to slightly improve the way of connecting them into a functional whole and create conditions for their permanence – first in the consciousness of each individual, and then in the collective conviction.

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EFFECTS OF INNOVATIVE TANDEM HOURS ON PHYSICAL EDUCATION ON MOTOR CAPACITY OF CHILDREN IN ELEMENTARY SCHOOL LEVEL

Abstract: The main goal of the research is to determine the effects of traditional and innovative (tandem) classes on physical education of the body composition and motor skills in young school-aged children. The research was conducted in five primary schools in the city of Skopje. Ten classes were chosen at random, two from each school, with five classes in the experimental group and five in the control group. The experimental group consisted of 115 subjects, while the control group consisted of 110 subjects. The following motor tests were used to realize the goals of the research: leaning in a sitting position, dynamometer in the palm of the hand, long jump, lying-sitting for 30 seconds, running 4 x 10 m and running 20 meters with progressive increase of speed. The components of the body composition are determined by the method of bioelectrical impedance with the help of which the body weight, the percentage of fat tissue, the percentage of muscle mass and BMI are measured. The effects of the applied treatment in the experimental and control group were determined on the basis of multivariate and univariate analysis of covariance. Based on the results, it can be concluded that at the end of the experimental treatment, the subjects from the experimental group achieved better results in motor tests: dynamometer

on the palm, long jump, lying-sitting for 30 seconds and odd running 4 x 10 m. The key element that led to improvements in the experimental group is probably the proper planning, organization and implementation of classes, ie the correct and optimal choice of type, duration, intensity and frequency of physical exercises and physical activities in each class after physical education.

Keywords: Tandem teaching, Physical education, Motor skills, Body composition

Introduction

Throughout the world, the class of physical education is characterized by diversity in relation to the elements of preparation and their realization in practice. However, besides its diversity, the class of physical education in different educational systems is characterized by a single common cause. This cause can be identified in the commitment of the process of physical education "form cradle to grave", which contributes to the development of the individual by the definition of the term "physically educated man" (Hardman, 2009). The endorsement of this idea has led to broadening of the role of physical education, and as such, it carries a specific type of responsibility. Its role can be defined by the content of the class, which encompasses highly contemporary issues in the frames of the educational process, with characteristics that cannot be offered by any other class or educational material (Hardman, 2009).

This responsibility is fully summarized in the Decision on the Role of Sports in Education, adopted by the European Parliament in November 2007 (Hardman, 2009). The preamble of the decision states that physical education is "the only class in which children prepare for a healthy life, that it is focused on their overall physical and mental development, that it conveys important social values such as honesty, self-discipline, solidarity, tolerance, team spirit and fair play, and together with sports, it is considered to be "one of the most important tools for social integration" (Hardman, 2009).

Based on the results obtained from the previous research, as well as the analysis of the domestic and foreign literature, some recommendations will be given for the promotion of physical activity and a healthy lifestyle in children and youth. Namely, primary school is compulsory, and the physical education class is of the same rank as the other classes, thus with a fund of three classes per week, physical education is right next to Macedonian language and mathematics. At first glance, according to this statement, one can assume that the physical education has no significant problems, however the problems start to emerge in the execution of the educational process and the practical implementation of the legal provisions. The period between the age of 6 to 11 years is when the most intense changes occur in the lifestyle of a person. Children, prior to their 6-th year of age, have no obligations and spend most of their time in play, and then suddenly get school obligations. Long hours of sitting, heavy and often inappropriate school bags, immense curriculums at school, and at home, are ideal conditions for occurrence of mild and more severe forms of postural disorders, weight gain and poorly developed motor skills, as supported by results of multiple researches. Experience tells us that physical exercise, as a proven means for prevention, prophylaxis and therapy, can provide help for these problems. If we take into consideration the mentioned problems, the results provided by the researches in our, as well as other countries, it is inevitable to conclude that the physical activity, especially physical and health education, is of immense importance in this period of life. All this poses the question of the quality of the class of physical end health education.

