

# EVALUATION AND EFFECTS OF THE PHYSICAL EDUCATION CLASSES USING DIFFERENT MODELS OF CLASS ORGANIZATION

Admir Hadžikadunić<sup>1</sup>, Vahida Kozić<sup>2</sup>, Senad Turković<sup>3</sup>, Muhamed Tabaković<sup>3</sup>  
Muriz Hadžikadunić<sup>3</sup>

<sup>1</sup> Faculty for Criminalistics, Criminology and Security Studies, University of Sarajevo, Bosnia and Herzegovina

<sup>2</sup> Athletics club Sarajevo, Bosnia and Herzegovina

<sup>3</sup> Faculty of sport and physical education, University of Sarajevo, Bosnia and Herzegovina

Original scientific paper

## Abstract

*This paper aims to present the investigation of the influence of the physical and health education at the transformation of basic motor abilities of students - fifth graders, using various methodical organizational work in teaching physical and health education in the course of one school year. The aim of this study was to determine possible differences in the basic motor abilities between differently treated groups of examinees consisting of 198 boys and girls attending the fifth grade of primary school (age 10-11 years). The sample was divided into two subgroups, control and experimental group (N = 99). Teaching model that was implemented by the control group was performed by the current curriculum with two hours per week of regular classes of physical and health education, with a variety of programs in athletics, gymnastics and sports games, but with the use of simple group methodical organizational forms of work. Teaching model that was implemented by the experimental group was performed by the same curriculum as the control group with the same contents, but with the use of more complex organizational forms. Based upon analysis of the data obtained, using the T - test, and canonical discriminant analysis, we have obtained significant differences of the results of basic motor abilities among students in the experimental and control group, and that these differences are in favor of the students in the experimental group, and that these students have significantly higher levels of applied basic motor skills compared to students in the control group.*

**Keywords:** *methodic organizational forms of work, the transformation of motor skills, teaching physical education*

## INTRODUCTION

Physical activity can meet the many needs of children, not just those relating to the movement, and it is therefore important to choose an activity that provides an opportunity to meet a number of these needs simultaneously, because if sport just meets one-dimension and only some of the important needs of the child, it is unlikely that the child would not persist in it. On the other hand, playing sports, the child may feel satisfied (a feeling of power, security, freedom, belonging) but this activity leads to exhaustion, both physical as well as mental, so it's especially important to avoid this unwanted moment. Children can be physically active in various ways and in different settings: the family, schools, sports clubs and other organizations, in the company of peers, etc. However, we will base this article at physical activity within the school through the subject of physical and health education. Physical and health education is an integral part of the overall educational process and any other interpretation could not be matched with the demands of society and pedagogy (Vukasovic, 1999). Healthy, resistible, sturdy body is a prerequisite for any further development (intellectual, moral, aesthetic and working), and physical and health education has the function of the health care. Although his first and fundamental task is a health care in the

broadest sense of the word, as the general physical condition of children's life, its goals are far-reaching and extend to the intellectual, aesthetic, social and moral side of the pedagogical action. So, these are complex processes in which the body and certain physical manifestations are the starting point, and the deeper goal is to develop a versatile personality. From that fact comes out that the physical and health education is the educational activities of the overall educational process. Physical and health education has characteristic of primarily, fundamentality and universality, so it is prerequisite for other educational areas, i.e. a basis for any other successful educational process. This term has a much broader meaning than any other subject in primary and secondary schools. The educational process must strive to complete, multifaceted and harmonious personality development - health, truth, goodness, beauty, and creativity as a fundamental human values. Exactly this is achieved by physical and health education, as it nurtures, develop and improve body constitution, mental and physical abilities and health as an essential component of the human beings. It is unique because it goes a lot further. It is only not limited to care for proper physical growth and development, but at the same time promotes the development of intellectual and

