

**THE IMPACT OF MATERIAL AND TECHNICAL CONDITIONS AND METHODS  
OF ORGANISATION ON THE MOTOR STATUS OF ADOLESCENTS**

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**Abstract**

Importance of physical education and its placement in the educational system are known for a long period of time. Many researches have been conducted in order to determine the extent to which physical education positively influences students. Results of some studies show that physical education classes are unsatisfactory and inappropriate, given the circumstances- age and individual skills of students, their needs and interests (Arunovic, 1978; Visnjic, 1983; Krsmanovic, 1988, 1995). Main reasons for inefficient physical education classes can be found in the bad concept of modelling teaching syllabuses and small number of physical education classes per week (Krsmanovic, 1995). The aim of the study is determining differences between examinees in terms of motor skills, depending on material and technical conditions as well as method of class organisation that is realization of the curriculum. The participants in the study were 142 adolescents, 17 years of age ( $\pm 6$  months). In order to assess motor skills 12 motor tests were used. Data processing was done by applying multivariate analysis of covariance (MANCOVA), significance of difference was determined by analysis of variance (ANOVA), while differences among examinees of the experimental and the control group were determined by discriminant analysis. After the experimental treatment, it was determined that there was statistically significant difference between the experimental and the control group within the motor skills system.

**Keywords:** Motor status, adolescents, organization of teaching, modified curriculum, material and technical conditions.

## Introduction

Physical education should become a powerful mechanism that will efficiently stem negative effects of modern life. It is necessary to choose a course content that will induce optimal reactions of an organism, that is a course content that will induce changes in terms of morphological features, functional and motor skills, being the main tasks of physical education in the primary schools (Zrnzevic i Zrnzevic, 2011). Importance of physical education and its placement in the educational system are known for a long period of time. Many researches have been conducted in order to determine the extent to which physical education positively influences students. Results of some studies show that physical education classes are unsatisfactory and inappropriate, given the circumstances- age and individual skills of students, their needs and interests (Arunovic, 1978; Visnjic, 1983; Krsmanovic, 1988, 1995). Main reasons for inefficient physical education classes can be found in the bad concept of modelling teaching syllabuses and small number of physical education classes per week (Krsmanovic, 1995). Choosing course contents and their structures are considered to be one of the fundamental problems. Therefore, choosing course contents has to be based on the scientific principles and in accordance with social, cultural and sociological requirements. The theory and practice of physical education in the last few decades indicate that there is need for students to actively participate in determining course contents (Mati i Bokan, 1990; Šekelji i Stamatovi , 2009).

Studying the differences between basically motor and functional skills of students under the influence of physical education classes, it is concluded that there have not been significant changes but some quantitative changes in terms of time covering annual physical education classes, have occurred (Tabakovic et al, 2007).

Based on the motor skills study of students of different educational profiles in the High School of Economics, it is determined that there are statistically significant differences in all given tests (Stojkovic i Ristic, 2007).

Despite recent advances in state policies that support physical education programs (Kann et al, 2007), many schools still struggle to provide the frequency and intensity of physical education and physical activity opportunities recommended by Healthy People 2010 (U.S. Department of Health and Human Services, 2000). These recommendations stipulate that children and adolescents should participate in daily physical education and be physically active for at least 50% of physical education class time. Although policies can dictate the amount of time allotted for physical education, students physical activity levels are functions of both environmental factors and student characteristics. For example, the amount of physical education class time devoted to management (e.g., taking role, transitioning between activities), affects the duration and intensity of students' in-class physical activity (Simons-Morton et al, 1993). At the student level, engagement in physical education is an important determinant of students' activity levels during class (Fairclough & Stratton, 2005; Ntoumanis, 2005; Standage et al, 2003), as well as their participation in physical activity outside of school (Ntoumanis, 2005).

The aim of the study is determining differences between examinees in terms of motor skills, depending on material and technical conditions as well as method of class organisation that is realization of the curriculum.

## **Methods**

The study comprised of 142 examinees, as the sample of adolescent population, from two gymnasiums in Novi Sad, 17 years old ( $\pm 6$  months). The control group consisted of the students who had their physical education classes in the school gyms, twice a week, one school class at a time, according to the standards of the curriculum. Other group that is experimental group consisted of 74 students who had a physical education class once a week, a block schedule of two school classes' duration, in a rented place which was not intended for school classes, because of specific material and technical conditions the curriculum was changed as well.

Testing was done in physical education classes. It was conducted with the consent of professors and students. There were two stages of measuring: initial and final measuring. The treatment lasted for 4 months and covered the control and the experimental group.