What should the class of physical and health education look like? The class, especially for the younger generations, should encompass contents that mostly address the capabilities that are most prone to development at that age. It is highly important to address the physical and physiological development without too much stress. It should be noted that kids are easily motivated into physical activity if the content gets their attention. Thus, it is highly important that the programs are realized through play. With an exclusion of the exceptions, the classes taking place in most of our schools are not on a satisfactory level. Because of the mere complexity of the issues that may arise at this age, only the best experts should have the responsibility to aid in the execution of certain movement exercises. At this age the possibility of abstraction is small, so the proper demonstration of certain exercises is especially important. Poor demonstration also entails incorrect learning and automation of the movement, which makes further work difficult. Despite this, it is rare for schools to pay attention to these problems, although teaching is scheduled to take place three times a week, in practice it is usually different. There are many reasons for this phenomenon, and for this occasion only the most common will be mentioned. One of the biggest problems in teaching in early school age is not maintaining the fund of classes provided by the curriculum. Namely, it is known that in this age the teaching is performed by the class teachers, and it is not uncommon for the lost lectures from other subjects to be compensated with physical education classes, as indicated by the children themselves in the conversations conducted during this research. This procedure does double damage: children are harmed by missing out on the positive effects of physical activity, and physical and health education is presented to them as an unimportant subject that is not mandatory and can be easily compensated. Experts in the field of kinesiology are well aware of how important it is to influence certain motor skills in a timely manner. If we look at the plans and programs, it can be seen that they are copied from year to year without taking into account the changes that have occurred in the meantime, tackles and equipment, improved teaching with new scientific knowledge, change in the population itself, etc. The affinities and abilities are not taken into account at all, and thus neither the needs of the students.

Although not all problems are listed, it can be concluded that physical and health education is largely devalued as a school subject. Knowing how important physical activity is for the healthy development of young people, the previous qualification of physical and health education sounds almost unbelievable.

The first component of the intervention should be structural changes in the subject of physical and health education. Children and young people have the need and right to physical and health education as an integral part of quality education, which enables permanent, individual and professional development, gaining knowledge about life, building ethnic values, communication, cooperation, teamwork, respect for others, fair play, acceptance of victory and defeat, living together in peace and harmony. Physical and health education is the only school subject that focuses on physical activity, physical development and health, so it needs its greater affirmation as a basic subject, pedagogical process (training, learning) that ensures the integral development of body and mind.

The main goal of the research is to determine the effects of traditional and innovative (tandem) physical education classes on body composition and motor skills (physical fitness related to health) in children of young school age.

Methods of the Research

The research is quasi-experimental of the longitudinal type and was conducted in a school environment on a sample of students from 1st to 5th grade within the regular physical education classes. A pre-test research project with randomized groups was used – experimental group (E) and control group (K). The purpose of such a scheme is to determine whether changes in the experimental group are significant in relation to the control group (Bala, 2007). The experimental treatment was represented by innovative (tandem) physical education classes, i.e. classes that were realized in collaboration with the class teacher and professors of physical education – experts. Both the experimental and the control group worked on existing curricula approved by the Bureau for the Development of Education. The experimental program lasted for a whole school year, with three hours per week.

Sample of Respondents

The sample had the characteristics of a convenient and random cluster. The research was conducted in five primary schools in the city of Skopje: the primary school "Johan Hajnrih Pestaloci", the primary school "Krume Kepeski", the primary school "Bratstvo", the primary school "Gjorce Petrov" and the primary school "Tefejuz". 10 classes were selected randomly, two from each school, of which 5 classes entered the experimental group and 5 classes entered the control group. The experimental group consisted of 115 respondents, while the control group consisted of 110 respondents.

Sample of Variables for Assessing Body Composition and Motor Skills

All respondents were measured by a modified battery of EUROFIT tests recommended by the Council of Europe, and some of them have been modified and adapted into the international scientific projects "Feeding and Assessment of Nutritional Status of Spanish Adolescents (AVENA study)" and "The Healthy Lifestyle in Europe by Nutrition in Adolescence" – (HELENA study) (Ruiz et al., 2006), "Identification and prevention of Dietary – and lifestyle-induced health Effects In Children and Infants" (IDEFICS study) (Miguel-Etayo et al., 2014). The following fitness (motor) tests were used in the research: seated forward bend, palm dynamometry, long jump, sit-ups for 30 seconds, shuttle run 4 x 10 m and running for 20 m with progressive increase of speed.

