at the initial measuring, we can spot that this number reduces, so the results of the final measuring show 38.33% of cases with this body deformity.

According to subjects' sex, kyphosis is more evident at boys (51.68%) than at girls (30.46%)

According to the results of the study, we can conclude that it is basic for primary schools to introduce initial measuring at the PE classes , at the school year beginning in order to determine postural disturbances and body deformities. This is important because it allows us to deal with it by different exercise programs during the PE classes .

It is also necessary to get some more space for pupils' physical state within the syllabus, and one PE class a week should contain body form exercises and shoulder girdle exercises, and all this for a good health of pupils and their optimal postural status.

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PRIMARY SCHOOL PUPILS' VIEWS ON EXTRA-CURRICULAR SPORT AND RECREATIONAL ACIVITIES

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1. Introduction

'None of the world's medicines can replace physical exercise but physical exercise can replace many medicines', are the words of the famous French doctor Tussaud who pointed out the beneficial effects of physical exercise a long time ago, but his teachings seem to be fading out increasingly in times such as these, since the world of today is preoccupied with its own rapid development and struggle for profit and people fail to recognize the wholesome aspects of the time they spend doing physical activities.(Stevo Popovic 2003).

The technological revolution that started two centuries ago enabled a sharp increase in the production of goods, improved the standard of living, created excess leisure and paved the way for the ensuing cultural development. This leads to the conclusion that man's working and living conditions have radically changed and improved since. However, general automatization and mechanization have been the cause of ever decreasing levels of man's physical activity not only at work but in his spare time as well.

As he strove to conquer and alter the world around him so that it would fit his own needs, man inadvertently gave rise to a series of negative phenomena which have imperiled his health and subsistence on the planet up to the present day. The need to move and do physical exercise represents one of the essential biological needs which is said to have coincided with the birth of mankind. Human health and normal functioning of all human organs, system of organs and human body as a whole, is fully dependent on regular and systematic physical activity.

In addition to all its positive features, modern lifestyle almost invariably involves practices which have destructive consequences for the development of character, especially with children whose bodies are ill-equipped to withstand negative environmental factors. As a result of their demanding schedules, they are left with too little time for engaging in kinaesthetic activities. That is why it is of paramount importance for children to structure their spare time in such a way as to secure maximum health, disease prevention and the development of all their physical capacities. It is for this purpose that the appropriate sport and recreational activities should be incorporated into the school curriculum. The sheer biological need for physical activity, games and fun, is the basic reason for the introduction and implementation of sport and recreational programmes in the syllabus.

Systematic implementation of scientific-based programmes of sport and recreational activities efficiently satisfies the relevant needs, guarantees the increase of physical activity in general and maintains and improves motorical, functional and operational abilities. Additionally, it prevents diseases, alleviates health problems, relieves medical disorders, fatigue and mental strain and provides new ways of effective organization of leisure. This approach also creates bonds between people and provides the necessary rest and diversion.

2. Aims

The basic aim of this study was to emphasize the significance of the extra-curricular sport and recreational activities in primary schools as well as to pinpoint the preferences, needs and interests of the pupils attending them. The degree of efficiency in achieving the primary goal of the research was directly influenced by proper performance of certain tasks, primarily those which involved probing pupils' views on the introduction of extra-curricular sport and recreational activities into primary school syllabuses and those concerning the appropriate processing and analysis of the research results and drawing valid conclusions from them.

3. Methods

3.1. Polled Sample

The sample of the polled pupils consisted of the seventh-grade population in 'Rajak Pavicevic' primary school. It was made up of forty seventh-graders whose selection was based on the following criteria: regular attendance and enthusiastic approach to lessons.

3.2. Techniques and tools

The data relating to the pupils' opinion whether extra-curricular sports and recreational activities should be incorporated into primary school syllabuses were collected through the use of the general surveying technique whereas the surveying tool used was a questionnaire comprised of nine questions. The pupils' task was to circle only one of the options provided, i.e. the option they found most suitable and appealing.

4. Results and analysis

The data were processed using a statistics software application called SPSS 10.0, fit for use on personal computers. This technique yielded different statistical figures categorized into several tables.

The tables contain distribution parameters of discontinuous statistical series. The columns represent classes and their respective frequencies, relative frequencies, accumulative frequencies and relative accumulative frequencies while the rows display the results for each of the polled groups based on the given answers together with the aggregates of frequency and relative frequency.

Table 1. exhibits data representing the answers of the polled sample of pupils to the question: 'Do you think there is a sufficient amount of extra-curricular sports and recreational activities in your school?' while the options provided were as follows: 'yes', opted by 12 pupils (30%) , 'no', opted by 23 pupils (57.5%) and 'maybe', opted by 5 pupils (12.5%).

Table 1.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	12	30	12 (40)	30 (100)
b	23	57,5	35 (28)	87,5 (70)
c	5	12,5	40 (5)	100 (12,5)
Total	40	100		

The figures in Table 2. represent the pupils' answers to the question: 'Would you like an extra sport and recreational activities class to be added to the existing physical education classes in your curriculum?' and the options were: 'yes', opted by 35 pupils (87.5%), 'no', opted by 2 pupils (5%) and 'maybe', opted by 3 pupils (7.5%).

Table 2.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	35	87,5	35 (40)	87,5 (100)
b	2	5	37 (5)	92,5 (12,5)
c	3	7,5	40 (3)	100 (7,5)
Total	40	100		

Table 3. shows data concerned with the pupils' responses to the question: ' Would you like to be engaged in certain sport and recreational activities during the break?', and the options were: 'yes', opted by 19 pupils (47.5%), 'no', opted by 7 pupils (17.5%) and 'maybe', opted by 14 of them (35%).

Table 3.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	19	47,5	19 (40)	47,5 (100)
b	7	17,5	26 (21)	65 (52,5)
c	14	35	40 (14)	100 (35)
Total	40	100		

The answers to the question: 'What would you like to do most during the break?', were categorized in Table 4. This time, the sample was given the following options: 'walk around and talk', opted by 13 pupils (32.5%), 'play on our own', opted by 6 pupils (15%) and 'be engaged in sports and recreational activities', opted by 21 (52.5%) pupils in the sample.

Table 4.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	13	32,5	13 (40)	32,5 (100)
b	6	15	18 (27)	47,5 (67,5)
c	21	52,5	40 (21)	100 (52,5)
Total	40	100		

Table 5. summarizes the statistical information relating to the respondents' answers to the question: 'Would you like to go on excursions and camping trips organized by the school?', and the options were: 'yes', opted by 38 (95%) respondents, 'no', opted by none (0%) and 'maybe', opted by 2 (5%) of them.

Table 5.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	38	95	38 (40)	95 (100)
b	0	0	38 (2)	95 (5)
c	2	5	40 (2)	100 (5)
Total	40	100		

Table 6. contains the statistics associated with the pupils' views on spending winter holidays on a mountain, doing sport and recreational activities. Their answers were as follows: 'yes', opted by 30 (75%) pupils, 'no', opted by 2 (5%) pupils and 'maybe', opted by 8 (20%) of them.

Table 6.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	30	75	30 (40)	75 (100)
b	2	5	32 (10)	80 (25)
c	8	20	40 (8)	100 (20)
Total	40	100		

The data in Table 7. pertain to the respondents' answers to question no. 7: ' If you circled 'yes' in question no. 6 ('Would you like to spend your winter holidays on a mountain doing sports and recreational activities?'), please explain why'. They were given five options: 'so I could throw snowballs and play some other games, opted by 12 (30%) pupils, 'so I could go sledging', opted by 2 (5%) pupils, 'so I could go skiing', opted by 15 (37.5%) pupils, 'so I wouldn't have to stay at home and study', opted by 4 (10%) pupils and 'other reasons', opted by 7 (17.5%) of them.

Table 7.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	12	30	12 (40)	30 (100)
b	2	5	14 (28)	35 (70)
c	15	37,5	29 (26)	72,5 (65)

d	4	10	33 (11)	82,5 (27,5)
e	7	17,5	40 (7)	100 (17,5)
Total	40	100		

The information in Table 8. represents the respondents' opinions on what they would like their sport and recreational activities to include. The options provided were: 'going skiing every year', opted by none (0%) of the respondents, 'going on excursions and camping trips more often', opted by 9 (22.5%) pupils, ' sport and recreational activities involving more fun', opted by 1 (2.5%) pupil, ' more outdoor games', not opted at all (0%), 'playing football more often', opted by 9 (22.5%) pupils, 'dance lessons', opted by 3 (7.5%) pupils, 'more swimming', opted by 1 (2.5%) pupil, ' organized trips to sports matches', opted by none (0%), 'more excursions', opted by 13 (32.5%) pupils, 'Saturday events', opted by 2 (5%) pupils, 'a school discotheque', opted by 1 (2.5%) pupil and 'other ' opted by 1 (2.5%) pupil.

Table 8.

Class	Frequency	Relative frequency (%)	Accumulative frequency	Relative accumulative frequency
a	0	0	0 (40)	0 (100)
b	9	22,5	9 (40)	22,5 (100)
c	1	2,5	10 (31)	25 (77,5)
d	0	0	10 (30)	25 (75)
e	9	22,5	19 (30)	47,5 (75)
f	3	7,5	22 (21)	55 (52,5)
g	1	2,5	23 (18)	57,5 (45)
h	0	0	23 (17)	57,5 (42,5)
i	13	32,5	36 (17)	90 (42,5)
j	2	5	38 (4)	95 (10)
k	1	2,5	39 (2)	97,5 (5)
l	1	2,5	40 (1)	100 (2,5)
Total	40	100		

5. Conclusions

The extra-curricular sports and recreational activities appeared to be insufficiently represented in the school syllabus which was confirmed in the answers of 23 pupils or 57.5% of the sample. This circumstance accounts for the pupils' desire for the incorporation of the aforesaid activities into the timetable (35 pupils or 87.5% of the polled total support this idea). According to the 19 respondents (47.5% of those surveyed) who opted for sport and recreational activities during the break, the possibility of introducing certain extra-curricular sport and recreational activities into the syllabus should be given serious thought.

The results of the research also indicate a keen interest in outdoor sport and recreational activities: excursions, camping trips and snow sports. P.E teachers should have a major role in putting into effect and coordinating these activities.

Based on the respondents' answers, several propositions relating to the introduction of sport activities into the curriculum are to be made:

- the first proposition stresses the need for organizing yearly excursions with sport and recreational activities as their pivotal point
- the second proposal foregrounds the idea of organizing as many outings and camping trips as possible, since the vicinity of National Park Tara and the surrounding area offer numerous possibilities for such activities
- the third proposal highlights the need to give football a prominent place on the list of sports to be represented in the curriculum as it appears to be children's favorite

The introduction of sport and recreational activities into the curriculum would play many important parts such as: disease prevention, correctional technique and compensatory measure. Sport and recreational activities have a soothing effect on the body and they aid children's rest and recovery from the exhausting school activities more than a passive rest does.

Extra-curricular sport and recreational activities directed by teachers should provide pupils with well-organized free-style game activities, ensure that all children develop a healthy carriage, enhance their immunity to infectious diseases, perfect their physical abilities serve as an active rest and finally teach children to embrace the standards of decorum.

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MARTIAL ARTS IN THE CURRICULUM IN SCHOOL PHYSICAL EDUCATION

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1. INTRODUCTION

Because of its influence on the development of many anthropological characteristics, martial arts and sports have been used for ages as an excellent tool in upbringing and education of youth. In current plans and programs for physical education in schools, despite all changes and corrections, content regarding specific martial arts can be found. Although this content is actually meant for a certain number of classes, realization of this teaching content rarely came to practice. Reasons for this were sometimes objective in nature, and sometimes purely subjective. From the objective problems, absence of space and training facilities are most commonly mentioned, but the main problem is the teacher's lack of interest to realize these elements of the program. This kind of practice led to the situation in which martial arts are almost completely missing from certain plans and programs for the curriculum for physical education and the consequences of this process hasn't been easy to distinguish at first. However, gradual decline of quality of many martial arts, but also sports in general in Serbia, can be linked to its inadequate representation in programs of physical education. A few years ago, the Ministry of Education and Sport started an initiative for introducing certain martial arts in teaching plan and curriculum for pupils of elementary and high schools of Serbia, in the form of a facultative class. As to confirm the professional and legal basis, and also the possibility of realization of this initiative, the Ministry of Education and Sports has entrusted the Faculty of Sport and Physical Education to make a study, whose goal is to determine justification of introducing martial arts in the curriculum for physical education in elementary and high schools in Serbia. In this paper suggestions and ideas have been given about the implementation of some of the content from the area of martial arts into the curriculum for physical education in elementary and high schools, in coherence with the interest for content regarding martial arts and actual plans and programs for physical education.

2. MARTIAL ARTS IN PROGRAMS FOR PHYSICAL EDUCATION

Many professional analysis and observations are pointing to a long time dissatisfactory state in the area of school physical education and sport, firstly from the aspect of possibilities for satisfying the needs of children and youth for physical activity and a real identification in the area of school sport.

In citing the main reasons for such a state, the most prominent ones are: lack of adequate objects for realization of curriculum and non curriculum activities, absence of adequate instruments and requisites for certain program contents, unsolved system for financing non-regular teachers etc., and even 18 % of observed Belgrade schools don't have a school gym (Milovanović, 2003.). However, in addition to pointing out these problems and focusing attention to the probable causes for such a condition, unfortunately there is still no consistently formed and tuned recommendation of measures for overcoming these evident problems. In today's curriculum for school physical education, the main place has been occupied by the content of basic sport branches, firstly gymnastics and athletics, but also established sports: soccer, handball, volleyball and basketball. This is understandable and justified, with regard to unquestionable and certified values of basic sports and the popularity of the before mentioned sports. However, one should have in mind that there is a significant interest in children and youths for new sport branches, which could, according to their values, become a very suitable content for the curriculum for physical education and sports in schools. Martial arts are definitely a part of this group.

Via analysis of actual programs, it is ascertained that **from 1. till 3. grade** of primary school, compulsory class Physical education has been carried out with 3 classes per week or 108 classes per year (the Ministry of Education and Sport RS, 2005). **From 4th to 8th grade** of primary school, by the current curriculum, the class Physical education has been carried out with 2 classes per week with educational activities and 1 class per week with sports activities, or 36 classes per year (the Ministry of Education and Sport RS, 2006). From martial arts only wrestling has found its place in these curriculums. It has been calculated that the wrestling program should be realized in the 6th grade of primary school and that the pupils in high schools, based on their abilities and interests, choose one sport for practice and development during the entire school year.

Wrestling is amongst those sports. Beside this minimal participation in programs for physical education, martial arts appear occasionally in republic school sport competitions for younger pupils, but are not provided in compulsory school program (Radojević and Grbović, 2002).

Martial arts can be practiced by pupils of all ages, irrespective of gender, height or bodily constitution. Although there are certain group of techniques which are more suitable to certain types of constitution (Jovanović and associates, 2005, Kasum, 2006, Kasum i Radović, 2007) all practitioners can practice together and practice the techniques amongst themselves (Stojanović, 2007). It is also common that pupils of different gender mutually practice with great efficiency. Martial arts in curriculum for physical education have a great influence in the correction of deformities and bearing, also in the development of fellowship and other socialization qualities, what's more, martial arts could have an important place and role in curriculum for physical education being a strong stimulant of the development of motor abilities, like speed, flexibility, strength, coordination, stamina, balance, precision, agility, orientation in space.

There is a great positive influence of martial arts to a whole range of psychological abilities, like self-confidence, perseverance, toughness, courage, aggression and stress control (Novaković, 2008). Proper muscles and fine built body are also achieved by systematical practice of martial arts, and the creative enthusiasm, which can be noticed at competitions, and trainings also, lead to high aesthetic forms, and in that way develop aesthetics and aesthetic expression (Stajčić, 2007). With all children who practice martial arts, moral norms and ethics of proper conduct are being nurtured and developed. The basic moral approach, which is being pervasive throughout the entire practice of martial arts, emphasize that one should not do to other, which he does not want to be done to himself, and togetherness, mutual help and responsibility are prerequisites for successful improvement. Hygienic habits should by no means be neglected and also the development of friendship and quality relationships with the environment. It is no coincidence that martial arts found its place in curriculums of schools and colleges all over the world. In many countries a lot of space in the educational systems has been dedicated to martial arts, especially in the USA, Russia and other countries of former Soviet Union, Japan, France, Iran, Turkey, Bulgaria, Romania, Finland, Sweden etc. If one has in mind that many athletes, who originated in martial arts and later on, duo to specific circumstances, went on to other sports and achieved top careers, the significance and justification of bringing these sports into school education programs is fully apparent. It is enough to mention the names of Michel Platini and Zinedine Zidane, who from judo, after arm injuries, went over to play soccer and achieved world glory. The similar story can be told for our famous basketball player Veselin Petrović, who was a very talented wrestler but, due to circumstances, went over to basketball and became a top player and a member of the representation of Yugoslavia.

By introducing a sport of choice in the programs for physical education, an opportunity has arisen for the pupils to, in their regular curriculum, get a chance to get acquainted with certain martial arts in a better and more detailed way. The pupils have been left with the possibility to, according to personal wishes and interests, choose a martial art as a class to which they will attend once a week. Of course, for these programs to be realized, there must be adequate conditions in schools, and a teacher who is willing to lead a program for a certain martial art. The absence of proper conditions for realization of programs for certain martial arts can very often represent a serious problem. First of all, the major problem is the absence of proper mats, on which the class for wrestling, judo or aikido would take place. Some teachers who face these difficulties are trying to solve this problem by improvising the mini fighting grounds from several gymnastics mats. In these mini fighting grounds, some simplified and reduced programs can be practiced, and total area and number of mats determine the number of pupils that can practice at the same time. In any case, what will be offered and to what amount, depends mostly on the aspiration and interest of the teachers and pupils. It can be concluded with confidence, that the attitude and interest of pupils will greatly depend on the creativity and aspiration of the teachers to realize such a program.