For the purpose of assessing motor skills, 12 tests were used that previously showed positive metric features (Bala, 1980). Having in mind the stated experiences and features, motor skill tests were used as follows:

For assessing statistical strength: pull-ups on the bar and push-up endurance;

For assessing explosive strength: standing long jump and lying med ball throws;

For assessing repetitive strength: push-ups on the ground and bending of trunk from lying position.

For assessing flexibility: high bending on the bench and shoulder flex bat.

For assessing speed: finger tapping and running 20 m.

For assessing coordination: agility with the bat and backward polygon.

Data processing was done by applying multivariate analysis of covariance (MANCOVA), significance of difference was determined by analysis of variance (ANOVA), while differences among examinees of the experimental and the control group were determined by discriminant analysis.

## **Results**

Based on the obtained results (Table 1), it is evident that there are statistically significant differences between examined groups. Also, it is possible to set a clear line between examined groups in terms of motor skill tests.

The analysis of the obtained results shows that there are statistically significant differences between the experimental and the control group, in terms of motor skills, after the experimental treatment.

Further analysis shows the results which confirm that except statistically significant differences, the clear line can be set between examined groups in term of motor skill tests.

Table 1. Significance of differences between groups after the treatment

<b>Analysis</b>	<b>n</b>	<b>F</b>	<b>p</b>
MANCOVA	12	3.113	.001
DISCRIMINANT	12	56.441	.000

On the basis of the stated, we can conclude that examinees from the experimental group have better test results in assessing statistical strength, speed and explosive strength, even though physical education classes are conducted under non-standard conditions and according to the modified curriculum.

From observing the obtained results (Table 2), we can conclude that statistically significant differences occur in four of twelve applied tests. Values of the stated tests are in favour of the experimental group, except the value of bending of trunk from lying position test which is in favour of the control group.

Table 2 Significance of difference between the groups of examinees after the experimental treatment

Test	Adjusted $\bar{x}_e$	Adjusted $\bar{x}_k$	F	p	Coefficient of discrimination
Pull-ups on the bar	46.39	49.50	1.801	.182	.005
Push- up endurance	158.75	139.02	15.882	.000	.091
Standing long jump	2.15	2.18	.072	.789	.001
Lying med ball throws	7.17	6.87	6.182	.014	.028
Push- ups on the ground	12.02	11.99	.004	.948	.007
Bending of trunk from lying position	14.04	12.89	9.763	.002	.051
High bending on the bench	28.57	26.97	.024	.878	.000
Shoulder flex bat	89.84	89.30	.112	.739	.001
Finger tapping	5.93	6.04	.470	.494	.003
Agility with the bat	7.55	7.21	1.513	.221	.005
Backward polygon	9.96	9.65	.551	.459	.003
Running 20m	3.19	3.36	23.736	.000	.004

This type of result was expected, since the examinees from the experimental group have their physical education classes according to the curriculum with teaching units containing exercises for developing statistical strength and explosive strength. However, worse repetitive strength test results were not expected. It is certain that this type of result comes from relatively small number of examinees. Thus, better speed results of the experimental group can be seen as logical, since the examinees of this group had lower values in assessing growth and development after the treatment.

## Discussion

In the system of motor skill test, there are statistically significant differences between the experimental and the control group in the initial measuring, in favour of the experimental group. In the system of motor skill test, there are statistically significant differences between the experimental and the control group in the final measuring, in favour of the control group. In the system of motor skill test, there is statistically significant difference between the experimental and the control group after the experimental treatment.

Experimental treatment showed that results in terms of motor skill test indicate existence of statistically significant differences.

The mismatch between the curriculum and existing material and technical conditions directly impacts on the motor status of adolescents (Katanic, 2010).

Second only to families, schools are the most powerful systems for the establishment of a physically active lifestyle among children, and therefore across the lifespan. Student engagement has been increasingly recognized as essential to the success of educational programs including physical education. Indeed, the current study supports prior research which indicates that engagement in physical education enhances the frequency and intensity of student physical activity (Ntoumanis, 2001). Given this association, activity-promoting physical education programs should be developed with consideration to the student, school, and classroom characteristics that strengthen or weaken student engagement in physical education over time. In doing so, it is essential to distinguish between student- and system-level facilitators of physical education engagement (Furlong & Christenson, 2008).

Undoubtedly, adequate exposure to high-intensity physical education is an effective contributor to healthy lifestyle among children and across the lifespan. The one study suggests that students' engagement in physical education is an important target for physical activity-promoting interventions. Specific physical education instructional strategies (e.g., reducing game play and increasing skill practice) are likely to increase student engagement and program effects can be enhanced by tailoring physical education opportunities to further engage students with low competency beliefs and poor body image (Bevans et al, 2010).

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