The components of the body composition are determined by the method of bioelectrical impedance (measurement of electrical conductivity – Bioelectrical Impedance Analysis – BIA). The measurement was performed using the Body Composition Monitor, model "OMRON – BF511", which measured body weight, body fat percentage, muscle mass percentage and body mass index (BMI). Before starting the measurement, the gender, age and body height of the respondent are entered in the Body Composition Monitor.

In order for the obtained results from the measurement, i.e. the assessment of the body composition to be as accurate and precise as possible, the preconditions that are recommended by ACSM (2005) and Heyward (2006) were met before each measurement.

Statistical Analysis

The basic descriptive statistical parameters are calculated for each applied variable. The normality of the distribution of all variables has been tested with the method of Kolmogorov and Smirnov.

The effects of the applied treatment in the experimental and control groups were determined on the basis of the multivariate analysis of the covariance (MANCOVA). Specifically, this analysis determined the magnitude of the effect achieved by the experimental program of the final measurement in the applied variables for assessing nutritional status and motor skills (physical fitness related to health). The condition for applying the multivariate analysis of covariance was to neutralize (equalize) the differences between the groups in terms of gender and age and the differences between the groups in the initial measurement. After the neutralization of the results, the real effects of the experimental group were determined. The differences at the univariate level, with the neutralization of the initial measurement, gender and age, were determined with the help of a univariate analysis of the covariance (ANCOVA), by correcting the arithmetic lines (Adj. Means). Testing of differences was performed using the f – test, and the significance level was shown as sig.

Results

In order to determine whether the groups are homogeneous, analysis of variance in the initial measurement was applied. The analysis of the variance in the initial measurement in the measures for assessment of the body composition and the motor abilities in the experimental and control group are shown in Tables 1 and 2.

In the initial measurement, in the body composition assessment measures, the respondents from the experimental and the contrast group did not statistically differ at the multivariate level. At the univariate level, a statistically significant difference was found only in the measure of body mass index. In motor tests, respondents from the experimental and contrast groups did not statistically differ at the multivariate and univariate levels.

This condition indicates that the two groups of respondents are relatively homogenized, which allows the experimental program to begin from the same starting point for both groups, however with the purpose of neutralizing the differences in age and gender, and the body mass index, as well as for preventing these differences to cause a "system error", the groups will be further homogenized by an appropriate statistical procedure, i.e. to determine the differences in the final measurement between the experimental and the control group, multivariate and univariate analysis of covariance will be applied.

Table 1

Significance of differences in body mass assessment measures between the experimental and control groups in the initial measurement

Variables	EXPERIMENTAL		CONTROL		F	Sig.	η^2
	Mean	SD	Mean	SD			
Body mass index	18,05	0,32	16,98	0,36	4,91	,028	,027
Percentage of body fat	22,36	0,80	20,08	0,88	3,61	,059	,020
Percentage of muscle mass	28,93	0,30	28,33	0,34	1,71	,193	,009
Wilks' lambda =.962		**F =2.32**			**Q =.077**		

Table 2

Significance of differences in body mass assessment measures between the experimental and control groups in the initial measurement

Variables	EXPERIMENTAL		CONTROLE		F	Sig.	η^2
	Mean	SD	Mean	SD			
Seated forward bend	17,91	0,49	19,02	0,57	2,20	,140	,012
Palm dynamometry	11,60	0,27	10,95	0,31	2,49	,116	,014
Long jump	102,92	1,94	104,17	2,24	0,18	,674	,001
Sit-ups for 30 seconds	10,92	0,51	10,33	0,59	0,57	,452	,003
Shuttle run 4 x 10 m	16,82	0,24	16,45	0,27	1,06	,305	,006
Wilks' lambda =.963		**F = 1.36**			**Q = .239**		

Multivariate and univariate analysis of covariance was used to determine whether there were statistically significant differences in body composition assessment measures and motor skills in the final measurement in the experimental and control groups. The results of the multivariate and univariate analysis of the covariance are presented in Tables 3 and 4.