There is a significant number of teachers in schools, who show interest and have an adequate level of skills for realizing the parts of the program for martial arts. According to the old program of the Faculty of Sport and Physical Education of that time, teachers of physical education attended the class of Fighting throughout three semesters, which, even to those with no previous experience in martial arts, gave a solid basis enough to start engagement in practice. In newer programs of the Faculty, the program for the class Theory and methodics of fighting has been brought down to one semester, which was clearly not enough for those not specialized in martial arts. The latest program provides that interested students, along with the curriculum for the class Theory and methodics of fighting, choose and attend to, through two years of Basic studies and one year of After-graduate studies, the Theory and practice of martial art by choice. This good possibility has been given to all of those who completed the 4-year studies at the Sport section, to go through After-graduate studies and fifth year, and get a degree and a possibility to work in a school. It is thus provided that all those especially interested in martial arts, get much more information from this area and become fully skilled for realization of all forms of curriculum and sports content from the area of martial arts.

3. INTEREST OF TEACHERS, PUPILS AND PARENTS FOR MARTIAL ARTS

The Faculty of Sport and Physical Education made, for the Ministry of Education and Sports of Republic of Serbia, a Study of justification for introducing martial arts in classes of physical education in elementary and public schools of Serbia (Jovanović, S. and associates, 2005). The research for this Study was made in 25 different regions throughout Serbia, on the sample of 1088 teachers of physical education, 8164 pupils and 5894 parents of school children. Special questionaries has been made for the Study:

- Questionnaire for teachers of physical education (opinion about justification for introducing martial arts in teaching programs of physical education, opinion about introducing a facultative class Sports in schools);
- Questionnaire for pupils (opinion about introducing a facultative class Sports in schools and type of sport, which a pupil would choose as a facultative class);
- Questionnaire for parents (opinion about introducing a facultative class Sports in schools and type of sport, which a parent would choose as a facultative class for his child);

The Study results showed the interest of pupils, teachers and parents for martial arts, in general and in particular, but also the interest for introducing a sport by choice in the program of physical education. Amongst the **teachers** of physical education there is mainly a positive attitude towards the idea of introducing of martial arts in the teaching programs of physical education. The idea was supported by 68,2 % of teachers engaged in the Study, and 31,8 % was against it. The percentage of suggested martial arts was the following: judo – 36 %, karate – 26 %, wrestling – 15 % and aikido – 13 % (table 1). This is probably because of the fact that judo, karate and wrestling, as popular and overall acknowledged sports, are already being taught at the University, so the teachers from the Study are considered to be generally competent for their realization in practice.

Table 1: Teachers' preference for a particular martial art

	Sport	Opinion FOR
1	judo	36.1%
2	karate	26.1%
3	wrestling	15.3%
4	aikido	13.3%
5	taekwondo	5.9%
6.	other	3.3%

At the same time about 52 % of the theachers involved in the Study considered that there are no arguments for introducing of these sports into the program of school clubs and extracurricular activites (Table 2). We link these results with the known facts that schools usualy don't have gyms, equipped for martial arts, where the school club programs would be realized at a higher level. By the way, in the current program for physical education a possibility has been provided, that any sport branch, even martial arts, which are of interest for the local community and pupils, and for which the proper facilities in school exist, can be practiced in school clubs and other forms of curriculum.

Table 2: Teachers opinion about the introduction of martial arts in form of school clubs and as extracurricular activities

Martial arts in school clubs		Martial arts as extracurricular activities	
YES	NO	YES	NO
47,7%	52,3%	48,9%	51,1%

The results of the Study show, that the **pupils** would mostly choose, as a class by choice, different sports and swimming: soccer – 19,1 %, basketball – 11,6 %, voleyball – 10,8 %, swimming – 11,6 %. For some martial arts, which were the main subject of the Study, the pupilis didn't show great interest, except some interest for karate – 4,7 %, but a much lower percentage for other martial arts.

As for the parents' opinion, similar results have been acquired. As a sport by choice **the parents** mainly chose swimming – 21 %, soccer – 14,8 %, basketball – 12,7 % and voleyball – 10,3 %. The parents also weren't favourable for the martial arts, but again chose karate – 4,3 %, rather than other martial arts.

Table 3: Pupils' and parents' preferences of sports

	Pupils	FOR	PARENTS	FOR
1	soccer	19.1 %	swimming	21.0 %
2	basketball	11.6 %	soccer	14.0 %
3	swimming	11.6 %	basketball	12.7 %
4	voleyball	10.8 %	voleyball	10.3 %
5	karate	4.7 %	athletics	4.8 %
6.	handball	4.6 %	gymnastics	4.6 %
7.	tennis	3.4 %	karate	4.3 %
8	shooting	3.3 %	handball	4.0 %
9	gymnastics	3.2 %	tennis	3.0 %
10	sport dancing	3.0 %		

The interests of female pupils for sport activities was a subject of a separate research (Radojević, 2006). The research included 3720 female pupils from 14 regions in Serbia from 4. till 8. grade of elementary school, who had to choose between 27 offered sport activities. The results show, that the female pupils are mainly interested in volleyball – 19 %, swimming – 15 % and basketball – 7.5 %, and from the martial arts the biggest interest was for karate – 4.9 %. After categorizing sports after type and similarity, it was established that the female pupils show the most interest for sport games – 34.6 %, then for sports of esthetics movement – 20.36 %, swimming – 16.42 %, and **martial arts – 7.95 %.** In the same research, which included 3663 male pupils of the same age, the result show their dominant orientation and interest in soccer – 39 %, basketball – 15 %, and swimming – 7 %, and as far as martial arts are concerned their interest was in karate – 4.9 %, judo and aikido – 2.5 %, and taekwondo and wrestling – below 1 %. These results show that in all **about 10 % of the pupils from the research is interested in practicing martial arts.** In the same research the parents of the pupils were asked similar question. From 5555 parents, 3428 mothers and 2137 fathers, 20.72 % of parents would like that their children to practice swimming, 14.85 % soccer, 12.03 % basketball, and 10.24 % volleyball. The percentage for martial arts was the following: karate – 4.3 %, aikido – 2.7 %, judo – 1.19 %, taekwondo – 0.67 %, and wrestling – 0.02 %. It means that **about 9 % of the parents involved in the research show interest that their children practice martial arts.**

4. CONTENT SUGGESTION FOR THE SPORT BY CHOICE

Various researches and analysis show that the teachers of physical education mainly support the idea to include martial arts in the programs of physical education in schools. The result of the researches, which were supposed to determine the interest of the pupils and their parents for martial arts, show that the interest for various martial arts in particular is less than the interest for some other sports. From all martial arts, the pupils and their parents are mostly interested in karate. For other martial arts the interest is somewhat less, but anyway, it could be concluded that there is some interest for judo, wrestling, aikido and taekwondo. However, considering the interest in martial arts in whole, we came to the conclusion that the interest is still considerable. We should bear in mind that during the research the other martial arts were not included, and surely there is some interest in boxing, kick boxing, savate, capoiera and jiu jitsu too. Locking at the results of the research in this light, it is logical to conclude that the interests of a great number of pupils and their parents were not adequately responded to. So we could say that the interest in martial arts is considerable, but they are almost not at all included in the curriculum for physical education. Experiences from many other countries with excellent educational systems, which are at the same time the leading sport nations in the world, speak in favor of paying more attention and giving adequate space to martial arts in the curriculum for physical education.

Many worldly recognized coaches from different sports rightfully recommend martial arts as additional to their basic sports. Wrestling as an additional sport in other sports were recommended by, among others, B. Poez and P. Matvejev, then by famous cycling coaches A. Bichev and K. Agnatov, famous Ukrainian coach, and a living legend in weight lifting W. M. Pisarenko, for water polo it was recommended by K. Laki, for boxing K. F. Gradopolov, A. Fesenko and T. Andreyev, and for rugby L. Frank and S. Karpal (Marić, Baić I Cvetković, 2007). Boxing is highly recommended as an additional sport to tennis players and judo and jiu jitsu for soccer, handball and rugby players (McClellan and Anderson, 2002). Similar recommendations for martial arts to be additional sports were given by many of our renowned experts from different sports, with special accent

on soccer, basketball, handball, water polo, rugby, hokey… The authors of this paper share their opinion and highly recommend martial arts as additional sports in all contact sports, as also in many sports which require the ability of maintaining and pertaining balance, for instance in gymnastics, kayak, kanu, sailing, skiing, ice skating, cycling…

All these arguments point to the fact that to the martial arts should be given more attention in the curriculum for the physical education. It should be no problem to organize the curriculum as a sport by choice in the areas where there is a certain interest and adequate conditions for the particular martial art. Such ideas were already considered and concrete solutions have been given (Jovanović, 1999; Novaković, 2008; Đeković, 2008; Stošković, 2007; Ilić, 2008; Veličković, 2008; Dragović, 2007; Mirilović, 2008). Nevertheless, objectively speaking, all the necessary conditions for the realization of these programs are mostly not met. We already know that there is a shortage of adequate facilities and requisites, and the interest of the pupils are often not reconciled. Therefore, the best and the most rational solution would be to create one general program which would unite the basic elements of many martial arts. A model of a unique program, as the one at the Faculty of Sport and Physical Education in Belgrade, would be surely the most appropriate and of the highest grade. Highly accepted by the students, the concept of this subject, which was also approved by the teachers of physical education in the research study, suggests that something similar should be offered in schools as well, as an answer to the evident interests and needs of the pupils and their parents. A program with a good concept, witch would incorporate the basic elements of boxing, karate, wrestling, judo, aikido, capoiera and maybe some other martial art, would surely arouse a significant interest, much bigger than that for the individual martial arts. Based on the research, conducted among the pupils of the 6th grade in an elementary school in New Belgrade, this kind of program would choose above 20 % of the boys and around 10 % of girls.

Baring in mind the significance of martial arts on one side and the problems of their realization on the other, the search for the most rational solution leads to a conclusion, that the carefully composed exercises of body work up could be a very good basis for introducing martial arts.

Those exercises, individually or with a partner, can be realized even in the most modest conditions, and this issue was a subject of several graduate papers on the Faculty of Sport and Physical Education in Belgrade. Stojanović (2007) underlined the significance of preliminary workout in teaching judo techniques, especially in the teaching of o-uchi-gari. He divided the preparations for this technique on individual exercises, exercises in pairs and exercises with requisites, a great number of which could be performed even without a mat. Stajčić (2007) divided the exercises for the technique uki-goshi on elementary movements and exercises with a partner, a great number of which could be performed on a separate piece of mat or without a mat. The similar approach in teaching judo techniques is recommended by Pavlović (2005) and Racković (2006), while Todorov (2000) gives an overview of work up exercises in pairs, with their aplication in judo. Stošković (2007) has an elaborate system of exercises for wrestling for beginners and Veličković (2008) has a detailed system of breathing techniques and sitting gymnastics for aikido training techniques. Mirilović (2008) gave a great number of exercises used in teaching movements and positions in boxing, while Đeković (2008) presented a great deal of exercises used in teaching kyokushinkai karate. Although every sport has its own specific exercises, it is evident that all those exercises can be grouped and divided to:

- Individual exercises – work up exercises and exercises that represent an imitation of movement performed during execution of a technique or a part of a technique.
- Exercises in pairs – practicing the technique with a partner in motion or not.
- Exercises with different requisites – for developing coordination of hands and legs and strengthening muscles which participate in performing certain techniques.

There is a great number of this kind of exercises and for a skilled teacher the possibilities are endless. By using various exercises a monotony during exercising is avoided and a level of motivation is increasing, and while exercising with different apparatus and requisites pupils unconsciously and in an interesting way for them practice movements which represent a base for performing complete techniques (Stojanović, 2007). By combining these exercises, very interesting polygons are created, which additionally stimulate the process of learning and improving of particular techniques and also make interesting and dynamic the whole process of training (Mirilović, 2008). This approach in training techniques of martial arts is possible even in schools where there is not possible to introduce the whole training program of particular martial arts. The fact that this kind of training could be realized without the use of a mat, ring and other special requisites, represents a significant recommendation and a valid argument for introducing these contents in school programs and their realization in practice.

The basis for a program with this kind of concept should make basic movements, positions, kicks, punches and blocks from boxing and karate, preparing exercises, basic positions, imitations and performing the techniques of throwing in wrestling and judo, as well as breathing exercises, sitting gymnastics exercises and basic movements in aikido. Depending on the conditions and prevailing interests of pupils the program can be steered to the desired direction, that is, to the particular sport or skill. We can offer these concepted

contens to the pupils like a selected sport alredy now, but it is necessary to make some efforts and occupy oneselves how these contents will become part of ordinary teaching aids.

5. CONCLUSION

Martial arts are not significantly represented in programs of physical education. In these programs, of all martial arts, only wrestling is mentioned. Wrestling is listed as one alternative which, as a part of a sports activity by choice, pupils can choose in the 6th grade of elementary school or high school. In addition that the space which was given to martial arts in the programs of physical education is not satisfactory, the realization of these programs itself can be judged as very poor, or more precisely, practically it does not exist. The main reasons are mostly the lack of adequate conditions, but all the analysis show that the realization of these programs is not satisfactory, even in schools with solid conditions. The research shows some interest among pupils and their parents for martial arts, especially for judo, karate and wrestling. Although this interest is significantly less than the interest for soccer, basketball, volleyball and swimming, the cumulative interest for martial arts can be considered as significant. At the same time the interest of teachers of physical education in schools for martial arts is at a very high level. These facts and also a great compatibility of martial arts with many other sports are convincing arguments in favor of the idea and initiative to offer to the pupils, as a possibility of choice, a unique program of Fighting, which would include contents from a large number of martial arts and skills. The contents which represent the compilation of basic techniques from particular martial arts will be offered to the interested pupils, but it is necessary to make some efforts and occupy onrselves how these contents will become part of ordinary teaching aids. Even in schools with inadequate conditions for introducing particular martial arts, the pupils can be solidly prepared for demonstration and use of many basic techniques from various martial arts, and also decide properly which of the existing martial arts is the most suitable for them. Skills and experiences, obtained in such a manner, represent a very good base for upgrading to a martial art by choice, and at the same time a significant additional activity for all the pupils, whose primary choice is some sport other than martial arts. A program with this concept is completely in accordance with current and widely accepted principals of multiple developments of young athletes (Bompa, 2000). A program with this concept aroused a significant interest and at the beginning of the next school year will be officially offered to the pupils of one elementary school in New Belgrade.

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EVALUATION OF THE PHYSICAL EDUCATION REFORM IN MONTENEGRO ACCORDING TO THE PARENTS VIEW POINT

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THE INTRODUCTION

Each reform of the educational process means the integrity of the numerous relevant factors, which ones if achieved on the optimal level, may guaranteed its success. The newest reform educational procedures of the education in Montenegro insist from the parents, after many different levels, to be more engaged in the total work of the school. The informative, the advisory, the managing (steering) and the voluntary role of the parents enable them, therefore, very serious and multisided, and in that way more concrete participation. The educational reform defined by the changes of the law regulation and by adopting and implementation of the new teaching programs on all levels of education in Montenegro, was started to be applied, as the pilot project, in the school year 2004/5. The implementation of the new teaching programs needs optimal (better) capital-technical assets conditions and the essential changes in the domain of the teaching contents, volume and the way of performing, reception, processing and return of the information (knowledge, skill and habits), including the monitoring, checking and estimation of the level of knowledge, abilities and obtained results. The reform procedures mean the intentions of the physical education which are focused at the:

- realization of the relevant conditions for the comprehensive children and students development in the anthropology sense;
- identification, followed by the emphasizing and considering their individual differencies, i.e. abilities and characteristics;
- considering of the needs, wishes and abilities for improving of the level of the anthropology characteristics at all educational levels;
- development of the conscious creative activities;
- achievements of the knowledge standards;
- flexibility in the teaching, outside teaching and extrascholar work process in the physical education;
- vertical and horizontal connection between the program contents.

Realization of the reform programs and the implementation of the law procedures, is possible to be observed from different points, by different subjects and their positions and the levels of the participation and as well the power of the influence. We think that the parents position, as the subject very interested that the reform is going to be successful, has to have very important place in all of the educational reform processes. Different direct and indirect contacts with the large base of the parents (parents of different level of education; the parents participants in the reform, the parents who are pedagogy and psychological employees; the parents as physical and educational teachers; the influence of the press and electronic media and 'round tables' on the parents etc.) led us to the conclusion that there are more different explanations of certain reform solutions, as well the reform in the whole. Different and not rare completely oposite impressions, estimations and attitudes of the parents about the educational reform in Montenegro, is treated as the problem of this research. In this sense we would like to perceive in more directly way the results of the reform processes, what requested to take up the monitoring of the most important segments of the educational process which is in the domain of the intentions and tasks of the physical education and which consists of the parallel analysis of the traditional and reformed process of work among the students characteristics of all aged. By all means, the population of the students parents and the first cycle of the elementary school, depending of the specific bent of the students anthropology characteristics and added more serious 'problems' related to the first scholl days, and because of the way of the realization of the total educational process especially in the first class, would be chosen to be the subject of this research. The parents of that students age, because of the numerous objective circumstances, are more interested in the cooperation with the school at all levels.

Considering all mentioned the final aim of this research was established, in the essence of to prove objectively the level and quality of the reform of the physical education teaching; perceiving of the strong and weak points in this process; researching, collecting, processing and implementation of the opinions, attitudes and estimation of the parents about the current changes in the organization and the realization of the physical education related course of study is to be of the outstanding importance for the students of this age.