professional abilities, moral and aesthetic properties, building moral characteristics and character. From the foregoing comes out the tasks of physical and health education. Among them are: health, physical, educational, aesthetic, recreational and moral tasks (Vukasovic, 1999). Unlike Vukasovic (1999), and Hadžikadunić and Mađarević (2004) all tasks, physical and health education are classified into two groups - biological (health and hygiene) and pedagogical (educational) tasks. These authors share the opinion that for the successfully achievement of the above tasks it is necessary to develop a sense of healthy life, to acquire knowledge and habit of nurturing the body's needs and characteristics of their own bodies. It is important that special attention be paid to the classes for leisure in the afternoon, exploring nature and competitions, and that the second degree schools physical education can no longer be confined to the teaching of physical education classes. Curriculum physical education is carried out in two forms - the mandatory classes and extracurricular activities. Physical education occupies a very important place in all primary and secondary schools and institutions of higher education, as a principle and as a subject in the form of mandatory classes and extracurricular sports activities, which represent a particular form of amendments to the program, in order to meet the wider interests of students. Unfortunately in teaching physical and health education exists a number of problems. Often these classes are reduced to the so-called technicism and formalism represented by highlighting the certain movements and form, rather than functionality. It's work without the imagination and without pedagogical merits of intention. To prevent and resolve the aforementioned problem, it is necessary to know the theory and adequately educate teachers who will provide the physical and health education real meaning, content, and their rightful place in the hierarchy of Pedagogical Sciences. Another problem is directly related to the time in which children actively participate in class. In fact, as pointed out Hadžikadunić and Madarevic (2004), a lot of time is "lost" during the uniform change, the lineup, the explanation, the class organization (switching from one to another form of work), equipment packing, and for only time of 45 min. Although the possibility for the development of motor abilities of students is limited to 2-3 hours per week, we must work with them in a planned, organized and systematic manner. At any time it is necessary to give them exercises that will have an impact on the transformation of anthropological characteristics of the children. While designing a curriculum, one of the main questions is which exercises to perform, especially when working

with children. The very process of creation and organization of physical education class requires from the professor a good knowledge of methodological and organizational forms of work. In physical education, today we know a various methodological and organizational forms of work. Some authors divide them in to classic and modern, or more simple and more complex organizational forms of methodical work. This division is bad if methodical and organizational forms of work that are considered modern or complex are not applied in an appropriate manner, and the teacher does not implement all the necessary preparations. Each methodical organizational form either a "classic" ("simple") or "modern" ("complex"), is considered to be well and properly selected, if the choice of the organizational form is carried out on the basis of appropriate tasks, appropriate age of the students, their prior knowledge and so on. Some goals, tasks and effects in physical and health education are better achieved by frontal, the others by group, and the most by individual work form. A well-chosen and properly administered form of work contributes to greater intensification, optimization and individualization of work, and thus contributes to the process of humanization of physical exercise. (Hadžikadunić and Mađarević, 2004).

#### *The intensification of the physical and health education*

The intensification of the physical and health education can be presented as an effort to apply appropriate measures and interventions to increase its effectiveness and efficiency. Quite a while these efforts have had primarily extensive direction. In sports practice, for example, the prevailing belief is that greater efficiency can be achieved only by increasing the scope of the training process, which has led to an enormous increase in training. Similar trends are found in the area of physical and health education. Effectiveness of work processes in general, and in teaching physical and health education, not only depend on the extent of exercise or training, but, first and foremost, on the rationality of applied programs, from the technology of the realization, applied methods, students' abilities. The essence of intensification is not to be extended during the exercise, but that the time available for their rational use, to have a truly productive time Berkovic (1990). The school practices, efforts in order to increase the physical and health education are oriented to increase "motor density" of physical and health education, i.e. the extension of the "pure" or "productive work." The impact of increasing the "motor density hour" of the physical and health education was the subject of some previous studies: Hadžikadunić and ass. (2004), was

performed by analyzing the workload of students in physical education class using cardio ultima monitor.