An overview of Table 3 shows that there are no statistically significant and univariate differences in body composition between the experimental and control groups in the final measurement.

Table 3

Significance of differences in body mass assessment measures between the experimental and control groups in the final measurement

Variables	EXPERIMENTAL		CONTROLE		F	Sig.	η^2
	Mean*	SD	Mean	SD			
Body mass index	18,27	3,86	18,37	3,14	0,62	,433	,004
Body fat percentage	21,84	8,21	22,42	7,83	1,42	,236	,009
Muscle mass percentage	30,37	0,12	30,32	3,16	0,07	,792	,000
Wilks' lambda =.987		**F =0.71**			**Q =.549**		

* Corrected arithmetic mean

Table 4

Significance of differences in body mass assessment measures between the experimental and control groups in the final measurement

Variables	EXPERIMENTAL		CONTROLE		F	Sig.	η^2
	Mean*	SD	Mean	SD			
Seated forward bend	18,36	6,14	17,31	6,15	1,52	,219	,008
Palm dynamometry	13,99	4,43	12,57	5,21	11,20	**,001**	,055
Long jump	119,91	4,08	113,43	3,44	7,77	**,006**	,039
Sit-ups for 30 seconds	15,08	17,46	12,48	21,29	18,97	**,000**	,090
Shuttle run 4 x 10 m	14,73	1,69	15,32	1,90	8,15	**,005**	,041
Running with progressive increase of speed	560,61	25,09	558,04	6,15	0,02	,884	,000
Wilks' lambda = .880		**F =4.24**			**Q = .000**		

* Corrected arithmetic mean

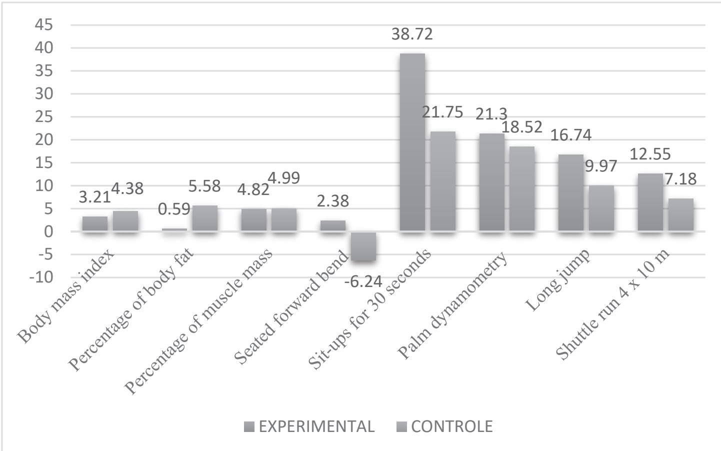
By applying the multivariate analysis of the covariance (MANKOVA), i.e. by testing the significance of the differences of the arithmetic mean in the measures for assessing the motor skills in the final measurement in the two groups of respondents, a statistically significant difference was determined, because Wilks' Lambda, 880 and df = 187, give statistical significance at level Q = .00. The magnitude of the partial n2 effect shows an average of 0.12.

In order to determine in which measures for assessment of motor skills there are statistically significant differences, univariate analysis of the covariance for each motor test was calculated. From the overview of Table 7, it can be seen that there are statistically significant differences in 4 out of 6 variables. Intergroup differences are found in the variables: palm dynamometry (F= 11,20; Sig = 0,01), long jump (F= 7,77; Sig= 0,06), sit-ups for 30 sec (F= 18,97; Sig= 0,00) and shuttle run 4 x 10 m (F= 8,15; Sig = 0,00).

Partial – n^2 is ranged between .04 and .09 and shows little to moderate effect. The greatest effect in determining the differences shows the variable: sit-ups for 30 seconds (partial – n^2 =.09).