Collecting and processing of the attitudes, estimations and opinions of the parents through the grade of the parents satisfaction with the reform, and this should serve to the future creators of the reform activities according to the real children and students needs, by the way doing this not neglecting, the social condition of the educational process. The reform initiatives, consequently, is necessary to be based on the attitudes and the opinions of the parents as recognised by them and undertaken in the qestionnaire.

Proceeding from the fact that the structure of the parents population is heterogenous in the sense of their social, educational, professional, were consistent as well non indifferent age of this group, we determined that the field and the way of research will be reachable to the most of the examined persons. In this sense by the questionnaire has been included the segments related to the mutual relationships: student – parent, that by itself occupied the interests of the parents on such level to guarantee the relevant attitudes and opinions to have been obtained. By the questionnaire, therefore, were included:

- the spacial and financial-technical assets for the realization of the educational, outside teaching and extrascholar activities of the physical education;
- monitoring, checking and estimation;
- communication and interpersonal relationships in the school;
- the organization and the realization of the outside teaching and extrascholar activities (free activities, excursions, school in the nature etc.);
- the different way of the cooperation between school and parents;
- the involvement of the parents and the local community in the performing of the teaching program.

RESEARCHING METHODOLOGY

Sample obtained from the examined persons

Collecting of the data by the qusetionnaire methodology was performed in 8 schools which ones started with the implementation of the reform procedures in the scholar's year 2005/06., in other words the schools in which the teaching process of the physical education was in the harmony with the reform model has been organised for 3 years. The actor of this research had held many conversations with parents at the parents meetings including the members of the Parents Council. The sample, obtained by parents from the population of the students parents of the first cycle in the elemnentary school, had reached 427 examined persons. The distinctive results of these conversations, i.e. opinions, attitudes and suggestions obtained from the conversations, were written down and used in order to clarify and to complete the parents answers presented in the questionnaire.

Questionnaire

The questionnaire was exposed by 20 statements and questions asking for the answer according to the principle of the five-scale type: I completely agree, I agree, Mainly I agree, I do not agree, I do not know, or just with Yes or No.

Procedure

The data obtained by the qestionnaire as the device of the research, have been worked out statistically and presented by the table-chart. The obtained information enabled the attitudes and the opinions of the parents given in their answers could be estimated very well estimated statistically, and also these results to exploit up to the maximum.

ANALYSES AND INTERPRETATION OF THE RESULTS OBTAINED BY THE RESEARCH

The research results were analyzed according to the obtained confirmations i.e. the answers. Right after, in order to get more relevant conclusions as the help to the expert, inspection and supervisory agencies responsible for establishing of the evaluation of the reform procedures in the first cycle of the elementary school, would be united with already established by researchers bservation of this essay, obtained in the direct conversations with the parents.

Some results obtained in the direct contacts with the parents, were very different even comparing with some obtained by the questionnaire's methodology. This is possible to explain by the fact that the parents-collocutors in the direct contact behaved themselves with more freedom, more relaxed, and more frankly, because most of them were relaxed while talking and expressed more detailed attitudes and opinions. The

problem of the representativity parents opinions and attitudes obtained in the direct communication with the researcher 'was overshadowed' by all means, with the smaller number of the sample and by the answers connected to the less number of the questions comparing with its numbers in the questionnaire. The questionnaire by itself, in spite of the fact that our wish was to offer to the parents enough freedom to impact their ideas and opinions, unfortunately, by the fact that 'something has to be written down on the sheet of paper', has a certain value of stereotype. All these facts show us that it was necessary to check the results of the researches on the larger sample, and by using the different techniques such as the focus groups and the observers of all the reform interested participants.

Parents Attitudes at the Physical Education Teaching

In the process of data collecting related to the new items in the physical education in the sense of suitable teaching contents adequate for improving of the students individual antropology characteristics level, the connection of the same and its possibility of application in every day life e.g. entertainment, game and competition, in the process of monitoring, checking, descriptive estimation, care for health and motivation for work efforts, as explained above, the parents presented their attitudes and opinions according to the following assertions:

1. **The learned out teaching contents from the physical education my child is able to apply without any problems in the conditions of every day life.**

Unambiguously it is possible to conclude that the planned teaching contents are very familiar to the students and they can surmount its without difficulties and use its with pleasure in the game and by the competition. According to the obtained answers only 1,87% of the parents are of the opinion that the teaching contents have been doing within the physical education are not adequate to their needs and abilities, so they cannot use them easily in every day life.

2. **My child has at disposition enough free time to play and for the other variety of activities.**

It is evident that the parents mean that their children have enough free time to play games and some other activities, not directly connected with the learning process.

On the purpose to get the questionnaire more real attitudes and opinions of the parents, concerning the questions connected to the teaching process, we expressed as the assertion no. 3: **My child spends too much time doing their homeworks.** The parents are differs in the opinion about the time which their children spend doing the homeworks. 'They completely agree' with this assertion 12,88% of the parents, while 20,37% of them 'agree'. The complete result of these both percentages indicate that the great number of parents mean that the reform model which offers less engagement of the students at home, has not been confirmed in practice. The make of homeworks at home requires from the students to bring their books home. This also means that the students need their parents help, e.g. in reading of the tasks, in helping and noticing of a certain problem, or even for the mode necessary to follow if you want to find the key for the task, for checking out of something already done etc. This fact still indicates as necessary in the learning process to be included. The contradictoriness of the attitudes and opinions presented on this assertion and on the assertion 'my child has at disposition enough free time to play games and some variety of activities' indicate the questionnaire weak points as the method of research, in the case examined persons were not occupied with the all questions in the questionnaire in the right way.

4. **Desriptive method of estimation does offer me enough information about the knowledge and the abilities of my child.**

The descriptive estimation as the new way of monitoring, checking and students estimation of the first cycle in the elementary school, the majority of parents accept as the way which enables them to obtain enough information about their children knowledge and abilities.

5. **The teacher does the descriptive estimation used on the right way in the estimation of the knowledge and the abilities of my child.**

The most of the parents mean that the teacher uses descriptive estimation in the way which enables the successful monitoring and advancing of the students in the improving of their antropology characteristics. On the basis of the direct conversation with the parents in different ways of the communication we have obtained the following attitudes:

- The significant number of parents mean that through the games and collective work at school, shall very favourite the students in their free time, it is possible to get students more freedom, selfinitiative and creativity, including the process of the new mobile structures, which ones at the first of all have its origin in the natural forms of mobilities.
- The conscious of the independence formed at school, enables the students more freedom while playing games, adopted to their personal individual interests.

A certain number of parents have 'severe' critical attitude to the phenomenon that the students spend too much time in the classroom, even including the physical education classes. We also noticed a lot of

remarks about outside-teaching and extrascholar classes are not organized regularly, in spite of the fact these organizational forms of activities are provided by the work program in I series of the elementary school.

It is very important to underline that the parents in the direct conversation were almost united in the attitude that the descriptive estimation have brought many unknown things, and generally speaking they are not satisfied with it.

Chart 1	Completely agree	Agree	Mainly agree	Do not agree	Do not know
1. By learning out teaching program contents my child can without problems use it in every day conditions.	46,84%	35,60%	11,01%	4,68%	1,87%
2. My child has enough time for play and for other variety of activities.	59,72%	26,70%	9,60%	3,51%	0,47%
3. My child spends too much time doing homeworks.	12,88%	20,37%	24,12%	41,92%	0,70%
4. Descriptive mode of estimation gives me enough information about knowledge and abilities of my child.	35,13%	30,44%	18,50%	12,18%	3,75%
5. Teacher uses descriptive estimation in the right way in estimation of the knowledge and abilities of my child.	60,19%	24,12%	6,79%	3,28%	5,62%

Parents attitudes of the general school atmosphere

In efforts to get know the parents attitudes and opinions about the school atmosphere in respect of the students relationships to the school, teachers, classmates, including the teachers relationships with the students etc. we put the questions about the attitudes and opinions of the following set of assertions:

Chart 2	Completely agree	Agree	Mainly agree	Do not agree	Do not know
6. My child prefers to go to school.	77,52%	19,67%	2,34%	0,47%	0,0%
7. My child loves teacher.	82,20%	15,22%	1,64%	0,70%	0,23%
8. School atmosphere is in the harmony rule and discipline.	30,21%	32,79%	20,84%	8,20%	7,96%
9. My child is satisfied how the other childern behave to her/him.	47,31%	29,51%	16,39%	5,15%	1,64%

Chart 3	Yes	No
10. Relationships among children are friendly.	83,61%	16,39%
11. Teacher respects my child personality.	88,29%	11,71%
12. Teacher induces my child to the work.	87,12%	12,88%

Most of the parents emphasize that their children are satisfied, cheerful, plain, communicative, that they like school and their teacher. However, when we talk of the common atmosphere at school we do not have predominant answers. A certain number of parents criticise the school atmosphere, insisting of the school to follow more upbringing and more disciplinary way of behaviour. It is underlined that younger students are imperilled by the older ones. Even it is suggested for some school spaces to have been separated. Also, they underline the necessity for more efficient engagement of the teachers in charge.

Dispersion of the parents attitudes and opinions of the students inter-relationships, including their commentaries in the direct communication indicate that at school 'problematic situations' are often happened such as: noise and children's aggressiveness.

The relationship among the students and the teachers during the lectures are filled with the friendly atmosphere, mutual confidence, understanding and good pedagogy instructions. The atmosphere at the lectures should transmitted be at the outside and extrascholar communication.

The Parents attitudes about the organization and the realization of the outside-teaching and extrascholar activities

The selection, contents, organization and realization of the outside-teaching and extrascholar activities at school are very important segment of the physical education engagement. The students parents of the examined population generally think that school, in its plans and programs has to include physical education as the school subject by itself, has to offer more organizative forms and more informative programs , adequate to the anthropology students characteristics, all in other words, according to their needs and abilities. Such a general attitude we identified derivated of the direct conversations with parents and on the basis of their attitudes stated on the following assertions:

Chart 4	Completely agree	Agree	Mainly agree	Do not agree	Do not know
13. School organized different forms of free students activities.	20,37%	21,55%	17,56%	21,08%	19,44%
14. School organizes the excursions regularly and on satisfied manner.	21,55%	24,12%	22,25%	18,50%	13,58%
15. School organizes regularly and on satisfied manner the School lecture in the nature.	22,25%	25,53%	18,27%	19,20%	14,75%

The fact that 21,08% of the parents do not agree with the assertion no.13, and having in mind that 19,44% of the parents do not have enough information about the free time activities, all this indicates to us that in this important segment of the physical education everyone has to be more engaged.

We especially underline data which was suprise for us, because 14,75% of the parents do not know the way how the School lectures in the nature are organized and performed.

In the direct conversation with the parents we obtained in some way 'more useful' attitudes and opinions. The parents are mainly unified meaning that the studens do not have enough number of the organized work forms in which they would like to participate, and some work forms offered to them are organized by the persons who do not belong to the members of the school staff. These activities have to be paid and are often very expensive. In spite of what skilled records have the persons who manage different sport schools, the parents mean that they do not satisfy educational and learning experience standards. The groups with the great number of students, and in the lack of space and financial-technical assets, operating as a stereotype, like

'ad hoc' students abilities and knowledge, by elimination of the individual way of work, this may be considered as the basic features of the outside teaching activities performed by 'the outside school' people.

As far as the excursions are concerned, here we have to ascertain that depending of the examined schools, the situation is 'black-white'. Namely, there are schools which realize the optimal number of excursions. On the other side there are some schools which do not realize any excursions during the school year. These remarks refered to the way of the organization and realization in the sense: the excursions do not have educational character, the excursions have not the satisfactory sport-recreation contents.

The parents are united that the School lectures in the nature are a relevant factor in the educational process, but mainly of them are not satisfied with the contents of teaching program and of the granted high marks. They suggest that the swimming and skiing schools are necessary to be organized as the School in the nature. They are united that the contents of the activities of the School in the nature should be justified by the high skilled teaching staff.

The parents attitudes of the spacial, financial-technical assets and hygienic conditions for the realization of the physical education- teaching

A certain number of the elementary schools in Montenegro do not have enough spacial and financial-technical assets necessary for the realization of the physical education-teaching. In some schools, caused by the objective and subjective reasons the students of the first cycle of the elementary school cannot exercise physical education-teaching in the sport hall. The parents in the direct communication underline, the two crucial reasons, therefore. Primarily they mean that the sport halls suitable for physical education teaching do not respond to the appropriate conditions, consequently the taechers use them very rare or in some schools it is impossible to use them at all because they are too occupied by the other classes, outside teaching and extrascholar activities of the older students. In some schools the sport halls are hired for the commercial purposes. The parents about this problem have very serious remarks related to the main teaching staff in the schools, who hire the halls for the physical education and allowed to the other organization of the sport school for very expensive prices.

It is also evident that most of the parents do not have adequate information with the conditions necessary to be satisfied as the minimum standards for the organization and realization of the physical education teaching. Also they do not know anything about own the participations in the The Parents Council and School Committee.

We based the presented statements according to the conversations with the parents and their attitudes about the following assertions and questions:

Chart 5	Yes	No	Do not know
16. Are you satisfied with the conditions for realization of the physical education teaching?	52,22%	41,69%	6,09%
17. Do you find correct the conditions for realization of the segment of the program of the physical education teaching in the schoolyard?	63,00%	31,15%	5,85%
18. Is it necessary that physical education teaching for this age must be performed by the professor of the physical education?	48,01%	39,34%	12,65%

The parents attitudes to the cooperation between the school, the parents and the local community

The set of the attitudes and questions related to this problem was planned in the following way:

Chart 6	Completely agree	Agree	Mainly agree	Do not agree	Do not know
19. We got on time enough information of the level of abilities and characteristics necessary for optimal activities of my child at the physical education teaching.	51,29%	21,08%	11,71%	8,67%	7,26%

Chart 7	5	4	3	2	1
20. Your participation in the creation and realization of the outside teaching and extrascholar contents would you estimate with the grade from 1 to 5 (grade 1 is the lowest one).	58,31%	14,75%	7,49%	1,64%	17,80%

The parents are very well informed about the level of knowledge, abilities and achievements in the physical education teaching during the parents meetings and through the direct individual conversations with the teachers. The indivdual conversations are initiated by the parents and the teachers.

The reform of actual reform procedures request more participation of the parents and the local community in planning of the segment of the physical education program. Their involvement in that requested work will be especially important in making sense of, selection, subsidizing and organization of the outside teaching and extrascholar activities. However, the parents estimate this kind of cooperation in the negative way.

During the direct conversations with the parents we were informed that in the numerous schools this kind of cooperation found no application. However, we got information that are, to tell the truth very rare, as the affirmative examples of the good cooperation between parents and school. In some schools the parents, who with their own expert and other qualifications deserved to be that, so they manage some sport schools, walking, biking and hiking tours etc.

CONCLUSION

Based on the questionnaire the sample of 427 parents of the students of the first cycle in the elementary schools the resarching of their attitudes and opinions about the educational reform in Montenegro indicated the point of the evaluation of the changes in the physical education. For the purpose to establish their attitudes and opinions, we applied the method of the questionnaire, enriched with the direct individual and group conversations with the parents. The direct communication and 'more relaxing' atmosphere contributed us to make more complete and more relevant conclusions about their attitudes and opinions. The questionnaire, which by itself had 20 statements and questions, was divided in five segments, which enabled us to get more evident picture of the parents attitudes and opinions, as well more complete conclusions. Acording to in that way planned and realized researches, it is possible to draw out the following conclusions:

- The educational reform provides that the teaching contents are adapted to the anthropology students characteristics of the first cycle in the elementary school.
- By the realization of the teching contents through the conscious, imaginative and creative game, the students, managed by the quality skilled-pedagogy teachers actions, may develop their creativity and freedom necessary for performing of the creative structures.
- The descriptive method of estimation has a lot of unknown things as for parents so for teachers. The descriptive grade is not enough motivated for the students.
- Atmosphere during the lectures is friendly, open, cheerful, where the students in the team (group) work demonstrate their own individual interests. In that work the role of the teacher should be focused to the supporting, correction and regulation of the work intensity and possibility to express their own emotions. A teacher with the great love, devotion and pedagogy sense is able to stimulate the individual independence and student's creativity.
- The educational reform has to be supported by the appropriate , i.e. adequate spacial and financial-technical assets. In some schools they are not on the high level, and consequently it is necessary to act very fast. The parents had serious complains of the way how the sport halls for the physical education are used in some schools. They underlined the critical attitude because these spaces are used in the commercial purposes.
- The parents underline that there are not enough free activities in the schools, and sometimes the selection is conditioned, because not in the harmony with the students wishes and needs. The fact that some free activities are perfomed by the persons who are not employees in the schools, followed by the fact that these activities have to be paid, make unable the students to participate in the numerous and additional sport activities important by itself for the development of the anthropology characteristics of this students age.

- The parents also mean that it is necessary for this students age to organize and realize more excursions with different contents and duration.
- The parents showed the wish and the need to be in more relevant way included in planning, organization and realization of the School in the nature. They request that the teaching program contents of the School in the nature should be enriched with the swimming and skiing teaching, managed by the expert staff.
- The cooperation between parents and school, besides of the individual or group contacts, in fact is on the high level.The parents, although underline unambiguous wish to be in more concrete way included in the school staff suggestions in the designing, and in the performing of some outside teaching and extrascholar variety of works in the harmony with their skilled qualifications.

On the basis of the underlined conclusions and personal attitudes in this essay the following recommendations are presented:

1. Parents need the team of the experts able to explain extraordinary them the advantages of the descriptive method of estimation of the first cycle in the elementary school.
2. The school main staff, skilled teams should ask from the state institutions the adequate spacial and financial-technical conditions necesary for performing the physical education teaching.
3. The sport physical education halls with the maximum time terms to put at disposition, as to be used in the function of the educational process.
4. The spaces of the school yards and polygons should be put in order, equiped by the necessary outfit.
5. The teaching contents in the domain of the physical education should be entrusted to the experts of the concrete contents.
6. The schools have to provide the health control and the students' care as well the physical education teachers have to bi at disposal.

