

MATHEMATICAL TERMS IN PHYSICAL EDUCATION CURRICULUM

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(Preliminary communication)

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Abstract

Mathematics is applied in all forms of human activity and therefore also in physical education teaching. According to the curriculum plan, 2nd grade students are expected to be able to differentiate a rectangle from a square, open from closed broken lines, straight from curved lines and also calculate their lengths. The aim of this paper is to show a correlation between physical education and mathematics so that students can learn the above mentioned mathematical terms through physical activity and in a fun and interesting way (dancing, exercises, and singing). The research took place in the elementary school “Rada Miljkovic” in Jagodina. Thirty 2nd grade students were examined and a questionnaire with 10 questions was used as an instrument. The organizational form of teaching was cellular. The acquired results showed a high level of positive effect of physical science on mastering mathematical problems.

Keywords: *second grade students, music method, questionnaire method, station method, physical activity, body shaping exercises*

INTRODUCTION

Physical science plays an important role in a world of scientific and technological flourishing which provides certain benefits in everyday life but also denies its basic characteristic – a movement. Physical science must affect the natural physical and psychical development of students and the strengthening of their stamina. Physical education is more and more becoming important part of modern man’s life – both in cultural and social context. Speaking of physical education today indicates physical science, sports and recreation. Physical education is partly organized as an obligatory course which is held in preschools, elementary and secondary schools, universities and academies. The influence that schools have on a child is highly significant not only in its general education but also in the aspect of their health and proper physical development. Physical education is a crucial part of elementary school curriculum because the subject of physical science helps with realization of all forms of education. Hence, physical education of elementary school students is a responsible and complex task. Physical science teacher has to live up to high pedagogical expectations. Unfortunately, in

most elementary schools the curriculum is attained by a verbal method where a lecturer teaches with a very few learning materials while students are taking the information in a passive way. “The way of teaching with one professor working with a whole class assures practicality and rationality of education which is an essential part of the traditional way of teaching. However, this “frontal” method of teaching is seriously flawed”.

One of the possible solutions could be applying of different innovative approaches, primarily didactic models which have as purpose overcoming defects of traditional teaching methods in the majority of elementary schools. Among the above mentioned innovations, a correlation between two or more subjects could be applied. The importance of the connection between physical education and other subjects (e.g. mathematics, Serbian language, musical culture) is vital in the process of modernization of teaching. One of the possible alternatives is the correlation with mathematics in which all of these elements can be integrated in the best possible way.

Mathematics is applied in all segments of human activity. Only a small fragment of information

is selected from a large corpus of mathematical knowledge and then is transformed to a form appropriate for young learners. This is how the subject “mathematics” came into existence. Mathematics is taught in schools, classrooms and individual work. In the same manner that we interconnect different knowledge from different subjects, the students will be taught to connect their knowledge with real life situations where this information could be applied. The goals of teaching mathematics in elementary school are:

- helping students to acquire elementary mathematical knowledge necessary for understanding occurrences and dependency in life and society;
- teaching students how to use the knowledge they gained in solving practical everyday problems;
- assisting students in continuing their mathematical education and self education and
- developing diversity in students’ personalities.

RESEARCH GOAL

The aim of the correlation between physical science and mathematics research is to help students to solve mathematical problems through physical activities. It is also a good way to make a change in clichés and formal phases of the teaching routine.

RESEARCH METHOD

The research took place in elementary school “Rada Miljkovic” in Jagodina in II-2 class that consists of 30 students in the second semester of the school year of 2010-11. During the main part of the class, the students were working according to the cellular approach to learning. A survey with 10 questions was applied in order to estimate the students’ attitudes. The results are shown using tables and diagrams.

In the beginning of the lesson, the students were given badges with the pictures of geometrical elements (circle, rectangle, triangle and a square) that they had learned during their mathematics classes. They pinned their badges on their shirts. They formed groups according to the geometrical elements they got, where the students with the same element were placed in the same group.

Throughout the introductory part of the lesson, students were using different ways of movements and on a whistle sound they changed the manner of walking: on fingertips, on heels, squatting, fast and slowly. At the same time, on the sound of a whistle they got back to the place where their geometrical element stood. Students of this age are already emotionally prepared for working because even a thought and mention of the physical education class itself has a positive effect on their work motivation. In this part of the lesson, the natural ways of movement were used and designed in such way to contain forms of movement that would be taught in the main part of the lesson as well as the mathematical elements.