Graph 1

Percentage differences in body composition and motor skills between the experimental and control group in the final measurement



Explanation of the terms under bars from left to the right: body mass index, body fat percentage, muscle mass percentage, seated forward bend, sit-ups for 30 sec, palm dynamometry, long jump, shuttle run 4 x 10 m, Experimental, Control

From the values of the arithmetic mean and the level of statistical significance, it can be seen that at the end of the experiment, the test subjects of the experimental group achieved better results in motor tests: palm dynamometry, long-jump, sit-ups for 30 sec and shuttle run 4 x 10 m. No statistically significant differences between the experimental and control groups in the final measurement were found in the test for seated forward bend and running for 20 m with progressive increase of speed.

Discussion

The study evaluated the effect of two different approaches in physical education for physical fitness related to health (body composition and motor skills) in early-school age children after 9 months of experimental treatment (108 classes of physical education).

Based on the obtained results, it is evident that the innovative (tandem) classes have contributed more to the development of musculoskeletal fitness, which is statistically proven. In the final measurement, compared to the initial measurement, the students from the experimental group on average made 4 body lifts more (39%) compared to 2 body lifts in the control group (22%), jumped 18 centimeters in the long jump (17%) compared to 10 centimeters in the control group (10%) and improved test strength: palm dynamometry by 3 kg (21%) versus 2 kg in the control group (18%). The stated progress of the experimental group in musculoskeletal fitness is in accordance with the research of (Faigenbaum et al., 2013; Faigenbaum et al., 2011; Jones et al., 2011). It is obvious that in our schools the physical education classes are inefficiently working towards improving the musculoskeletal fitness in early school age children. Classes organized by the class teacher do not contribute as much as they should to the development of the arm, chest, spine muscles and the explosive power of the lower extremities. Progress in musculoskeletal fitness requires special planning of activities and exercises taking place at least 2 to 3 times per week (Behringer, vom Heede, Yue & Mester, 2010; Faigenbaum et al. 2009).

The results of the research indicate that the innovative classes (realized by the class teacher and professor of physical education) are much better planned, organized, realized and dosed, compared to the traditional classes realized only by the class teacher.

No statistically significant differences were found between the experimental and control groups in the final measurement in the flexibility assessment test – deep seated forward bend. In the final measurement compared to the initial measurement, in absolute values, the students from the experimental group improved the flexibility on average by 0.42 centimeters (2.38%). In the control group between the initial and the final measurement, the flexibility decreased by 1.18 centimeters (6.24%). As a possible reason for the small changes in flexibility is considered to be the originally established flexibility that was at a relatively high level among students of this age. The achieved threshold is a limiting factor in the development of this ability. Another possible reason may be insufficient activity. The recommendations are that despite the application of stretching exercises in the preparatory (warm-up) and the final part (cool-down) of the class, independent activities that contribute to the development of flexibility should be organized 3 times per week. In this research, as well as in the research of Yarania and collaborators, such activities are not separately organized. The limiting factor in our research was the three classes of physical education in the weekly cycle. In the future, we may need to consider increasing the number of physical education classes, as well as organizing additional physical activities with children in this age group.

Innovative classes have contributed much more to the development of motor fitness (coordination, agility and speed), which is even statistically proven. In the final measurement compared to the initial measurement, the students from the experimental group improved the shuttle running test 4 x 10 m for an average of 2 seconds (12.55%), as opposed to 1 second in the control group (7.18%). This can be expected if we consider the fact that the curriculum for these age categories is dominated by activities of locomotor, manipulated and non-locomotor type, which positively affect the improvement of motor fitness. The development of coordination and agility is related to the development of the nervous system which by the 6th year is 60%, and by the 12th year is up to 90% of the total development, so the sensitive period for the development of muscle fitness is from 6 to 12 years, and the critical period is 6 to 8 years of age. The process of developing coordination is more a matter of improving movement rather than motor skills. It should be noted that the exercise programs in various sport activities have a general foundation based on coordination, or acquisition of motor experience (Bompa, T., 2000, cited by: Kukolj, M., 2006).