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POSTER PRESENTATIONS

BODY IMAGE AND SPORT PARTICIPATION OF ADOLESCENT GIRLS

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Introduction

Adolescence is characterized by dramatic physical and psychological changes. Adolelescents need to accept those changes and overcome a number of challenges of growing-up process. Although most young people cope with adolescence successfully, some of them may develop different mental health disorders, including body image disturbance.

"Body image lies at the heart of adolescence (Ferron, 1997; p. 375). Body image is a multidimensional concept which refers to the person's mental image of her\his physical appereance, as well as corresponding feelings, beliefs and sensation of one's own body.

Body image is extremely important for adolescent; in early adolescence they use only physical characteristics, usually those they find negative (fat, overweight, short…) to describe themselves through other categories such as intelectual, social, emotional categories and those are usually the ones they find positive (Simmons & Rosenberg, 1975).

Self-esteem of adolescents is closely connected to perceived physical appearance. "Physical appearance correlates most highly with global self-worth; athletic competence consistently bears the lowest relationship with global self-esteem, and falling in between are scholastic competence, social acceptance and behavioural conduct" (Harter, 1999; p. 158). Correlations between perceived physical appeareance and self-esteem of children and adolescents vary from .52 to fascinating .80.

The question here is: Why one's outer physical self is so closely connected to one's inner, psychological self?" (Harter, 1992). According to Harter, the one possible answer would be that physical appearance is qualitatively different domain from other domains such as scholastic or athletic competence, social acceptance… Physical appearance is a constant characteristic of self, and it is constantly being observed by others, but iti is also being self-examined. One has more control over his other characteristics, they can choose whether to express them, when and how they're going to express them (Harter, 1992; p. 118). The research shows that people start to react to one's physical self from his early childhood. „Those who are attractive by societal standards are responded to with more positive attention than those who are judged less physically attractive" (Harter, 1992: p. 118).

Modern society considers physical appearance to be extremely important and this attitude has a very bad influence on women. West culture glorifies slimness and perfect, thin body constitution often reducing the perception of a women to a mere physical appearance. As girls grow older (5-16 yrs) the perception of their physical appearance declines while this is not te case with the boys (Harter, 1992).

"The fact that boys globally express more satisfaction and pride in their changing body than do girls, is closely related to another basic difference in the way the genders experience puberty. In order to have a positive adjustment to the morphological changes they undergo, boys evaluate themselves on such factors as body efficiency and physical ability. Girls assess the changes in their body depending on whether they becomemore or less physically attractive" (Ferron, 1997).

Nevertheless, there is still an open question about what precedes: Do high perception of physical appearance determine one's high self-esteem or high self-esteem has a positive influence on one's satisfaction of his own look? The research of Zumpf and Harter (according to Harter, 1992) which was conducted on the sample of adolescents, showed that 60% of respondents reported that it is the physical appearance that defines their self-esteem.

The research has shown that one third to one half of adolescents struggle with low self-esteem especially in early adolescence (Harter, 1990; Hirsch & DuBois, 1991). Adolescent girls have lower level of self-esteem than boys of the same age and at the same time their self-esteem shows a tendency to decline.

Pipher (1994) describes this declination "a social and developmental Bermuda Triangle" in which girls "lose their assertive, energetic and 'tomboyish' personalities and become more deferential, self-critical and depressed. They report great unhappiness with their own bodies" (p. 19). The expression „to be too fat" is cited as the most frequent concern of adolescent girls (Rhea, 1998; according to Dudley, 2007).

So, the question emposes: Can physical activity and sport have protective effect and can they have positive influence on a body image of adolescent girls?

According to Bunker)1998) participating in sport and physical activities directly influences the

development of self-concept and perception of self-esteem and one's competence.

Calfas and Taylor (1994) have reviewed 20 relevant articles in order to identify the strongest relationship between psychologic variables (self-esteem, self-concept, anxiety, stress etc.) and physical activity of adolescents. They came to conclusion that physical activity does not have a negative influence, in other words it is strongly related to self-esteem\self-concept improvement, the symptoms of depression and anxiety\stress. The relationship between physical activity and self-esteem\self-concept is positive, but low (+.12), the correlation between physical activity and stress\anxiety reach -.15, and between physical activity and depression: -.38. These findings indicate that physical activity of adolescents contributes to psychological well being.

Hausenblas & Symons Downs (2001) have carried out a meta-analysis of the literature relating to body image of athletes and non-athletes. They came to conclusiona that there is low positive relation between body image and sport activity, in other words the athletes have more positive body image than non-athletes. The analysis of intermediary variables has shown that the relationship is the same in girls and boys.

Ekeland, Heian & Hagen (2005) have analysed 23 studies in order to find out the effect of physical activity toward self-esteem of children and adolescents. Although most of the studies analysed, as noted by authors, do not meet high quolity standards, the synthesis of findings suggest that exercise could have a short-time positive effect on self-esteem of children and adolescents. A high quality research on that population is required, with adequate follow-up, claim the authors.

Marsh (1998) conducted a longitudinal study of physical self-concept of adolescents participating in elite sport and those who are not athletes. Elite adolescent athletes had higer physical self-esteem than non-athletes and gender separated analysis indicated: a) female athletes had higher physical self-concept than female non-athletes, b) in both groups older females had lower physical self-concept than younger females, c) the same were the results reffering to physical appearance, d) gender differences were most obvious with physical ability and appearance, where males had higher scores than females.

According to Koivula (1999) those who participate in a sport have more positive perception of body image than those who do not participate in sport activities. Concerning the fact that boys are more engaged in sport than girls, they could have more positive feelings about their own bodies than girls, especially during adolescence.

Miller and Levy (1996) reported that girls participating in sports show higher athletic competence and body image than girls who are not participating in such activities.

Bowker, Gadbois & Cornock (2003) examined the role of a gender, sport engagement and gender orientation in a prediction of general self-esteem and domain specific self-esteem. Participants were 16.1 yrs old adolescents. The authors concluded that male respondents were more satisfied with their weight and appearance than female respondents. Female respondents whose feminine orientation was more emphasized reported hihger self-esteem when participating in non-competitive sports, and reported lower self-esteem when participate on highly competitive sports. Although sport participation might be the way of self-esteem prediction, gender orientation and the type of sport represent intervening factors. Beside that, a very strong positive correlation has been noticed between weight satisfaction and perceived physical appearance (.76; $p<.01$), between weight satisfaction and percieved physical attractivness (-.56; $p<.01$). Years of participating in recreative sport significantly correlate only with perceived physical attractivness (.20; $p<.05$), while years of participating in a competitive sport were not significantly related to other variables.

Jaffee & Mahle Lutter (1995) examined the relationship of factors such as body weight, physical activity, comparison etc. with positive or negative body image. The sample of respondents comprised 152 female adolescents, 11-17 yrs old (13,24 an average). All of them were participants of YMCA summer programmes in different parts of USA. Study results show that low body image is associated with many factors, including the factors reffering to body weight and lower level of engagement in organiyed sport.

Gill & Overdorf (1994) have concluded that adolescent girls who participate in sport percieve their bodies heavier than they actually are. About 44% of respondents with healthy weight admitted they used some unhealthy ways to reduce their weight, because they felt their weight was not perfect.

Davis & Cowles (1998) reported that girls who participate in a sports where slim figure is an ideal body constitution (gymnstics, long distance running) show greater dissatisfaction with their bodies than girls participating in other sports, although they have less body weight.

Contrary to this findings, Mueller (2007) argued that practising competitive sports could be a protective factor for adolescent girls when it come to the pressure of a fitting in the established body weight ideal. Therefore, practising sports decreases a possibility that girls will perceive their normal weights as overweights.

Harrison & Narayan (2003) examined how engagement in extracurricular sport activities (especially sports) is related to psycho-social functioning and health behaviour of adolescents. On a representative sample of 50,168 of 9 graders they concluded thath students who practise sports (sports only, or in combination with other activities) have a significantly healthier self-image comparing to those students who do not practise any sports (deal with some other activities or no activities). Also, there is a significantly lower possibility for

appearance of emotional problems, suicidal behaviour, etc.

Dealing with feasibility, acceptability and efficiency of intervention programme of sport activities in schools, Dudley (2007) concluded that intervention attains positive effect on perceived body image of adolescent girls, age 11.

Previous research mostly found out that sport and physical activity have positive effect on a body image and other aspects of a physical self-concept, and even on global self-worth.

In order to examine the relationship between sport participation and body image of adolescent girls, a research was conducted on a sample of elementary school students.

Method

Participants were 272 adolescent girls, aged 12-14 yrs. All girls were students of the 5th or 7th grade of elementary schools in Novi Sad. After the poll was conducted, two subsamples were established: girls engaged in organized sports (in sport clubs), N=147, and non-athlete girls (N=125). Basic characteristics of sample and subsamples are shown in tables 1 and 2.

As it could be seen from the table 1, there are significant differences in proportion of 7 graders in two subsamples. No significant differences were obtained between subsamples according to academic achievement (table 2).

Table 1 Sample and subsamples characteristics according to participants age (grade)

	V grade	VII grade	Σ
Athletes	57	90	147
Non-athletes	83	42	42
Whole sample	140	132	272
$\chi 2=20.64$ (df=1); p=.00			

Table 2 Sample and subsamples characteristics according to participants academic achievement

	Excellent (A)	Very good (B)	C, D, E	Ukupno
Athletes	102	38	7	147
Non-athletes	98	19	8	132
Whole sample	200	58	15	272
$\chi 2=4.73$ (df=2); p=.09				

The poll was conducted anonimously, and beside demographic data, it consisted of questions concerning physical activity and physical self-perceptions. In this study, data reffering to perception of health, perception of nutritional status, satisfaction with one's own body and perception of physical appearance were analyzed.

Data analysis included chi-square test ($p \leq .05$).

Results

There are no significant differences in perception of health status between athletes and non-athletes students (table 3). About 68% of all respondents perceived their health status as very good, another 28% perceived their health status as good, and 4% of adolescent girls reported not so good health status.

Table 3 Perception of health status

	Very good	Good	Not so good	Σ
Athletes	103 (70.00%)	37 (25.17%)	7 (4.76%)	147 (100%)
Non-athletes	82 (65.6%)	38 (30.4%)	5 (4.00%)	125 (100%)
Whole sample	185 (68.01%)	75 (27.57%)	12 (4.41%)	272 (100%)
$\chi 2=0.96$ (df=2); p=.62				

There are no significant differences between subsamples of sport participants and non-participants in perception of nutritional status (table 4). It could be seen from the table that 57% perceive they have optimal weigh, 19% respondents perceive themselves as overweight, and some 11% of girls perceived themselves as underweight. Around 13% of participants do not concern with weight.

Table 4 Perception of nutritional status

	Too skinny/ skinny	Just right	Fat / very fat	Doesn't think about it	Σ
Athletes	18 (12.24%)	88 (59.86%)	24 (16.33%)	17 (11.56%)	147 (100%)
Non-athletes	11 (8.80%)	68 (54.4%)	28 (22.4%)	18 (14.4%)	125 (100%)
Whole sample	29 (10.67%)	156 (57.35%)	52 (19.12%)	35 (12.87%)	272 (100%)
$\chi 2=2.83$ (df=3); p=.42					

Subsamples show significant differences in satisfaction with one's own body, as well as in perception of physical appearance (table 5 and 6). In both cases results favor the more active group, girls who participate in organized sports.

Tabela 5 Would You like to change something in Your body shape?

	Yes	No	Σ
Athletes	59 (40.14%)	88 (59.86%)	147 (100%)
Non-athletes	66 (52.80%)	59 (47.2%)	125 (100%)
Whole sample	125 (45.96%)	147 (54.04%)	272 (100%)
$\chi 2=4.36$ (df=1); p=.04			

Tabela 6 Perception of physical appearance

	Looking very good / good	Average	Not so good/ not good at all	Doesn't think about it	Σ
Athletes	100 (68.03%)	24 (16.33%)	9 (6.12%)	14 (9.52%)	147
Non-athletes	64 (51.2%)	35 (28.00%)	7 (5.60%)	18 (14.4%)	125
Whole sample	164	59	16	32	272
$\chi 2=4.36$ (df=1); p=.04					

Discussion

The results obtained indicate that sports participation is related to more positive body image of adolescent girls. Significant differences were found between athletes and non-athletes in body satisfaction and perception of physical appearance. No significant differences were found in perceptions of health and nutrition status.

Attention should be paid to the fact that girls participating in sports were older than non-participating girls, bearing in mind that during adolescence, the level of perceived competence (including athletic ability and physical appearance) decreases, with accuracy of those perceptions increases (Harter, 1999).

Although our results fit in previus findings, which have indicated that there is a relationship between sport participation and positive body image, little is known about the nature of that relationship.

Namely, according to Harter (1982) self-efficiacy and perceived competence directly influence physical self-esteem, which in turn affects adolescent physical activity behaviour. Adolesecents who highly rates their own physical competence are more likely to engage in physical activity and sport. That is how the circle is closed: adolescents who participate in sports percieve their physical competence higher, and on the other side, those who perceive as highly competent in physical domain will more often take part in physical activities and sport.

Findings of Boyd and Hrycaiko study (1997) are very indicative: adolescent girls with low levels of self-esteem and self-concept (physical ability and physical appearance) benefited the most from intervention physical acitivity programme. At the same time, the most remarkable positive changes were seen in the youngest girls (aged 9-11), who appreciate the programme the most.

Implications reffer to the need of an early enhancement of self-esteem within the context of physical activity and tayloring the exerice programme according to the needs of adolescent girls with low self-perceptions of physical abilities and physical appearance.

The importance of physical appearance to general self-worth in adolescence, forces us to look for new possibilities of enhancing physical self-perceptions at this age. Girls could be more vulnerable because there is social pressure to fit in gendered image of ideal female body (which is often too thin or too unrealistic).

Although sport participation undoubtly may have a positive influence on body image, and therefore adolescent self-esteem, recent research that engaging in some sports could be potentially risky in terms of healthy body image. There is growing evidence of high proportion of eating disorders among female athletes, especially in sports where the sport performance reffers to slim body shape, and where the aesthetic component is emphasized (gymnastics, figure scating, dance, distance running etc.). These disorders, followed by the body image distortions, attain 15-62% in female athletes population (Sundgot-Borgen, 1993), 60-80% in female gymnasts, comparing to 1-3% in general population. Besides, the positive effect of sport activity could be influenced by age, sport type, gender orientation or having/not having success in sports.

Bearing in mind that disturbed body image can lead to a lower self-esteem, anxiety, depression, eating disorders and range of health problems, there is urge for further research of potential and actual contributions of sports participation to positive body image.

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SOME TRENDS OF DYNAMOMETRIC FORCE DEVELOPMENT IN MALE ATHLETES

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1. Introduction

In order to collect precise measurements of dynamometric or isometric force, one has to rely on modern technology, ie. electronic equipment. Hence, the question is not how to collect data, but what the data will really tell us about the muscle force of the typical modern-day athlete.

So far we know that different muscle groups have different trends of development. This is also true for the arms, in which the differences in muscle force of the left vs. right arm in young athletes become more prominent with age. The fact that, in trained individuals, maximum values of muscle force are often seen at 30 years of age suggest that this motor ability can be maintained for a very long time by training. However, there are differences between muscle groups of the trunk compared to the extremities in terms the rates of their development.

In the present study, we have drawn a sample of healthy, young athletes, and classified them into age subgroups. It is important to point out that our sample size allows us to make relevant inferences for most age subgroups, with the exception of the oldest ones that were not as populated. Fortunately, this was most certainly compensated for by the negligible fluctuations and eventual stabilization of muscle force at this stage of its development.

The purpose of this investigation was to study the trend of muscle force development in a very large population of healthy, young, male athletes, and subsequently compare our findings to those previously published.

2. Methods

1833 male athletes, aged 8-30, were divided into 23 age subgroups: 8 years (29 subjects), 9 (44), 10 (60), 11 (62), 12 (88), 13 (121), 14 (136), 15 (170), 16 (230), 17 (207), 18 (171), 19 (109), 20 (81), 21 (55), 22 (44), 23 (46) 24 (38), 25 (37), 26 (27), 27 (34), 28 (21), 29 (15) i 30 (9).

The athletes were mostly tested just before the preparation training period. Force measurements were taken by the electronic reaction dynamometer, with the devices for strapping of subjects and recording cells at 150, 200 and 1000 kp. All measurements were recorded in kiloponds. The task was repeated three times, and only the best result was recorded. In the hand-flexor test, subjects had to squeeze two bars as close to each other as possible.

The belt was placed across the chest at shoulder height for the upper-body flexors, over the back and under the underarms for the upper-body extensors, and over the back side of the hips for the leg extensors. Generated force was recorded by an electronic cell, which was connected to a computer processor for processing of data. When maximal extension or flexion was achieved, the test was terminated.

The following dynamometric measurements were taken:

- absolute force of the right-hand flexors (PDA)
- absolute force of the left-hand flexors (PLA)
- absolute force of the upper-body flexors (PTA)
- absolute force of the upper-body extensors (OLA)
- absolute force of the knee-extensors (ONA)

All participants were tested at the Provincial Institute for Sport in Novi Sad, Serbia, on the dynamometry testing apparatus, in accordance with the existing testing procedures. The data were analyzed by means of descriptive statistics, from which a curve of muscle force development in young male athletes was derived.

3. Results and discussion

Means and standard deviations of subjects body mass, body height, right- and left-hand flexors, upper-body flexors and extensors, and leg extensors are presented in Table 1.