Then during the preparation time, students did a series of ten exercises where they used mathematical elements e.g. they used their right arm and leg to mimic numbers 1 to 5 in the air, and their left arm and leg for numbers 6 to 10. They also used their

heads and torsos to mimic numbers. All exercises were followed by counting in a specific rhythm and pace. The main goal of exercising in this phase was directed to advancing the working capability and strengthening the sensomotoric centers in the frontal lobe and vegetative functions, increasing the cardiovascular function, improving thermo regulative functions of the body and especially increasing the muscle temperature.

Afterwards in the main part of the lesson was organized in a station form. Students were placed in three groups, same as the number of parts of the lesson.

The first station consisted of playing hopscotch. Each student threw the ball twice, added the numbers they got and jumped in different ways to the result they got. Numbers in this game were from 1 to 12 and they were all written on rectangle-shaped pieces of paper. This is the part where students practiced adding and recognizing rectangles.

In the second station, students were supposed to walk in a different ways: regularly, squatting, jumping on one leg and from one leg to another on the broken open and closed lines. After walking on broken open and closed lines, students were supposed to measure the line lengths.

The students’ task in the third station was to calculate the squares sizes that were drawn on the mats. They calculated the size by adding the sides of rectangles for the rectangles and squares for the squares, since they hadn’t learned yet calculating the volume for these geometrical figures. All students participated in all three stations.

While connecting these two subjects, we’ve been assured that the correlation existed in all parts of the lesson because “without using correlation or using it in a faulty manner, not only leads to wasting valuable lesson time but also burdens the students which are often talked about nowadays”. (Lazarevic-Bandjur, 2001).

The final part of the lesson was also interesting since we established a connection with Musical education as well. Students danced with a balloon between them to the song called Mathematics. The pair, who succeeded to dance for the longest period of time with the balloon without falling down, won the game. Observed from the perspective of physical education class, this was the time for students to cool down and relax.

After the lesson, we conducted a survey to see how the students liked this way of teaching and learning. We also tested the efficiency of the correlation between mathematics and physical education in realization of operational lesson’s tasks within both subjects.

RESULTS OF THE SURVEY

Furthermore, we will show the results of the survey with a few given questions relevant to this research using tables, histograms and pie charts.

Results in Table 1. shows that a great number of students, 19 (63.33%) like both subjects equally,

then 8 (26.67%) prefer mathematics to physical education and 3 (10.00%) prefer physical education to mathematics, which can be seen on the pie chart 1. and histogram 1. The fact that most students find both

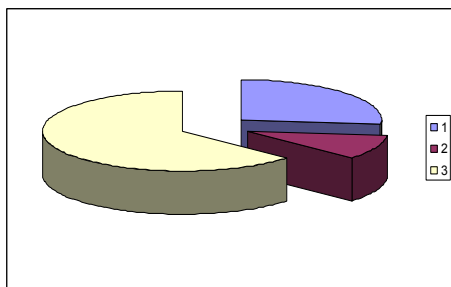
Table 1.

<i>Which o you prefer</i>	<i>n</i>	<i>%</i>
Mathematics	8	26,67
Physical education	3	10,00
Both equally	19	63,33

mathematics and physical education useful is highly satisfying.

According to the majority of students, 21 (70.00%), the mathematics class in correlation with physical education was *very interesting* as opposed

Pie Chart 1.



Pie chart 2.

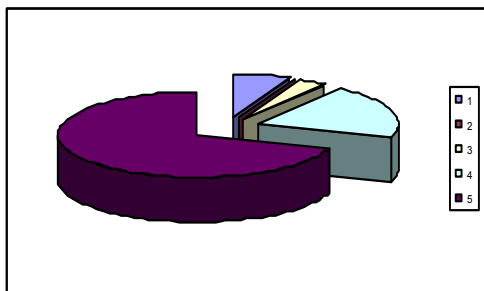


Table 3.

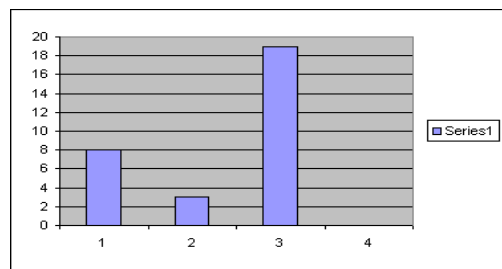
<i>The physical education class I participated in today was</i>	<i>n</i>	<i>%</i>
Boring		
Very boring	2	6.67
I don't know	0	0
Interesting	1	3.33
Very interesting	7	23.33
	20	66.67

Table 2.