The body composition between the two measurements did not change significantly in the two groups of respondents. But the absolute values are less favorable in the control group. In the experimental group, body mass index increased by 3.21%, the body fat percentage to 0.59%, and the muscle mass percentage increased by 4.82%. In the control group the body mass index increased by 4.38%, the body fat percentage by 5.58% and the muscle mass percentage increased by 4.99%. The results obtained are consistent with previous research by Voltera and colleagues (Walther et al., 2009). The results are also in accordance with the results of a meta-analysis in which it was concluded that intervention in a school environment has little effect on body mass index (Guerraet al., 2013; Harris, Kuramoto, Schulzer & Retallack, 2009), as well as other body composition assessment measures (Harris, Kuramoto, Schulzer & Retallack, 2009). Harris and colleagues (2009) point out the insufficient level (duration, intensity and frequency) of physical activity that is necessary to make changes as a possible reason. Another possible reason is that physical activity itself has less of an effect on body composition compared to the joint influence of physical activity and dietary factors. Contrary to these results, interventions performed in the school environment (Carrel et al., 2005; Kain, Uauy, Vio, Cerda, & Leyton, 2004; Kriemler et al., 2010) lead to a positive effect on body composition. Individual interventions include additional classes in physical education (Kriemler et al., 2010).

It is evident that innovative classes (tandem) contributed to the improvement of several variables that were applied in this research. The key element that led to the improvement in the experimental group was probably the proper planning, organization and implementation of the classes, i.e. the correct and optimal choice of the type, duration, intensity and frequency of physical exercises and physical activities in each class of physical education. Regular physical activity and / or programmed physical exercise are the most important factors that maintain and improve physical fitness related to health. Schools can provide conditions for young people to engage in physical activity, improve physical fitness related to health, and can play a very important role in motivating young people to stay physically active (Burgeson et al., 2001). They constitute suitable places to promote positive health habits. Taking into account current trends such as the dramatic increase in the prevalence of obesity in children and adolescents who spend more time watching TV or playing on the computer, reducing physicaly active movement, shows that schools should take the lead in getting young people to involve in appropriate forms of everyday physical activity in order to improve physical fitness related to health and gain sports literacy (Pate et al., 2006).

Based on the conclusions of the National Association for Sport and Physical Education, physical education classes should prepare children and adolescents for physically active and healthy living (PBNASPE, 2011), encourage them to engage in activities and develop habits for regular lifelong exercise (The Cooper Institut, 2010). The creation or selection of the best curricula for physical education and their implementation by some of the best professional teaching staff is a critical step in effective development of physically educated individuals who will choose to participate in physical activities throughout their lives (CDC, 2006).

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NEW TEACHING PRACTICE FOR THE NEW ERA

Abstract: The aim of this paper is to present a new teaching practice that was enforced mainly because of the pandemic and the new circumstances for organizing the teaching process using distance learning and mostly blended teaching.

The pandemic has accelerated an existing trend towards online and hybrid learning. This shift has uncovered new and innovative ways for students and educators to organize their teaching and learning activities and to interact in a more personal and flexible manner online. We are aware that the teaching profession is a key mediating agency for society as it endeavors to cope with change and upheaval. The teaching profession must adapt a great deal so that it can act in a constructive manner within a fast-changing society if it is to retain the confidence of society.

The presented teaching practice in one Macedonian classroom with usage of different learning applications and learning platforms (Nearpod, Google Classroom, GoLab, Wordwall, Kahoot, Google Forms, Microsoft Teams, etc.) opens the discussion about the core competences teachers need as they are inadequately prepared to facilitate young people's understanding of and engagement with technologies in general.

In addition, the experience throughout one-school year with distance learning challenges the role that teacher has in the new era of teaching. His/her role changes towards equipping and motivating students' acquisition of skills and knowledge like self-directed learning, self-regulation, innovation, communication and cooperation.

The paper will present several recommendations for improvement of teaching with the usage of technology so to provide authentic experiences for both teachers and students.
Keywords: Teaching, Technology, Competences

Introduction – The Teaching Profession

The teaching profession in the modern course of life is confronted with numerous sources of information and ways of learning, and is in a situation where it has to "prove" its value and necessity. Even in the past it was concluded that this is not a simple profession, but a complex set of