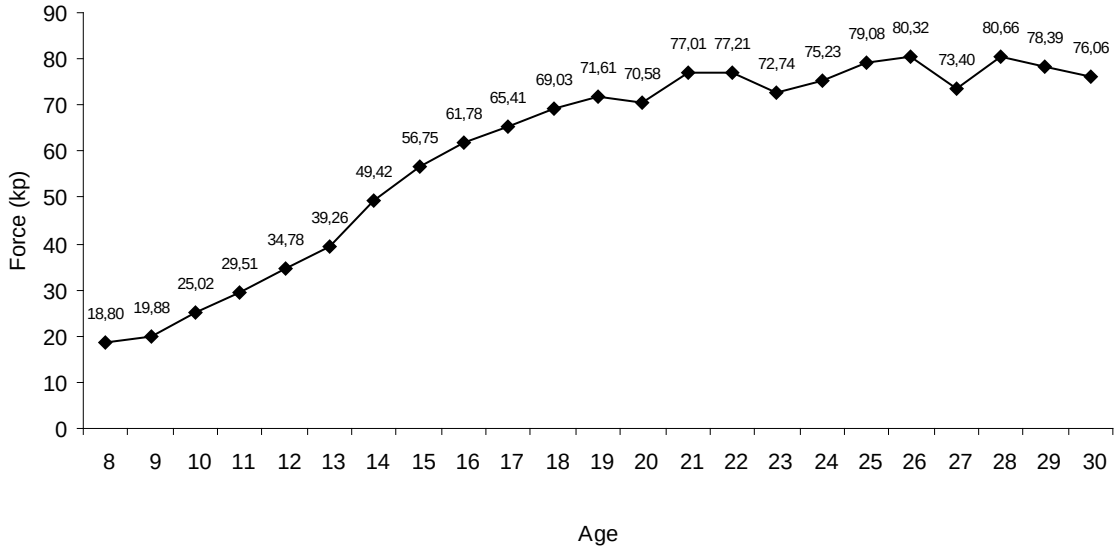
Table 1. Means and standard deviations of analysed variables

Age	Means and St.Dv	Body mass (kg)	Body height (cm)	Right-hand flexors (kp)	Left-hand flexors (kp)	Upper-body flexors (kp)	Upper-body extensors (kp)	Leg extensors (kp)
8	M	29,65	133,03	18,80	17,73	19,11	60,33	103,25
	SD	7,10	8,83	5,61	5,49	6,05	14,37	24,68
9	M	31,90	138,05	19,88	19,24	20,81	67,13	124,23
	SD	5,72	8,10	5,31	5,25	10,36	18,30	34,63
10	M	37,57	145,03	25,02	24,08	27,07	76,40	143,18
	SD	8,48	7,70	5,01	4,73	10,61	19,41	39,78
11	M	42,06	151,30	29,51	28,98	33,70	87,56	161,31
	SD	10,08	8,15	8,17	8,33	9,66	21,08	60,21
12	M	47,16	157,27	34,78	33,88	35,87	100,68	188,53
	SD	9,24	7,07	8,85	9,01	10,66	23,28	80,50
13	M	49,98	162,92	39,26	37,99	40,18	108,06	212,61
	SD	9,87	9,77	10,52	10,72	12,91	24,16	63,87
14	M	59,06	170,36	49,42	47,85	48,33	133,88	264,35
	SD	11,35	9,30	12,55	11,55	13,91	30,20	80,75
15	M	64,54	176,02	56,75	54,52	55,52	146,34	290,32
	SD	9,40	7,47	10,67	10,47	13,58	27,40	75,69
16	M	69,42	178,76	61,78	59,72	60,76	162,37	317,78
	SD	9,53	7,73	10,95	11,07	13,60	31,61	73,05
17	M	70,59	178,84	65,41	63,38	63,55	169,05	337,56
	SD	9,79	7,29	12,09	12,25	14,99	31,71	92,19
18	M	75,14	180,09	69,03	67,21	69,36	188,56	364,33
	SD	11,65	8,05	13,68	13,35	17,49	36,43	89,69
19	M	78,69	181,95	71,61	69,90	71,18	187,83	373,60
	SD	12,36	9,24	15,48	15,07	19,09	30,46	104,31
20	M	77,70	181,19	70,58	68,40	73,41	189,15	379,99
	SD	10,61	11,22	13,42	13,23	21,19	47,67	102,39
21	M	79,33	181,89	77,01	73,73	72,26	193,04	393,64
	SD	9,87	8,09	12,29	13,59	16,53	31,00	109,88
22	M	83,21	182,04	77,21	72,89	76,99	199,70	406,45
	SD	11,99	9,03	17,46	14,36	13,54	42,72	107,81
23	M	80,01	182,18	72,74	70,82	73,35	203,00	409,30
	SD	10,71	8,34	16,46	15,35	15,41	31,86	123,43
24	M	79,83	182,66	75,23	73,06	73,89	214,50	425,47
	SD	11,63	8,05	14,52	13,27	14,93	40,52	99,62
25	M	84,78	182,19	79,08	77,66	78,27	213,85	439,21

	SD	11,34	9,22	17,86	18,79	17,89	42,04	126,55
26	M	85,43	183,96	80,32	77,77	79,38	207,80	435,62
	SD	13,79	8,45	15,10	14,00	18,61	52,24	98,93
27	M	85,61	184,47	73,40	69,94	72,15	205,28	446,69
	SD	9,87	6,44	14,47	13,73	13,41	23,95	122,87
28	M	84,96	183,14	80,66	78,44	71,00	198,11	432,03
	SD	9,89	6,65	16,58	13,71	11,85	31,85	109,82
29	M	85,07	184,74	78,39	74,89	72,98	185,75	423,32
	SD	12,03	6,09	13,27	13,97	15,20	16,06	110,04
30	M	83,91	182,06	76,06	73,22	77,33	178,00	396,11
	SD	7,84	6,71	15,00	13,16	13,15	25,42	51,27

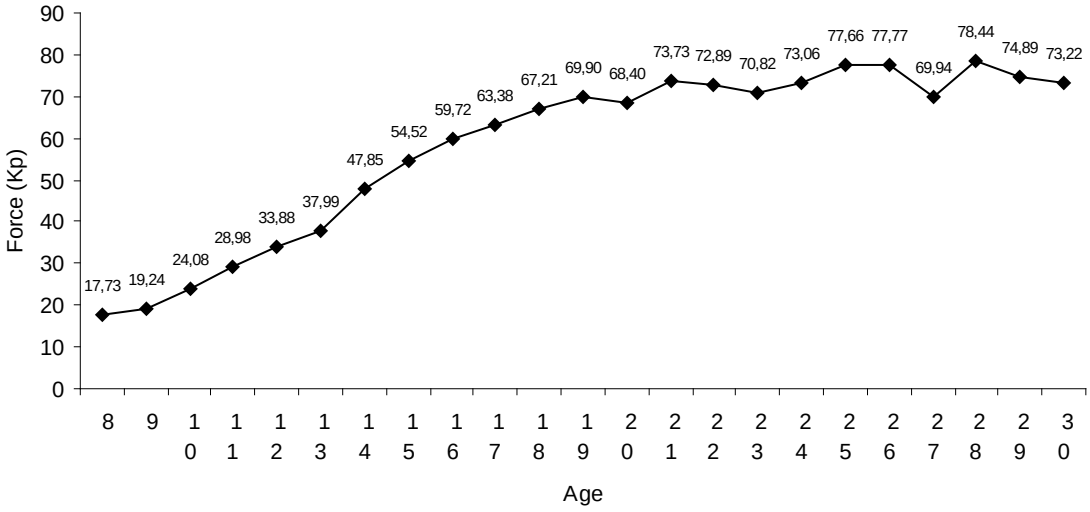
The results suggest that the trends of the development of force in young male athletes are not linear. Looking at the absolute force of the right-hand flexors (PDA), after a relatively slow start, the first point of inflexion can be noted at the age of 9, from which its development is accelerated steadily from 9-17 years of age, until the second point of inflexion. Following this, one can notice a sort of stabilization, characterized by much slower and smaller increments of force until its peak between the ages of 22-28 (Figure 1).

Figure 1: Dynamometric force development of the right-hand flexors (PDA



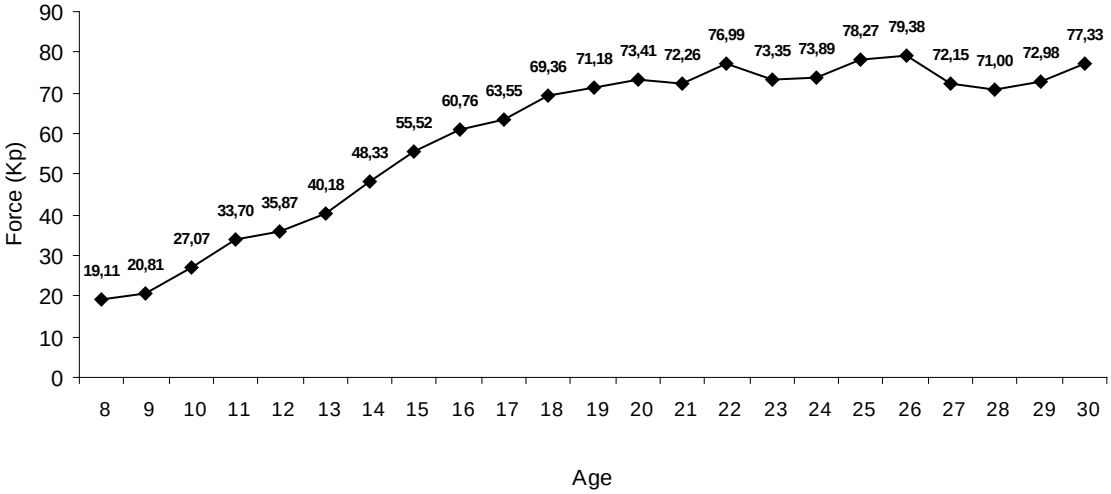
A similar trend is observed for the left-hand flexors (PLA), although the first point of inflexion seems to occur a little earlier. Further research may be warranted in this case, since without a closer look at this finding, we can only speculate as to what sort of reasons might explain the difference in trend between the left vs. right hand (Figure 2).

Figure 2. Dynamometric force curve of the left-hand flexors (PLA).



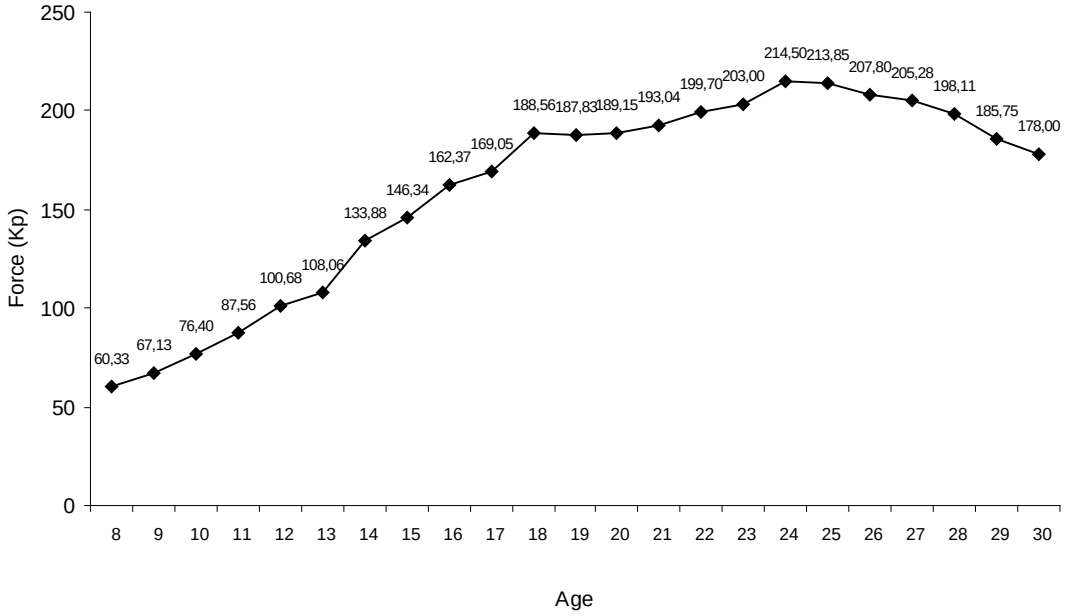
The upper-body flexors (PTA) display yet another similar trend to that of the hand flexors. It is important to emphasize that the values appear to stabilize at the age of 18, reaching their maximum by the age of 26. After 26 y, some fluctuations are detected, with little or no decline in force (Figure 3).

Figure 3. Dynamometric force curve of the upper-body flexors (PTA).



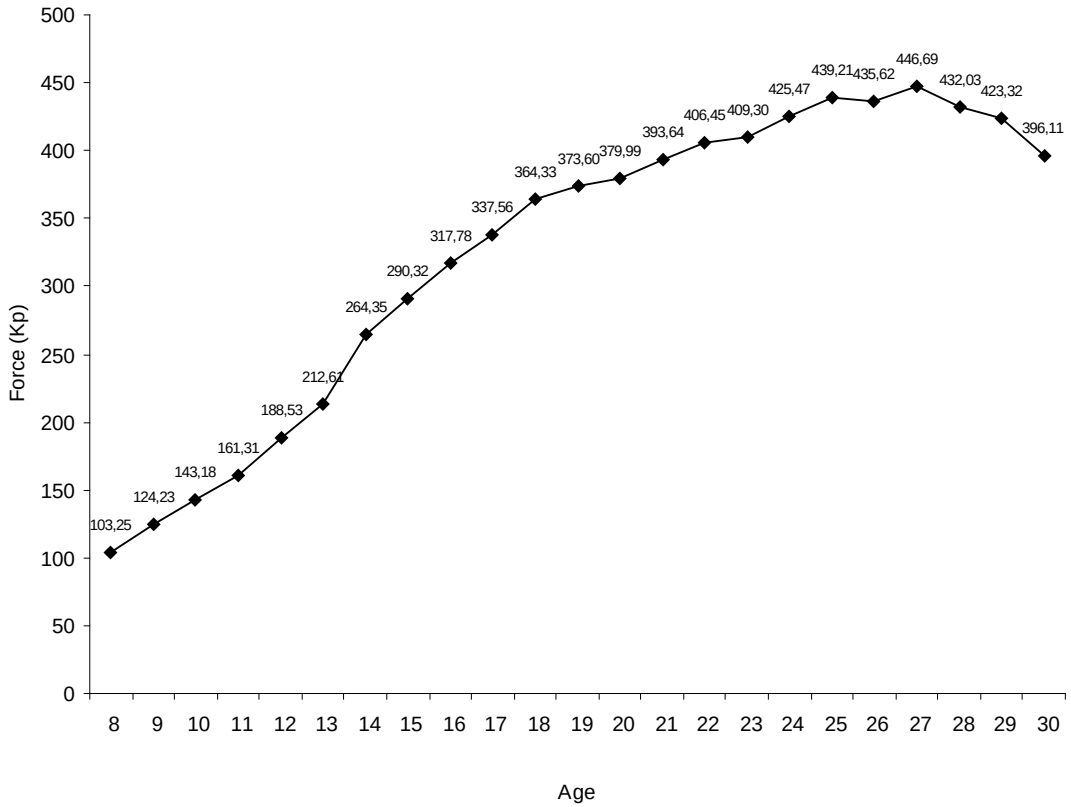
As for the upper-body extensors (OLA), the first point of inflexion is seen at around 9 years of age, with steady increments until 18 y. After this, the development slows and takes some time to stabilize, reaching its peak values by 26 y. From there, there is a significant and irreversible drop in dynamometric force (Figure 4).

Figure 4. Dynamometric force curve of the upper-body extensors (OLA).



With regard to dynamometric force of the knee extensors (ONA), the points of inflexion are generally moved toward later ages as compared to the other measured muscle groups. The first one is recorded at 10 y, after which there is a steady increase of force till 18 y, followed by a long period of stabilization and the peak reached by ~28 years of age. A significant decrease is recorded from this year on (Figure 5).

Figure 4. Dynamometric force curve of the knee extensors (ONA).



Therefore, it can be concluded that the rate of dynamometric force development of the largest muscle groups in healthy, young, male athletes, has a number of similarities, but also certain differences. The findings for all muscle groups show a rather slow development until approximately 9-10 years of age, when the first point of inflexion occurs toward a fast and steady increase. The only exception are the lower extremities, for which these fast increments seem to begin a bit later. The intense and steady development continues till the age of 16-18, or even 19 for the lower extremities. Dynamometric muscle force in male athletes begins to stabilize, with minor fluctuations, in the following 6-10 years. Eventually, there is a significant deterioration of dynamometric force, that can, nevertheless, be maintained over the years.
These observations can be summarized in the following way:

Table 1. I_1 - first point of inflexion; I_2 - second point of inflexion; max - maximum force; PDA – right-hand flexors; PLA – left-hand flexors; PTA – upper-body flexors; OLA – upper-body extensors; ONA – knee extensors.

	PDA	PLA	PTA	OLA	ONA
I1 (years)	9	9	9	9	10
I2 (years)	17/18	16/17	18	18	18/19
max (years)	28	28	26	26	28

Comparisons with a similar study (Kurelić & Momirović, 1975) indicate that maximum values of dynamometric muscle force are reached much earlier in sedentary children (at ~17 years of age) compared to those tested in our study. This is not surprising considering the continuous stimuli that sport training typically has on dynamometric muscle force long after this age.

The muscle force curve for the ages 8-19 reported by others (Peters, Stemler, and Janeff; Farfel, Jokl, and Winter; as cited by Harre, 1973), has shown similar dynamics of development for all muscle groups assessed in our study.

4. Conclusion

The purpose of this study was to examine the developmental curve of dynamometric muscle force in a large population of 1833 healthy, young, male athletes, aged 8-30 y, and to compare our findings with those of others.