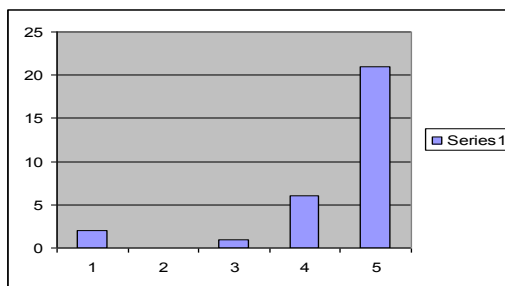
<i>The mathematics class held today was</i>	<i>n</i>	<i>%</i>
Boring	2	6,67
Very boring	0	0
I don't know	1	3,33
Not interesting	6	20,00
Very interesting	21	70,00

to the traditional way of teaching a lesson, and 6 (20.00%) students think that the lesson was *interesting* and 2 students think that the class was boring which is shown in the results in the table 2, as well as on the pie chart 2. and histogram 2. The reason behind these

Histogram 1.



Histogram 2.



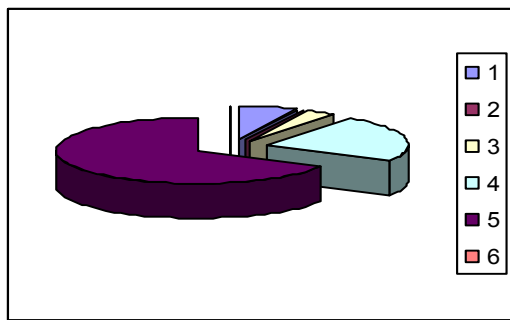
results lies in the fact that mathematics lessons in correlation with physical education enables students to learn in a funny and interesting ways through movements, games and in a group with all other students which is not possible during other lessons.

A large number of students, which can be seen in Table 3., 20 of them (66.67%) answered that the

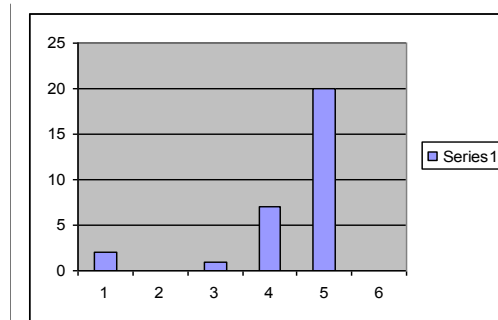
Table 4.

<i>Would you like to have more of these lessons</i>	<i>n</i>	<i>%</i>
Yes	30	100
No	0	0

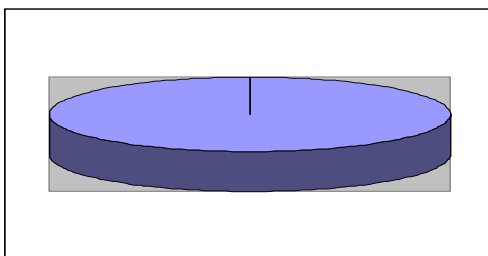
Pie Chart 3.



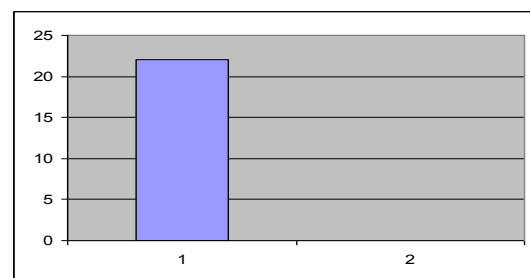
Histogram 3.



Pie chart 4.



Histogram 4.



lesson they had was very *interesting*, 7 (23.37%) students said that it was *interesting* and 2 (6.67%) that it was *boring*. According to these answers, we can conclude that the students were satisfied with this lesson. Based on the responses of students, we can conclude that students are satisfied with this class, because the game, running and jumping beats the competition in an easier and more interesting way the elements of mathematics which used to be very heavy to learn.

In accordance with the students' responses, we found that the majority of students, 30 (everyone who participated in conducting this survey) can grasp the importance and the point of correlation, which is a very good sign. We believe that this was possible thanks to the teachers who had an organizational skills and a different way of lecturing which helped students to learn in a different and enjoyable way.

CONCLUSION

Today we often talk about the shortcomings of traditional organized classes. The aim of the modern school is the maximum development of each student, so to apply new teaching systems, and thus overcome the limitations of traditional teaching.