From the analysis of the load during the physical and health education class, it can be seen that for the simpler forms of organizational (parallel, parallel with additional exercises) intensity zone shifted towards lower values of cardiac frequency. For more complex organizational forms of methodical work (AC ward, the ward alternately with additional exercises and polygon) moves the zone of intensity towards higher values of cardiac frequency. From all of this we could very easily conclude that the intensification of the physical and health education is greater by the use of more complex organizational forms of the methodical work. Prskalo and associates (2006) investigated the possible differences between different groups of patients treated with regard to methodical organizational forms of work used in teaching physical education. The research confirmed the hypothesis about the positive influence of group methodical organizational forms of work on the effects of an increase in teaching physical education. It indicated that a significant advantage of complex organizational forms of work, in the experimental group contributed to intensification of the teaching process and significantly improved results in all three anthropological targeted areas than the control group.

## METHODS

### *Participants*

Aim of this study was to determine possible differences in the basic - motor area between differently treated groups of respondents of 198 boys and girls attending the fifth grade of primary school (age 10-11 years). The sample was divided into two subgroups, and attempted to experimentally verify the control group (N = 99).

### *Procedures*

Teaching model that was implemented by the control group performed at the current curriculum with two hours per week of regular classes of physical and health education with a variety of programs in athletics, gymnastics and sports games, but with the use of simple group methodical organizational forms of work (frontal, work in three, work in fours). Teaching model implemented in the experimental groups was performed by the same curriculum as the control group with the same contents, but with the use of more complex organizational forms methodical work (parallel, parallel form of work with additional exercises, parallel alternate, alternate form of parallel operation with additional exercises, alternate, alternate form of work with additional exercises). For the assessment of motor skills we used the protocol of EUROFIT test battery that includes a battery of 8 tests for assessment of the basic motor skills (Table 1).

**Table 1.** Sample of variables

<b>For the balance assesment we used test:</b>	
1.MFLA	Flamingo balance test (sec i 1/10 sec)
<b>For the assesment of the segmentary speedwe applied:</b>	
2.MTAPR	Hand tap (sec i 1/10 sec)
<b>For the flexibility assesment we used test:</b>	
3.MDUS	Sit and reach (cm)
<b>For the strength we used following tests:</b>	
4.MDALJ	Standing long jump – explosive strenght (cm)
5.MSNAS	Hand grip – static strenght (Nm/kg)
6.ML_S	crouches – repetative strenght of the trunk(no of repetitions)
7.MIUZ	Bar hang – functional strenght (sec i 1/10 sec)
<b>For the agility we used test:</b>	
8.MTR10X5M	10x5m run (sec i 1/10 sec)

### *Statistical Analysis*

After realisation of the two basic types of organization, which lasted for one school year or 70 hours we analyzed partial quantitative

difference (change) in motor skills of the experimental and control groups, using t-tests, and analysis of global quantitative differences, using canonical discriminant analysis, in order to

determine which of the available models of the organization of the physical and health education gives effective results in the transformation of motor abilities of students of fifth grade.

## RESULTS

Taking into account previous observations and by T – test analysis, canonical discriminant analysis, and on the basis of the parameters we can conclude that there are significant differences of results of basic motor abilities among students in the experimental and control groups, and that these differences are in favor of the students in the experimental group, which have a much higher level of applied basic motor skills compared to students in the control group.

## DISCUSSION

### *The partial quantitative differences of basic motor skills between experimental and control groups*

In order to determine the quantitative differences of partial results of the basic motor skills between students in the experimental and control groups, we applied the t – test analysis. Based on the obtained results, the arithmetic mean (Mean) of the two samples, experimental and control groups, and based on the significance of differences (SIG) of the T - test, one can see that there are a number of partial

differences (Sig or <.05). The analysis of the arithmetic mean (Mean), of the two samples (Table 2), we can see that there are certain differences in the values of means. Differences were noted in almost all applied variables of basic motor skills: variables for assessment of dynamic balance (MFLA), variables for assessment of the segmental speed (MTAPR) variables for the assessment of flexibility (MDUS) variables to estimate hand grip power (MSNAS), variables to evaluate repetitive strength of the trunk (ML\_S), variables for assessing the functional power of arms (MIUZ). Most of mean differences are in favor of the students in the experimental group, except in two variables that are in favor of the control group: variables to estimate balance (MFLA) and variables for assessing the flexibility (MDUS). For variables assessing the explosive leg strength, running speed and agility we did not registered value of means that have significant differences between the two samples. Probably this can be explained by the degree of genes inheritance of the explosive power and speed, which in most studies by various authors are found to be between 80 and 90%. Another reason is probably the lack of knowledge of tests that have been applied. This explanation is likely to be given and to the agility as well as a motor skill which is closely correlated with the speed and explosive power.