Data analyses of five major muscle groups show a slow development until the age of 8-9, followed by a more prominent, steady increase in dynamometric force until 16-18 years of age. Maximum values are typically reached by 22 years of age for some muscle groups (left- and right-hand flexors), and maintained until approximately 28 y, after which dynamometric force begins to decline. A similar trend is observed for the upper-body flexors and extensors, as well as the knee extensors, but with a slightly delayed peak (~23-27 years, and ~25-29 years, respectively). The values consistently begin to deteriorate after ~27 y (upper-body) and ~29 y (knee extensors).

It is, therefore, obvious that the curve of muscle force development in the present study is comparable to the trends previously reported by others. The results indicate that these curves are not identical for all the muscle groups. These differences can be detected even between the left and right extremities. Unlike in the sedentary, maximum values of dynamometric force have been shown to be unchanged for longer periods of time, suggesting the importance of sports training for successful preservation and maintenance of dynamometric muscle force until a certain age.

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DOCUMENT ANALYSIS OF DIFFERENT EDUCATIONAL SPORT SCHOOLS' CURRICULA

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Introduction

In Hungary there was a modification about educational sport schools' curriculums in February, 2007. In the sense of the law, several schools may perform sport school tasks among particular sports. These schools have to prepare their local curriculum based on an educational sport school curriculum. Besides these, raised level physical education classes have to be ensured. The educational institutions may choose from several sports according to the local peculiarities, establishments, claims.

The aim and methods

The curriculums of different sports were examined from the aspect of the content. Women artistic gymnastics, men artistic gymnastics, ice-hockey and speed skating curriculums were analyzed on the fact that how the curriculums were built up, what kind of similarities and what kind of differences can be revealed. How the curricula of the particular sports change besides the raised level physical education classes?

It was in an interest how the certain documents define the time frame, the aims, the content and the requirements of the education. Is there a document where the requirements of other sports fit in the other sport curriculum?

In the documents those coordination and conditional abilities were in a great attention which can be found in the listed sports in common

The object of the analysis was the documents of the sport school curricula. The method of the research was a document analysis.

Results

The sport school curriculum of the physical education and sport education area disintegrates to 1-12. grades. The time of the physical education class was defined, which is 180 hours/year for 1-4. grades, 140 hours/year for the 5-6. grades, 110 hours/years for 7-8 grades, while it is only 72 hours/year for the 9-12 grades. Examining the documents of the sport curricula, these numbers of lessons are completed with the time frame of the certain sports.

The Table 1 shows the time frame for the blocks

Table 1 Time frame for the blocks

	1-2. grades	**3-4. grades**	**5-6. grades**	**7-8. grades**	**9-10. grades**	**11-12. grades**
Physical Education Block	180 hours /year	180 hours /year	140 hours /year	110 hours /year	72 hours /year	72 hours /year
Woman artistic gymnastic block	Not defined	Not defined	Not defined	Not defined	Not defined	Not defined
Man artistic gymnastic block	Not defined	Not defined	Not defined	Not defined	Not defined	Not defined

Ice-hockey block	3 x 55 min/week (~191 hours/year)	3 x 55 min/week (~191 hours/year)	4 x 55 min/week (~254 hours/year)	5 x 55 min/week (~318 hours/year)	5 x 85 min/week (~491 hours/year)	5-8 x 85 min/week (~491-786 hours/ year)
Speed skating block	Not defined	Not defined	Not defined	Not defined	Not defined	Not defined

The time frame for women and men gymnastics trainings was not defined. Knowing the sport and the requirements of the curriculum, it is presupposed that the daily training work includes 2-4 hours already in the first class. There was no reference indicating the time frame in speed skating. At the same time the following were seen in ice hockey; increasing the grades the training time is changing from 3x 55 minutes (super mini age group) to 5-8 x 85 minutes.

During the document analysis it was observed, that the curriculum is split into grades in the physical education area. The requirements are determined into two years in men gymnastics, in ice hockey and in speed skating. In primary school this is in every other grade and in secondary school it is from 9-12 grades in women gymnastics. The Table 2 shows the content-dissociation of the documents,

Table 2 Content-dissociation

Physical Education Block	**1. grade**	**2. grade**	**3. grade**	**4. grade**	**5. grade**	**6. grade**
Woman artistic gymnastic block	1-2. grades	3-4. grades	5-6. grades	7-8. grades	9-12. grades	
Man artistic gymnastic block	1-2. grades (kids)	3-4. grades (kids)	5-6. grades (pubescent)	7-8. grades (pubescent/ cadet)	9-10. grades (juvenile)	11-12. grades (juvenile)
Ice-hockey block	1-2. grades (supermini)	3-4. grades (mini)	5-6. grades (preparatory)	7-8. grades (kid)	9-10. grades (pubescent)	11-12. grades (juvenile)
Speed skating block	1-2. grades (Junior E-F)	3-4. grades (Junior E-F)	5-6. grades (Junior C-D)	7-8. grades (Junior C-D)	9-10. grades (Junior C-B)	11-12. grades (Junior B-A)

The general basic principles, the aims and the part aims are standing at the beginning of the certain curricula according to the grades. In the document of physical education knowledge block, basic principles are defined such like the health promotion, develop the motor abilities, build the motor education, choosing suitable sport or pique the needs for competing and doing sport. No basic principles are stated in the certain sport documents.

The curricula, which change on the different classes, formulate aims, part aims on the next level. The man and woman gymnastics documents are not splitting into separate sphere. Besides the general aims like endearing sports, increase the satisfaction of motor abilities, adequate the gain needs, general and specific groundwork, there are particular part aims like strengthening the ambition of performance, learning compulsory exercises, get used to the competitions and continue that, failure tolerance, get over the difficulties and healthy lifestyle education etc. The ice hockey sport block document is splitting into cognitive, affective, psycho-motor and social aims like review of fundamental rules, endearing the skating, developing the team-discipline, teaching new game elements, acquiring of skating with stick or building the group cohesion. The aims are expanding by the progress of the age in detail. Cognitive, motor and affective spheres appear in speed skating, but going forward in the classes, the aims are flaring only a little. The following aims were found in the document: sport-specific movements, developing coordination abilities, tolerating the growing loads, getting acquainted with competition rules, fair game, using the learned technical and tactical elements etc. The Table 3 shows the aims of the examined curricula.

Table 3 Aims

	AIMS			
Woman artistic gymnastic block	Aims		Part aims	
Man artistic gymnastic block	Aims		Part aims	
Ice-hockey block	Cognitive sphere	Affective sphere	Pshychi-motor sphere	Social sphere
Speed skating block	Cognitive sphere	Motor sphere	Affective sphere	

In the curricula the contents, the requirements and comments appear on the next level. The physical education knowledge block splits the curriculum into subsections; ability development, conditioning, track and field, gymnastics, physical education and sport games and swimming. In woman gymnastics there are subgroups which are the following: vault, uneven bars, acrobatics (later floor and beam acrobatics) and beam. The man gymnastics curriculum divides the content into preparatory practices, motion substance developing general and special abilities and exercises of the sport gymnastics. Subgroups were found in the ice-hockey curriculum like skating-technique on ground and ice, stick training, tactical elements, goalkeepers training, mental preparing, playful movements and ability development. The speed skating curriculum contains exercises on the ground and on the ice, and it also mentions playful motions. The Table 4 shows the content parts of the curricula.

Table 4 Content parts

Physical Education Block	**Ability-development**		**Conditioning**	**Track and Field**	**Gymnastic**	**PE games, sport games**		**Swimming**
Woman gymnastic block	Valut	Uneven bars		Acrobatics, Floor - acrobatics		Beam, beam-acrobatics		
Man gymnastic block	Pre exercises	General ability development	Floor	Pommel horse	Ring	Valut	Parallel bars	High bar
Ice-hockey block	Skating techniques		Stick-tech-niques	Tactical elements	Training goalies	Mental training	Games	Ability develop-ment
Speed skating block	Ground exercises			On ice				

The conditional and coordination abilities were also in the attention of the examined documents. These can be found collectively in the listed sports. Thereinafter the certain documents are rated separately, but the contacts of the curricula are referred at the same time. The woman artistic gymnastics block's content was restricted to only the competitive sport.

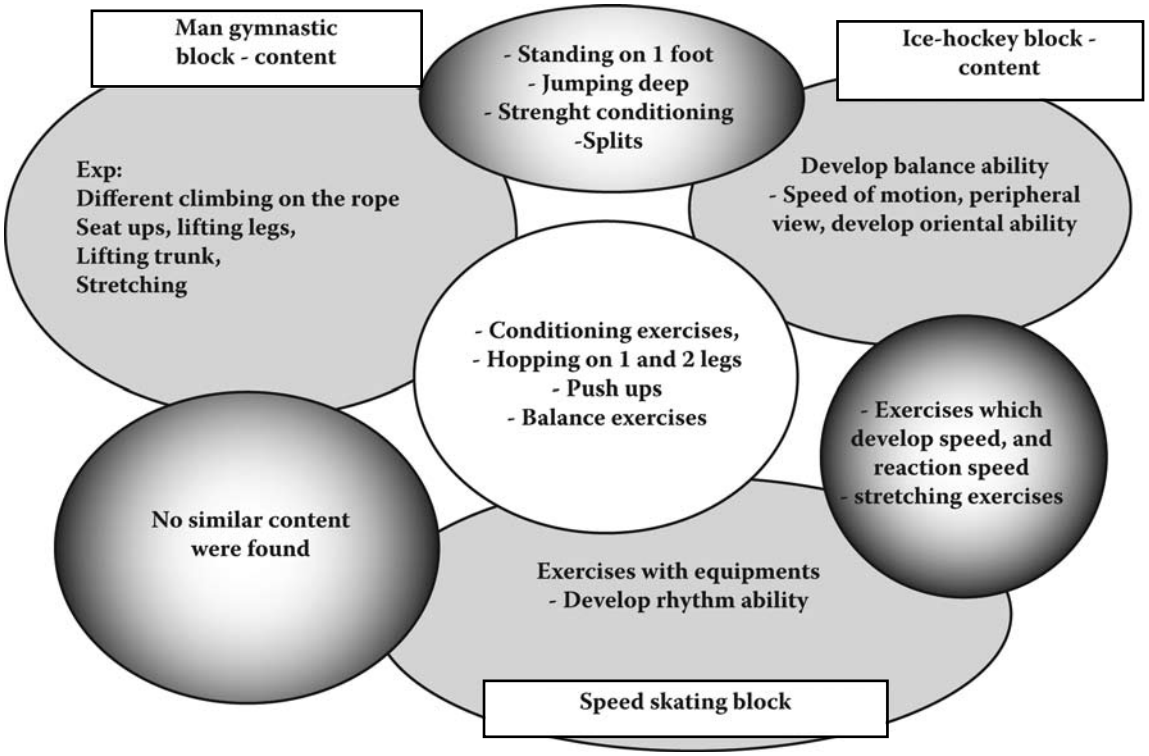
It is interesting, that the man gymnastics curriculum is different. In the course of the preparatory exercises the document writers suggest conditioning and aim-conditioning tasks, which can be found in the ice hockey and the speed skating curricula. There are many identities to the mentioned two sports among the exercises developing the general abilities, for example: hopping, standing on one foot and push-ups. These contents are much more and these may be utilized to the two icy sports according to us. Climbing exercises, sit-ups, leg and trunk exercises are also mentioned. There are jumping, hopping on one and two legs, stretching the shoulders, hip and spinal column in the higher classes.

The ice hockey sport block is the most detailed. As it was experienced in the man gymnastics block, this curriculum also contains standings on one foot and hopping-jumping exercises. The curriculum deals with the balance exercises and the development of the sense of balance, which are reckoned to serve the developing of the other 3 sports. The speed of motion, the peripheral vision and the oriental ability are in a big attention. What there is in the gymnastics, there is also in the ice hockey like exercises increasing the flexibility of the joints, jumping up from deep jumping and strengthening exercises. Training for the split movement is very important in the practicing of the young goalies in ice-hockey, which is same for the man gymnastics. It is also substantial that other sport exercises can be found in the ice-hockey curriculum

like swimming, basketball, soccer and floorball. The curriculum writers recommend fitball exercises to develop the balance.

Unfortunately, the speed skating curriculum is not much detailed. The sport is very close to the ice-hockey, so the coordination and conditional exercises used for ice-hockey players can be also used in speed skating. Some exercises were found which are similar to the man gymnastics. Developing speed and reaction exercises were in the curriculum of the speed skating. They also use stretching exercises. The Figure 1 shows the similarities.

Figure 1 Similarities



Conclusions

It was wished to reveal the assumption, that there are a lot of similarities in the selected sports. Certain conditional and coordination abilities can be developed with the help of the other sports. It is possible to make use the other sports contents to achieve goals. The training may be enriched and the students can also develop from other activities. Besides these, it is also a question that the content of the physical education block is given to the students or not. The answer will be also searched in the future.

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MONITORING SPORTING ACTIVITIES AND NUTRITION HABITS AMONG CHILDREN ATTENDING NOVA DUBNICA SECONDARY SCHOOL (SLOVAK REPUBLIC)

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INTRODUCTION

School-age is divided into three phases: younger school-age (6-11 years of age), middle school age (11-15 years) and older school-age (15-18 and up to 20 years). Because of the intensive tempo of growth and physiological changes in this period, a balanced diet supplying adequate amounts of energy and nutrients taken at regular intervals is of marked importance. The nutritional needs of children during school attendance depend upon their age, movement-oriented activity and sex and vary over the course of the individual phases. The amount and type of food taken also hinges upon whether or not the child plays games and is active in the fresh air during his leisure time or whether he reads or devotes himself to other pursuits during leisure time (Luhánová, 1971).

Woynarowska (2005) compared children from 22 countries that were European Union members as at 1 May 2004. She found that boys aged 11, 13 and 15 are the most physically active in Northern Irland (25% of Irlandian boys devote at least 60 minutes/day to some kind of exercise), in the Czech Republic (23%) and Slovenia (21%). The majority of girls aged 11, 13 and 15 exercise at least 60 minutes/day in Ireland (15% of girls), the Czech Republic (14%) and Holland (12%). Conversely, the lowest interest in exercise among both boys and girls is shown in Germany and Estonia (in both countries 8% of boys and 5% of girls), 8% of boys in Italy and 5% of girls in Portugal and Belgium. In Serbia there Kisin et al. (2007) were interested about national programs of support of health of children and youth.

The human being is equipped from birth in such a way as to allow easy movement. Movement is a source of pure pleasure, especially for children. Today, however, there are more and more signs that leisure time is being spent in a sedentary matter, not only with adults but also with children. The moments of adventure which children formerly experienced in games and physical activities they now experience only virtually, sitting in front of the computer or television screen with minimal expense of physical effort. Inadequate movement and the growing popularity of fast foods is having a native influence on the appearance of overweight and obesity and accompanying illnesses. This is more than a cosmetic problem. It is one that brings serious health risks. Genetic predisposition also naturally plays an important role, research in recent years has clearly shown that overweight is negatively influenced by too much and too frequent stress, inadequate movement and faulty nutritional habits. One of the most important prerequisites for long-term reduction of body weight is movement-oriented activity (Krejčí, 2007). It has been demonstrated that suitably chosen and adequately movement-oriented activity acts preventatively against a range of diseases of civilization (Fialová Fiala, 2002; Juříková et al., 2005, Zvonař, 2007). Encouraging and stimulating the development of self-esteem and self-control are necessary not only to prevent overweight but also to stave off health risks in general. Recent research indicates that people taking part in recreational movement activities more than 400 minutes per week suffer demonstrably fewer health problems (Zvonař, 2007).

Education for a healthy lifestyle can have an important influence on the quality of life from childhood right through to old age (Krejčí, 2007). Conditions for instruction in school, lifestyle and eating habits have a fairly large influence on health and capability for work. Many negative influences (stress, bad habits, improper nutrition) which are present among students make themselves felt as illnesses in adulthood (Szpakov et Pašala, 2006). The quality of life is limited by genetic predisposition, the natural environment, life style, standard of living and life satisfaction. Good feelings are narrowly tied to physical fitness, personal habits, a positive approach to life, stress management, nutrition and weight control (Křivohlavý, 2001).

MATERIALS AND METHODS

Research was undertaken at the secondary school in Nova Dubnica into the lifestyle of 10-year-old pupils. More than 100 children took part in the research. Only 80 filled out questionnaires properly in a manner suitable for further processing, 42 of them boys and 38, girls. The investigation was made using questionnaire methodology. The questionnaire contained a total of 109 questions pertaining to eating habits, lifestyle, movement-oriented activity, relation to school and the educational process in general, self-image and leisure time. The results of this work concern movement-oriented activity and nutrition in the children question. Some results have already been published on the same theme but using a smaller sample of children (Juříková et Maschtovská, 2008a; Juříková, 2008). Results with a large sample of children were published in work by Juříková et Maschtovská (2008b).

The children were first divided into groups based upon height and weight. While the Body Mass Index (BMI) is used to evaluate these factors with adults, for children the BMI may not used before the end of growth without taking the age of the child into account For children aged 3 to 18, the BMI is used in conjunction with a percentile graph of weight and height (Nevoral, 2003). Individual weight categories used for children are indicated in Table I (Vignerová et Bláha, 2001).

Table I BMI evaluation of children based upon age percentile height and weight graphs

Percentile	Category
⟨ 3	Alarmingly low weight
3 – 25	Reduced weight
25 – 75	Normal weight
75 – 90	Increased weight
90	Overweight
⟩ 97	Obesity

Table II includes all children in the research divided into groups based upon weight and height percentiles.

Table II Division of children investigated based upon weight and height

Sex of children	Number of children						
	Height/weight ratio						Total
	2. percentil	10. percentil	25. percentil	50. percentil	75. percentil	90. percentil	
Boys	2	2	8	14	14	2	42
Girls	0	10	10	10	8	0	38
Total	2	12	18	24	22	2	80

The table makes clear that most boys (66.7%) fall into the 50th or 75th percentile which, together with the 25th percentile with 19% of boys, represents normal weight. The same number of girls fall in terms of weight and height into the 10th (26.3% of girls), 25th (26.3% of girls) and 50th percentiles (once again 26.3% of girls). This means that most girls (52.6%) are of normal weight but 26.3% of girls are of reduced weight.