Not every type of curriculum is convenient for any type of teaching methods or system. Since broken, open and closed lines and geometrical objects are covered in the 2nd grade elementary school we decided to connect geometrical objects with physical activity of the students. This is how we prepared the class with the correlation between mathematics and physical education, named Geometrical objects in physical

education. Based on these results, we concluded that this type of learning is more interesting to the students than the traditionally held classes, as well as that they unanimously agreed that they would like more lessons similar to this. The goal of this paper was not only to demonstrate that the correlation of mathematics and physical education is an ideal teaching model or a solution for the problems of traditional teaching, but also shows a possibility to combine two or more subjects with different teaching methods and models toward achieving more effective learning degrees. The role of the teacher is very important in this type of classes. It is necessary that the teacher is not only masterful in fields of psychology, pedagogy and methodology but he also has to be creative and well organized and prepared for each class. In this way, curriculum would be more interesting to students and their knowledge more permanent and useful in practice.

REFERENCES

- Bandjur, V., Potkonjak, N. (1996). *Pedagoška istraživanja u školi* [Pedagogical research in schools. In Serbian.] Beograd: Učiteljski fakultet – Centar za usavršavanje rukovodilaca u obrazovanju.
- Bogičić, S., & Trokanović, J. (2005). *Psihofizička i emocionalna zrelost dece za upis u prvi razred osnovne škole u Negotinu* [Psycho-physical and emotional maturity of children for enrolling in the first grade of elementary school. In Serbian]. Beograd: Srpsko lekarsko društvo.
- Višnjčić, D. (2008). *Nastava fizičkog vaspitanja* [Physical education curriculum. In Serbian.] Beograd: Zavod za

- udžbenike i nastavna sredstva.
- Gordon, T. (2008). *Kako biti uspešan nastavnik* [How to be a successful teacher. In Serbian.] Beograd: Kreativni centar.
- Dejić, M. (1997). *Metodika nastave matematike* [Methodology of teaching mathematics. In Serbian.] Jagodina: Učiteljski fakultet.
- Dejić, M. & Egerić, M. (2003). *Metodika nastave matematike* [Methodology of teaching mathematics. In Serbian.] Jagodina: Učiteljski fakultet.
- Jukić, S. (1997). *Didaktika* [Didactics. In Serbian.] Jagodina: Učiteljski fakultet.
- Kragujevic, G. (1991). *Metodika fizičkog vaspitanja* [Methodology of teaching physical education. In Serbian.] Beograd: Zavod za udžbenike i nastavna sredstva.
- Lazarević, Z., & Bandjur, V. (2001). *Metodika nastave prirode i društva (Methodology of teaching the subject - nature and society)*, Beograd: Učiteljski fakultet u Beogradu.
- Matić, M. (1978). *Čas telesnog vaspitanja [The class of physical education. In Serbian.]* Beograd: Partizan, Novinska izdavačko-propagandna ustanova, Saveza za fizičku kulturu Jugoslavije.
- Špijunović, K. (2000). *Razvijanje originalnosti u procesu matematičkog obrazovanja učenika od 1. do 4. razreda osnovne škole* [Development of the originality in the process of education of the students between grade 1 and 4 of elementary school level. In Serbian.] *Nastava i vaspitanje*, 49(4), 568-577.

МАТЕМАТИЧКИ ПОИМИ ВО НАСТАВАТА ПО ФИЗИЧКО ВОСПИТУВАЊЕ

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(Прейходно соопштение)

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Апстракт

Математиката се применува во сите форми на човековата дејност, а со тоа и во наставата по физичко воспитување. Според наставниот план и програмата предвидено е учениците од второ одделение да го разликуваат правоаголникот од квадратот, отворените и затворените испрекршени линии, како и да ги пресметуваат нивните должини. Целта на овој труд е да се утврди поврзаноста на физичкото воспитување и математиката, така што совладувањето на наведените наставни содржини по математика треба да се реализира низ игра, вежбање и песма. Истражувањето е реализирано во Основното училиште „Рада Миљковиќ“ во Јагодина. Примерокот на испитаниците изнесуваше 30 ученици од второ одделение врз кои е применета метода на анкетаирање со 10 прашања. Како организациска форма на работа примената е методата на станици. Добиените резултати од истражувањето укажаа на високи позитивни ефекти на физичкото воспитување при совладувањето на математичките поими.

Клучни зборови: *ученици од второ одделение, музичка метода, метода на анкетаирање, метода на станици, физички активности, вежби за обликување на тело*

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