**Table. 2** Differences between the experimental and control groups in the area of basic motor skills

Variables	Group	Mean	Std. Deviation	N
MFLA	1	11,8868	6,04188	99
	2	14,1148	9,92617	99
MTAPR	1	13,6899	6,78888	99
	2	14,0695	2,78153	99
MDUS	1	22,4747	7,60081	99
	2	30,6970	8,98917	99
MDALJ	1	149,9091	22,06997	99
	2	149,3737	27,49827	99
MSNAS	1	14,6010	12,19568	99
	2	12,8081	4,80365	99
ML_S	1	23,1919	4,51681	99
	2	18,1919	4,80152	99
MIUZ	1	22,6958	28,54613	99
	2	14,2851	13,02381	99
MTR10X5M	1	22,6815	2,92154	99
	2	22,8295	2,86182	99

Further analysis of the significance of the difference of the T - test (Table 3), it can be seen that most of the applied variables of basic motor skills that previously achieved some differences in the value of the arithmetic mean (Mean), achieved also the statistical coefficient (Sig = or

<.05 ). Variables that did not reach statistical significance of the coefficient are the variables for assessing segmental velocity hand movements (MTAPR), explosive leg power (MDALJ), static power arm (MSNAS), and the running speed and agility (MTR10X5M). As

already mentioned, registered in this ratio they were probably influenced by genetic factors, and they are the variables to which physical activity can have very little impact, especially in terms of implementation of the physical and health education with two hours a week or 70 hours based on year. Based on the partial analysis, T - test between experimental and control groups,

we concluded that there are significant differences in the number of variables of basic motor abilities, and that there are difference in favor of the students in the experimental group, and their level of basic motor skills is at a higher level than the level of basic motor abilities of students in the control group.

**Table. 3** Differences between the experimental and control groups in the area of basic motor skills

	Wilks Lambda	F	df1	df2	Sig.
MFLA	,982	3,640	1	196	0,58
MTAPR	,999	,265	1	196	,607
MDUS	,802	48,297	1	196	,000
MDALJ	1,000	,023	1	196	,880
MSNAS	,991	1,852	1	196	,175
ML_S	,775	56,954	1	196	,000
MIU2	,965	7,114	1	196	,000
MTR10X5	,999	,130	1	196	,719

*The analysis of the quantitative differences of basic motor skills between experimental and control groups*

In order to determine the global quantitative differences in results of the basic motor skills between students in the experimental and control groups, we applied discriminative

analysis. The criterion for discriminant variable intensity applied was (Wilks Lambda). For the interpretation of the significant discriminant variables and they explain a certain percentage of variability. By analyzing the results in Table 3, it can be seen that there is one significant discriminant function (63).

**Table 4.** Significance of isolated discriminant functions

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Corelation	Test of Function(s)	Wilks Lambda	Chi-square	df	Sig
1	,669a	100,0	100,0	,633	1	,599	98,342	8	,000

Reviewing the results in Table 4. we can see that the largest contribution to discriminant function have the following basic mobility variables: variables to assess the flexibility (MDUS), variable to evaluate repetitive strength of the abdominal muscles (ML\_S) and variables to evaluate the static strength of arms.

Based on the results in Table 5. we find that the highest correlation with the discriminant function, i.e. the variable that distinguishes the maximum value of the results of basic motor skills of the two subsamples have the following motor variables: variables to evaluate repetitive strength of the abdominal muscles (ML\_S), flexibility (MDUS), functional strength of arm and shoulder (MIUZ), balance (MFLA), static power of the hand (MSNAS), segmental velocity hand movements (MTAPR), running speed and agility (MTR10X5M), explosive leg power (MDALJ). In these variables, the biggest differences are the in the results of basic motor abilities between the two samples, students in the experimental and control groups. Based on the centroid groups, and by further analysis of table 6, we can conclude that the experimental group of subjects is on the negative side of the discriminant function, as well as in the space anthropometric characteristics, based on what we define variables that have a negative impact on the discriminant function, while the control

**Table 5.** Discriminative standardized coefficients

Variables	Function 1
MFLA	,275
MTAPR	,044
MDUS	,656
MDALJ	,300
MSNAS	-0,79
ML_S	-,775
MIUZ	-,163
MTR10X5M	,001

group is in the positive part of the discriminant function, on the basis of which we define the variables that have a positive impact on the discriminant function.