RESULTS AND DISCUSSION

The first question concerned the relationship to sports for individual groups of children. Children responded to the question of whether sports are important for them using a scale numbered from 1 to 10, with 1 indicating sports are unimportant and 10 indicating sports are very important to them. The most frequent answer for each height/weight group was recorded. Results are indicated in the table.

Table III Importance of sports for individual groups of children

Sex of children	Height/weight group					
	2. percentil	10. percentil	25. percentil	50. percentil	75. percentil	90. percentil
Boys	10	10	9	8	8	5
Girls	x	9	5	8	6	x

For boys, increasing height was associated with a lower importance accorded to sports. Boys whose height and weight were in the 90th percentile, representing overweight, found sports the least important. For girls, this relationship was not as marked. Overall, however, it may be noted that sports were less important for them than for boys. Kopecký (2000) indicates that physical exertion in the form of movement activities which respect developmental patterns have an impact in reducing the height/weight ratio in the 10-15 age group the lowest possible level.

Information concerning sports for the children investigated and the particular sports they engage in is given in Table IV.

Table IV Sporting activities of children

Number of children	Sports groups
Girls:	
8	tennis
3	swimming
2	movement-oriented games
2	swimming + basketball
1	swimming + dancing
1	athletic + dancing
1	dancing + basketball + cycling
20	do not participate in sports
Boys:	
15	football
3	basketball
3	florball
1	taekwondo
1	aerobics
1	football + table tennis
18	do not participate in sports

The table shows that more girls participate in sports. 13 girls indicated that they take part in a single sport. 4 indicated that they take part in 2 sports and one girl indicated that she even participates in three sporting groups. The favourite sports for girls were tennis and swimming. 20 girls unfortunately took no part whatsoever in sports. 23 boys participated in a single sport, 1 boy participated in 2 and 18 boys were not involved in any sporting groups. The favourite sport of boys was football.

Another question determined whether boys spend their leisure time at home or whether they also play outdoors. It may be presumed that, once outdoors, children will be engaged in movement and will therefore actually take part in movement-oriented activities, even if they are not directly involved in a sporting group. The answers given by the children to this question are indicated in Table V.

Table V Spending leisure time outdoors among children investigated

Children	Frequency with which leisure time is spent outdoors				
	Daily	Several times per week	Once per week	Rarely	Never
Girls	22	16	0	0	0
Boys	20	20	2	0	0

The table shows that most girls (58% of girls) spend their leisure time playing outdoors several times per week, with 16 girls playing outside daily. 20 boys indicated that they go outside daily, and 20 boys indicated that they go outside several times per week. 2 boys indicated that the play outside only once per week. In an investigation of a smaller number of children from the same school, it was determined that most girls take part in sports rarely and most boys take part in sports once per week (Juříková et al, 2008).

Movement activities are very important but not all children regularly take part in sports or run outside with their friends. In the current hyper-technologized epoch, more and more children sit in front of the computer or television when they come home from school. This was the motivation for the next question, aimed at what children could not give up during their leisure time. There were three choices: television, computers, sports. Answers to this question are in Table VI.

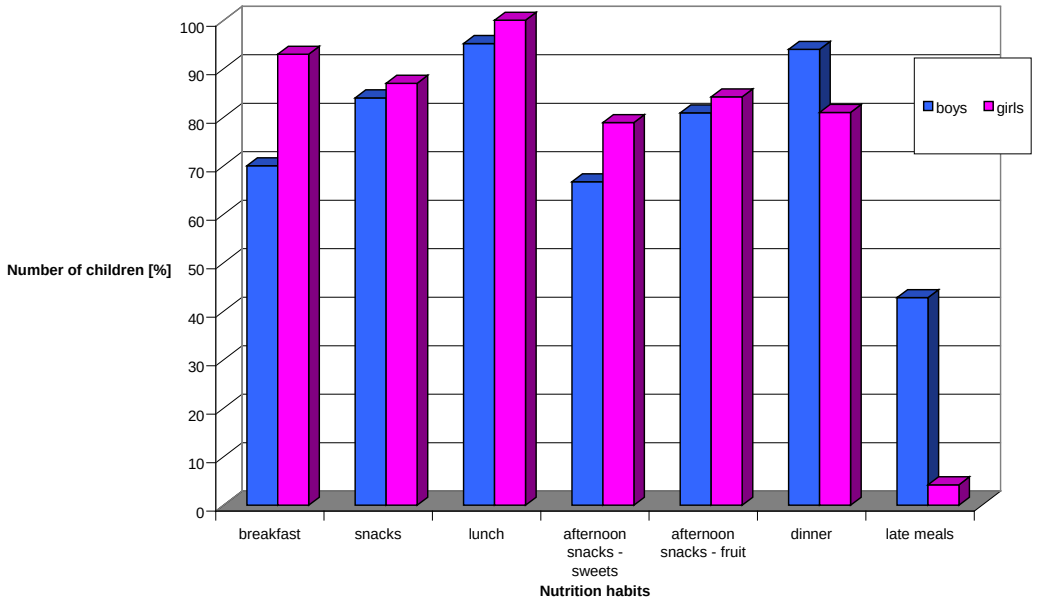
Table VI What children would not easily give up

Children	TV	PC	Sport	TV + PC	TV + Sport	PC + Sport	nothing
Boys	15	18	7	0	2	0	0
Girls	19	10	8	0	0	0	1

The table indicates that 35.7% of boys would give up television, 42.8% would give up computers and 16.7%, sports. Two boys would give up television and sports but not computers. Television was most easily given up by girls (19), with sports, happily, being the hardest to give up (8 girls). 26.3% of girls could give up computers. One girl indicated that she could not give up any of the three choices. Adachi-Mejia et al. (2007) take that children, which have a TV in their bedroom, have significantly more often overweigh than children, which have in their bedroom no TV.

A further question concerned the eating habits of the children. Answers to questions concerning regular consumption of breakfast, midmorning snack, lunch, an afternoon snack in the form of sweet baked goods, or other sweets or afternoon snacks in the form of fruit, and whether they also eat dinner are indicated in Graph 1. The last column in graph number 1 indicates answers to the question of whether more food is eaten after dinner.

Graph 1 Nutrition habits of the children under investigation



As is evident from the graph, more girls and boys regularly consume breakfast, snacks and afternoon snacks, whether in the form of sweets or fruit. All children regularly consume lunch. This is because all children have prepaid lunches in the school cafeteria. Afternoon snacks in the form of sweets are consumed by fewer children than those who consume fruit. Fruit as an afternoon snack is enjoyed by 80,9% of boys and 84.21% of girls. A regular dinner is had by fewer girls than boys and late meals are regularly eaten by fewer girls than boys, as well, in spite of the fact that the difference between boys and girls in the consumption of dinner and late meals is less in this sample than was determined with a smaller sample of children from the same school in foregoing research (Juříková et Maschtovská, 2008b). It's likely that girls are more concerned than boys with having a slender figure. Foreign studies indicate that girls are already dissatisfied with their figures by age nine (Tigemann at Lowes, 2003). A study by Gardner et al. (1999) demonstrates that both sexes, both boys and girls, have a tendency to see themselves as being broader than they are in actuality and desire to be more slender. Taller, more slender children were more satisfied with their bodies (Štajnochrová, 2008).

CONCLUSION

The research indicates that 85.7% of boys aged 10 years are of normal weight. Only 2 boys from the entire cohort were of alarmingly low weight and 2 boys were overweight. Most girls (52.6%) were of normal weight. 10 girls were of reduced weight and eight girls were of increased weight. Overall, 27.5% of children were overweight in the group and 2.5% were obese.

The children usually indicated that sport was very important for them (on a scale of 1-10, most children placed sports in the eighth position). A tendency was observable in boys for lower values of the weight/height ratio to be paired with a lower importance accorded to sport, This tendency was not apparent in girls. Nor was participation in clubs dependent upon the weight/height ratio.

52.5% of children questioned took part in sport clubs, with 45% taking part in 1 sport club. 5 children indicated they took part in 2 sport clubs and 1 girl even indicated participation in 3. 45.7% of children unfortunately took part in no sporting groups, but 52.5% of children indicated that they play outdoors daily, where they also take part in movement-oriented activities. Many children devote their free time to sedentary occupations, as well, such as watching television or working on the computer. If the children were forced to give up sports, the computer or television, most would rather give up the computer or television, which is a heartening result.

As concerns eating habits, it was determined that girls regularly consumed breakfast, snacks, lunch and an afternoon snack (whether in the form of sweets or fruit) more than boys. The meal most often consumed by the children was lunch – consumed each day by 95.2% of boys and all girls. Girls eat dinner regularly less than do boys. Late meals are regularly consumed by 42.8% of boys and only 4.21% of girls.

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EFFECTS OF BASKETBALL CLASSES AT THE BASIC MOTOR AND FUNCTIONAL ABILITIES TRANSFORMATION IN EIGHT GRADE MALE PUPILS

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Introduction

The aim of the physical and health education field is fulfilment of biopsychosocial motives for motion as an expression of satisfaction of some human needs, increasing thus adaptive and creational abilities in modern life and work environment. A special aim of physical and health educational field is development of health culture in pupils for preservation and promotion of one's own health and of environmental health.. From this definition of this educational field, results also the aim of physical and health education, manifested in a possible and necessary influence on promotion of students' health, on development of their features and abilities, on formation of motor knowledge and improvement of motor achievements, at promotion of desirable educational values, and on adoption of certain theoretic knowledge and kinesiological information.

Physical exercises must not become contents to be learned by a student, but they should be means for strengthening and development of students, both in physical and psychological sense. Physical and health education must not be limited to development of condition, improvement of technique and tactics, but must systematically affect anthropological status of students through a systematic and planned organized activity. The final outcome of this work depends also on organization and implementation of exercise process in PE and health education classes, especially because an expert is fully independent in his/her selection of methodological and organizational forms of work, of contents and methods of work as well as of applied didactical approaches. Whether the desired changes will occur affected by physical exercises, what kind of changes will that cause or how long will they last, depends on doses, distribution and control of loading. In order to influence by physical exercises, in a secure and efficient manner on the entire anthropological position of students, their physical development, development of their features and abilities, fund of motor knowledge as well as educational effects of such work, it is necessary to determine not only the real state of anthropological position of students and the guidelines of their transformation, but at the same time ensure the obtaining of feedback on results and progess of students. Thus, all that together with the fact that the science of kinesiology gains every day more and more information on values of (certain) kinesiologic activities which can affect the transformation of anthropological status of students, lead us to a conclusion that planning, programming and control of the process of physical exercises are requisites for a positive transformation of anthropological status of students and fulfilment of needs of each student.

The influence of special programs on motor abilities were subject of some scientific researches so far: Bavčević, Babin, Prsakalo, 2006; Hadžikadunić, 2007; Hadžikadunić, 2004; Luka, Jukić and Šimek, 2006; Malina, 1984; Stanković, 2002, Skender, 2004; Tabaković, Skender, Turković, 2006; Tabaković, Turković, Skender, 2005. In majority of the recent researches about the influence of special programs on motor and functional abilities, significant partial and global quantitative differences were determined in the tests of motor abilities under the influence of certain program.

METHODS

In this one-month research of influence of program contents pertaining to basketball teaching cycle in regular classes of physical and health education, held twice a week, on basic motor and functional abilities of 8th grade students of an elementary school in Sarajevo, was applied on an overall sample of 100 students who participated at initial and final measurement at the beginning and at the end of the applied teaching cycle of basketball.

The overall sample was tested by the Eurofit battery of tests, with a total of eight variables for evaluation of motor abilities, and with one variable for evaluation of functional ability (Table 1). Program contents of the basic part of the class of physical and health education consisted of the following basketball elements: leading and passing of the ball, standing and running jump-shot, double step with placing of the ball, shooting from the position for three points, feinting and dribbling with or without defence, feints by leading, dribbling, stopping,

play 1:1, 2:2, 3:3, moving in attack and defence with or without a ball, elements of tactics, class competition. The overall number of classes was ten with an overall frequency of 29. In an overall one-year curriculum for physical and health education for eight graders, the basketball teaching cycle was realized in the first month of the first semester, in order to eliminate the influences of other teaching cycles on transformation of basic motor and functional abilities.

Table 1. Tests for evaluation of motor and functional abilities according to Eurofit program

Tests for evaluation of basic motor abilities	Test mark
Flamingo balance test	(FLA)
Hand tapping	(TAP)
Sit & reach	(PPR)
Standing long jump	(DSM)
Hand grasp	(DIN)
Sitting – lying	(DTK)
Hang with elbows bent	(ZGB)
Running back and forth 10×5 m	(10X5)
Test for evaluation of functional ability	Test mark
Running 20 m back and forth with gradual acceleration	(20U)

For the purpose of this research we applied the basic statistical indices (arithmetic mean, standard deviation and minimal and maximal results). In order to establish quantitative differences a discriminative analysis (SSDIF – analysis of quantitative changes) was applied, carried on differences of the first and the second measurement (initial and final). Based on Mahalanobis distance and Hotelling's T – test, it was determined that there were significant quantitative changes in the test of motor abilities in the period of one-month basketball program within the regular classes of physical and health education.

RESULTS AND DISCUSSION

The values of the calculated parameters in Table Y1 indicate that there are no significant deviations from normal distribution of the result frequencies, which tells us that the results are normally distributed so no further analysis can follow.

Table Y1. Basic statistics, distribution and Kolmogorov-Smirnov test

TEST = 0.1340, DMAX = 0.1127

CLASS	LEFT	RIGHT	F	FC	FCR	EXP	EXPC	FCT	D
1		5.12	8	8	0.05	23.12	23.12	0.16	-0.10
2	5.12	15.37	73	81	0.55	41.21	64.32	0.43	0.11
3	15.37	25.61	43	124	0.84	46.98	111.30	0.75	0.09
4	25.61	35.86	15	139	0.94	27.31	138.61	0.94	0.00
5	35.86	46.10	6	145	0.98	8.08	146.69	0.99	-0.01
6	46.10	56.34	0	145	0.98	1.21	147.90	1.00	-0.02
7	56.34	66.59	1	146	0.99	0.10	148.00	1.00	-0.01
8	66.59	76.83	1	147	0.99	0.00	148.00	1.00	-0.01
9	76.83	87.08	0	147	0.99	0.00	148.00	1.00	-0.01
10	87.08		1	148	1.00	0.00	148.00	1.00	0.00

The table Y2 displays basic central and dispersion parameters of basic motor abilities of students (initial and final measurement). By the insight of the results of arithmetic means (XA) at initial and final measurement, it can be seen that there were statistically significant changes at the final measurement, in all variables, except in the variable "running back and forth" (10X5), which estimates agility as motor ability.

Table Y2. Basic statistical indices (initial and final measurement)

(XA = arithm. mean , DX =half span in which with 95 % accuracy there is a real value of arithmetic mean, MIN = minima result , MAX = maximal result)

INITIAL MEASUREMENT	XA	DX	MIN	MAX	SKEW	KURT
I_FLA (flamingo)	17.36	1.95	0.00	92.20	2.57	13.80
I_TAP (hand tapping)	11.58	0.24	8.40	15.80	0.61	2.98
I_PPR (Sit & reach)	18.11	1.12	0.00	38.00	- 0.26	3.11
I_DSM (standing long jump)	174.65	4.28	18.50	235.00	- 1.37	9.77
I_DIN (handgrip strength)	23.66	1.32	4.00	49.00	0.59	3.03
I_DTK (lying sitting)	24.49	0.73	7.00	35.00	- 0.69	4.46
I_ZGB (Hang with elbows bent)	35.46	8.35	0.00	604.00	8.90	97.58
I_105 (running 10 x 5)	24.39	4.07	13.58	210.00	6.80	47.88
I_120U (running 20m with acceleration)	870.54	57.35	160.00	1800.00	0.24	2.41
FINAL MEASUREMENT						
F_FLA (flamingo)	22.69	2.00	4.40	91.00	2.08	10.02
F_TAP (hand tapping)	10.87	0.21	8.30	17.70	1.09	6.39
F_PPR (Sit & reach)	21.58	1.05	7.00	44.00	0.38	3.03
F_DSM (standing long jump)	191.33	4.81	16.50	240.00	-2.74	16.38
F_DIN (handgrip strength)	30.89	1.51	12.00	57.00	0.30	2.60
F_DTK (lying sitting)	27.85	0.66	14.00	40.00	-0.41	3.54
F_ZGB (Hang with elbows bent)	43.29	4.00	0.98	117.00	0.32	2.33
F_105 (running 10 x 5)	34.40	26.36	10.66	2010.00	11.89	143.50
F_20U (running 20m with acceleration)	1103.44	100.89	200.00	7200.00	6.17	61.03

By the analysis of quantitative changes (Table Y3), based on Mahalanobis distance and Hotelling's T-test, it can be ascertained that there were average quantitative changes in the tests of motor and functional abilities during one-month period of application of program of basketball educational cycle.

Table Y3. Testing of significance of changes

Mahalanobis distance	4.3950
Hotelling's T-test	650 .4670
F-test difference	68.3408
DF1	9
DF2	139
P	0.0000

From the analysis of the Table Y4 we can generalize that quantitative changes moved in the field of functional abilities, power and segmental speed of the movement frequency which can be explained by the structure of movement itself and efficiency of performance of basic elements of technique and tactics of basketball game, based exactly on these motor abilities. Based on the analysis of global quantitative changes, it can be concluded that average statistically significant positive changes of partial and global transformation

qualitative effects of the basketball teaching cycle on basic motor and functional abilities of the 8th grade students were obtained.