**Table 6.** Structure of discriminant Function and cluster centroids

Variables	Function 1
ML_S	-,659
MDUS	,607
MIUZ	-,233
MFLA	,167
MSNAS	-,119
MTAPR	,045
MTR10X5M	0,31
MDALJ	-,013
Group 1	-,814
Group 2	-,814

#### PRACTICAL ASPECTS

Reasons for these established differences between applied basic motor abilities between students in the experimental and control groups can be found in specific ways of organizations of the administered program of the physical and health education in one school year, which is reflected in the application of complex organizational forms (Parallel, parallel with additional exercises, parallel alternate, parallel alternating with supplementary exercises, alternate form, alternating form with additional exercises) in the experimental, and methodical application of the simpler forms of work organization (frontal approach, work in threes, fours work) in the control group.

The experimental group realized the same content as the control group, but the organization of these facilities applied methodical complex organizational forms of work, characterized by optimum load in restricted conditions that are present at schools in the Sarajevo Canton (Hadžikadunić et al., 2004). Optimum load, by the application of the adequate program content and teaching methods and more complex forms of organization of work, certainly caused a greater number of positive transformation and thus the higher the level of basic motor abilities of the students in the experimental group, compared to the number of positive transformation and level of motor abilities of students in the control group who they have accomplished the same facilities, with the same number of equipment

and teaching aids, but with the use of simple methodical and organizational forms of work characterized by limited applications in poorer working conditions, which does not facilitate exercise of the process according to the authentic needs of students, and certainly leads to inadequate load of students, as well as a lack of motivation due to low intensity exercise, which certainly affected the lower level of basic motor skills of registered students in the control group. Another advantage of methodical organizational forms which are used in the experimental group (methodically complex organizational forms of work), and who probably have contributed to the difference in the area of basic motor skills mostly (repetitive strength of the abdominal muscles, flexibility, functional strength shoulder belt, balance, running speed and agility, explosive leg strength), are just additional exercises, whose main function is that after exercise (forward roll, jump shot, etc.), the student passes the additional exercises, whose content is chosen specifically with regard to motor skills that we want to develop (Prskalo, 2011). So for example in the case of the experimental group we used additional exercises such as crunches, different training for development coordination, flexibility, explosive strength, push-ups, and running with different tasks. With all of this of course we have to bear in mind the factor of continuing growth and development of motor abilities in this age, but it is likely that quantitative differences (changes) in the basic motor behavior due more to the significant increase in cyclic and acyclic movement type and the application of more complex organizational methodical of work with and without additional exercises as adequate programming content (Stankovic, 2009).

In the context of these findings, there is no doubt that we have to take into account the changes that have come in terms of interpreting assignments and able to provide information on how to exercise and learn new movements because complex methodical and organizational forms of exercise have the ability to be explained to a number of pupils, enabling us that in the course of the hour we have less "downtime", which in the case of simple methodical organizational forms of work is not the case, because the application of these methodical organizational forms of work set limit to differentiating tasks, and therefore the experimental group during the period from the first to the second measurement got familiar with complexity and structure of movement - activities that are covered by applicable set of indicators.

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### Corresponding Author:

Admir Hadžikadunić, Ph.D.  
Faculty for Criminalistics, Criminology and Security Studies,  
University of Sarajevo, Bosnia and Herzegovina.  
Tel: 00387 62 226 070  
Fax:00387 33 561 216  
e-mail: [ahadzikadunic@fkn.unsa.ba](mailto:ahadzikadunic@fkn.unsa.ba)

*Received: 27. March 2013*

*Accepted: 28. May 2013*