Table Y4. Elementary indices of differences

	A	D	S	R
MFLA	5.33	0.09	0.79	0.38
MTAP	-0.70	-0.89	-0.87	-0.41
MPPR	3.46	0.25	0.95	0.45
MDSM	16.69	0.01	0.63	0.30
MDIN	7.22	0.18	1.18	0.56
MDTK	3.36	0.25	0.93	0.45
MZGB	7.83	0.00	0.16	0.08
M105	10.01	0.00	0.06	0.03
F20U	232.91	0.00	0.43	0.21

(A = differences arithmetic mean, D = discriminative coefficients,
S = standardized orthogonal projections, R = structure of discriminative factors)

CONCLUSION

In order to achieve even more significant global quantitative changes (effects), the contents of the applied program procedure should be sufficiently programmed so to cause more significant changes in ever greater number of variables of motor and functional abilities, and therefore a number of classes should be increased in this cycle, as well as apply contents of program procedure which will be sufficiently enough programmed to cause more significant changes in greater number of variables of motor and functional abilities, time line of the applied program should exceed 10 classes, while implementing the program the intensity of loading that will require even greater physical engagement from the subjects, while implementing the program apply more complex teaching-organizational forms of work, which will contribute to greater intensification of the class, i.e. which will reduce "idling" at physical and health education classes due to inability of individual approach to students because of large classes, apply work in homogenized groups.

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THE INTERACTION OF THE DEVELOPMENT OF STATIC AND DYNAMIC MUSCLE POWER IN PHYSICAL EDUCATION

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Introduction

The lifestyle in industrial societies like ours has resulted in the more frequent occurence of a great number of illnesses, also called civilisational hazards. The lack of exercise, sedentary lifestyle, and one-sided static and dynamic strain have combined to make arthrosis and calcification of the spine an endemic in our age. Arthrosis cannot be totally cured, but knowing what causes it, it can be prevented. The prevention of adult-age spinal illness should start in childhood by making the proper posture become automatic on the one hand and ending the lack of exercise on the other, while keeping the developmental changes of the physique and operation of the body in mind. Reaching school age is a turning point in the appearance of bad posture, incorrect movement and the break-up of muscle balance, because young students suddenly have to sit on badly chosen seats for 35-40 hours a week. However, the muscle balance can be restored and maintained by targeted and regular exercises. Therefore curriculums for physical education should include exercises and tasks that help good posture.

I. Review

By finding the corresponding activity to the development and interest of the individual, physical education has an important role in schools turning out physically and mentally healthy, balanced young adults with good working capacity. In addition, it is the shared responsibility of school health care and pedagogy professionals, especially P.E. teachers and physiotherapy teachers, to promote body culture as part of a healthy lifestyle as well as the development and maintenance of fitness as an everyday need and lifelong programme. Considering that a child's development of physical skills is not regular, long physical inactivity or not enough strain can cause irrecoverable loss. *Farmosi* (1990) also agrees that if a young child does not participate in good quality or adequate amount of physical education, then the level and expansion of conditional and coordinational skills is below the optimal. Children enter school at the age of six or seven, where they participate in regular physical education. Its level can determine the development of their motor skills for life. Unfortunately, the natural forms of exercise and play are pushed to the background, although it is well known that exercise is vital for the body.

A considerable percentage of the human body is muscle that needs exercise. The basic structural framework is stable, and is able to function in a particular way. However, if there is a change in its structure, then the continuity or potential implementation changes too. Where else, if not within the framework of physical education, should the criteria of good posture be taught or bad postures corrected if needed? According to *Makszin* (1997) the development of good posture should already start in primary school, when good habits are formed by the exercises. In *Keller*'s *and György's* (1987) wording, exercise for proper posture built into the material of P.E. lessons and adapted for the school year can prevent illnesses. He claims that improving breathing and back muscle strengthening exercises should have adequate weight in the P.E. curriculum. In his opinion, by making the bones and muscles more mobile through conscious and controlled relaxation and stretching, to some degree deformities in the future can be prevented and surmounted. To reach this aim elements of physiotherapy should be added to the physical education syllabus.

In *Gergely*'s (2001) words – doctors and teachers concerned abut children's health urge an increase in the number of P.E. lessons and, first and foremost, preventive sessions. The reason for this is that the correction of functional and stuctural changes does not always necessitate medical service. A specialist, in this case a P.E. teacher, is needed who, based on his or her anatomical and functional knowledge, can teach a range of applicable excercises. MGT's posture correctional test gives direction for this preventive activity and to its application in physical education (Somhegyi at al, 2006).

II. The aim of the survey

Statistical data confirm that in the last two decades the number of Hungarian youths who live with some form of faulty posture or posture defect is five times higher than before. The Hungarian Spine Therapeutical Association (Magyar Gerincgyógyászati Társaság), hereafter referred to as MGT, prepared a preventional programme in 1996 for the recognition and correction of these problems.

The aim of MGT is to introduce P.E. teachers to certain special posture corrective exercises that all children are able to do regularly in school, and, as far as possible, even in nursery school. In this way arthrosis of the spine in the future can be prevented, and good posture can be enforced. The occurence of kyphotic posture and its age-related changes are not significant. However, this problem has to be especially dealt with because harmonious cooperation between the front and back muscles of the torso can be split. In that case the strain relations change and in the endangered age (school starting age, teens) the deformations can appear in a more serious form. The number of scoliotic deformations rockets at the beginning of school age. The reason for this is the rise in the number of lessons spent in inactivity and inappropriately chosen school bags.

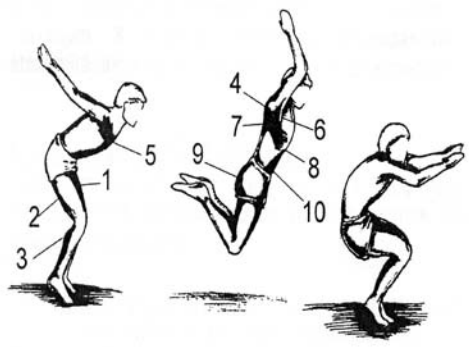
From all these it becomes unequivocal that it is not enough to simply offer lively activities in the school and nusery school classes, but it is necessary to teach and learn properly selected exercises that counterbalance the dysfunctional muscle work..

III. Methods

The aim of our research is to compare the MGT calibrated test system's test of static muscle power to the dynamic muscle power test of the same muscle group. Our hypothesis was that if there is some kind of a disturbance, abnormality, in the student's static system, in the spine's components among others, then it is visible in the dynamic field as well. We chose three exercises to measure static muscle power exertion from the 12 tests of MGT, taking into account the results of previous surveys. These exercises were supplemented with three test exercises from the exercise material of Hungarofit that need dynamic muscle power exertion. The performance was calculated on the basis of the Hungarofit measuring and evaluation table.

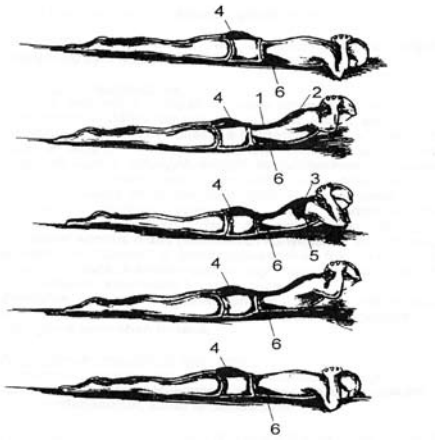
Out of the three chosen dynamic muscle power exertion tests, the first one is a long jump with both legs from a standing position and measures the dynamic power of the lower limbs.

Diagram 1



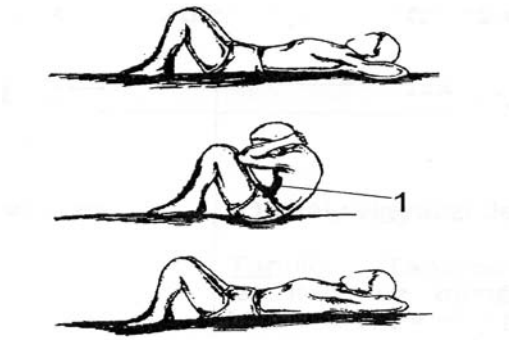
The second task is to to raise and lower the torso while lying down on the front until exhaustion. This measures the power and endurance of the back muscles.

Diagram 2



The third exercise is to sit up from lying down on the back and then to lie down again continuously until exhaustion. The measures the power and endurance of the abdominal muscles.

Diagram 3



Participants

The participants in the research are 163 13- and 14-year-old boys and girls attending school in Budapest. The research was carried out in the second half of the 2007/2008 academic year. On the basis of gender and age four groups were set up as follows:

Group 1: 13-year-old boys (44 in total)
Group 2: 14-year-old boys (34 in total)
Group 3: 13-year-old girls (45 in total)
Group 4: 14-year-old girls (40 in total)

Data analysis

While analyzing the data we first performed the basic statistical calculations (average, dispersion, standard error of the mean and variational co-efficient). Following this we applied the Kruskal-Wallis ANOVA test as a statistical method.

IV. Results

The next two diagrams demonstrate the results of the long jump with both legs from a standing position in points *(diagram 4)* and in centimetres *(diagram 5)*. It is evident from the results that there are no differences among the points of the four groups. However, on the one hand in the results in centimetres, there are

significant differences between the 13-year-old boys and the 13-14-year-old girls, the 14-year-old boys and the 13-14-year-old girls, and between the two groups of girls. On the other hand there are no differences between the two groups of boys.

Diagram 4

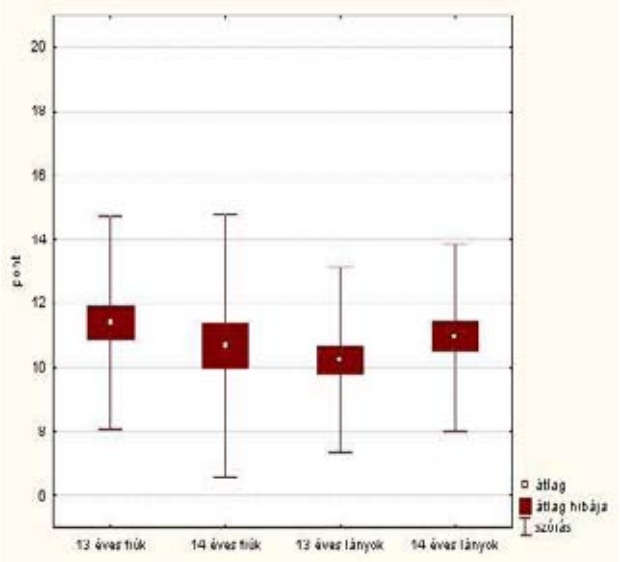
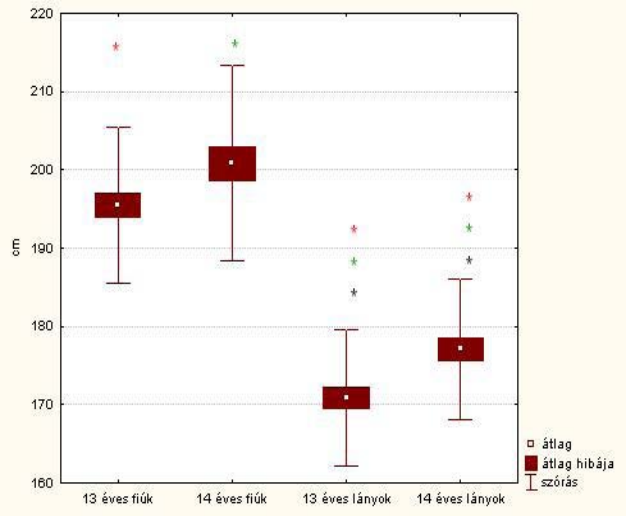


Diagram 5



The following diagrams show the results of raising and lowering the torso in points *(diagram 6)* and repetitions *(diagram 7)*. It is obvious from the results that there is a significant difference between the results of the groups. There is considerable difference between the 13- and 14-year-old boys, between the 14-year-old boys and 13-year-old girls, and between the 14-year-old boy and 14-year-old girl groups as well. It is surprising the 14-year-old boys performed the worst, below the level of both girl age groups. There is no difference between the four groups in the number of repetitions in raising and lowering the torso.

Diagram 6

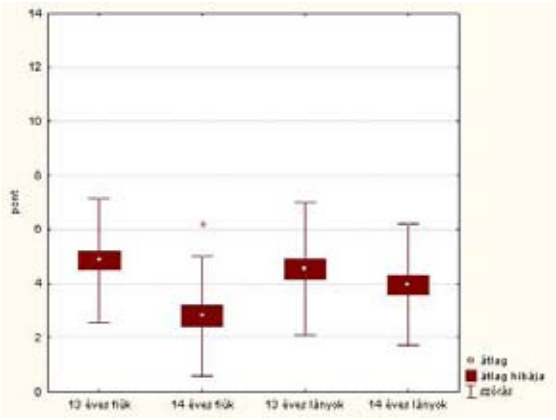
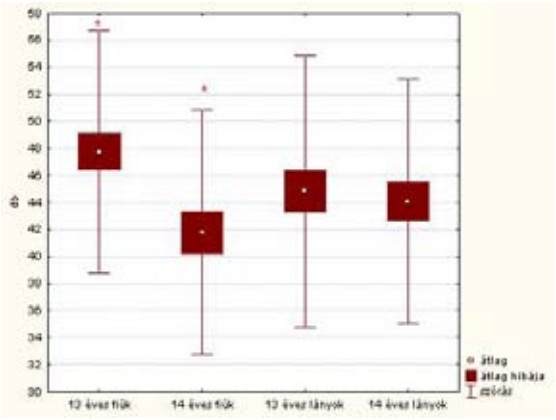


Diagram 7



There is no significant difference between the point values of the third exercise *(diagram 8)* requiring dynamic muscle power exertion: sitting up and lying back down. However, there is a very considerable difference in the number of repetitions *(diagram 9)* between the 13-year-old boys and the 13-14-year-old girls, and between the 14-year-old boys and the 13-14-year-old girl groups. Only in one group, between the 13-year-old boys and the 14-year-old girls, was no significant difference found. It is evident from the data that the 14-year-olds performed better in both age groups however it is visible that the 13-year-old boys' results are better than the 14-year-old girls'.

Diagram 8

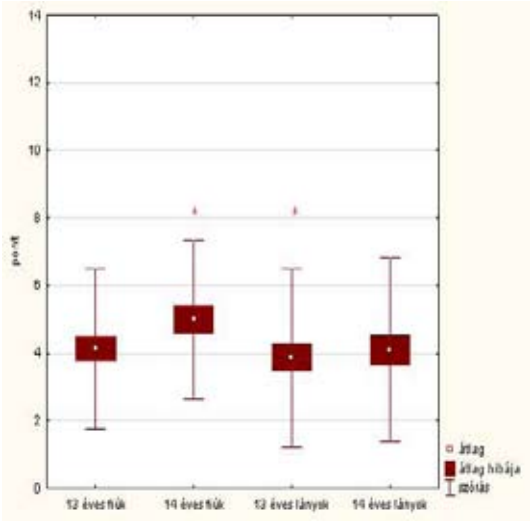
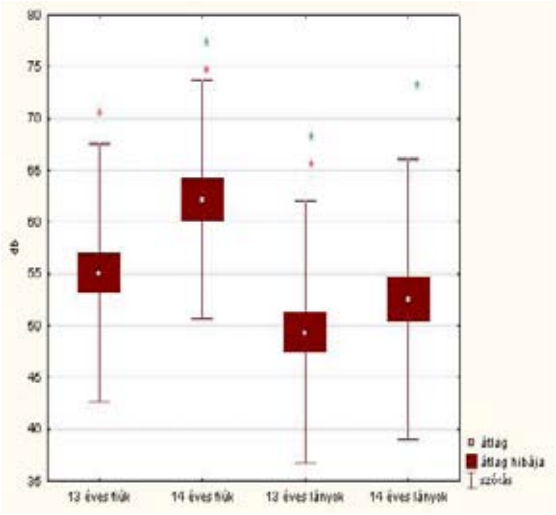


Diagram 9



V. Conclusions

Summarizing the results of our research, we concluded that only half of the students observed were able to do the tests on static muscle power properly. We came to the same conclusion when measuring the dynamic versions of the test exercises, which verifies our hypothesis that if there is some kind of difference, dysfunction in the students' static area then shows in the dynamic area as well. The Hungarian scientific literature dealing with physical education mainly examines the dynamic area, and does not direct enough attention to the study of the static area. From this it follows that harmony should be found between dynamic and static exercises, and between the tests and procedures examining dynamic and static muscle work, because this is the only way we can get a relevant and accurate picture of the children's functional operation. It is noticeable that in the syllabuses of P.E. lessons both in schools and nursery schools the natural supports dominate. It is important that such exercise material moves both sides of the torso appropriately, and with the proper correctional situations it can prevent and improve scoliosis and kyphosis that is not yet visible in an x-ray, as well as bad posture. In the treatment of such deformations physical education and physiotherapy have a very important role. The scientific literature researched is one-sided in its emphasis on the importance of prevention and its possibility within the framework of the P.E. lesson. P.E. teachers have an adequate programme and publications on hand to eliminate postural errors and develop good posture. Therefore their role is to apply this with their best knowledge, highest concentration and proper dedication. It should be not pedagogical activity but the child's aptitude under pressure and their physical and mental condition on a particular day that determine, when planning a lesson, the tasks to be performed.

Finally it is important to state that it is the duty of the P.E. teachers to do everything possible to prevent incorrect posture and the deformities caused by it, and to teach how to perform movements correctly and profitably. We have to call the attention of everybody involved in the pedagogical process (students, parents, teacher colleagues) that the role of exercise for children is not only to channel their surplus energy but rather to avoid the development of mild or more serious posture problems by performing exercise consciously.

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