

Marta Dedaj, PhD

Preschool Teacher Training and Business Informatics College Sirmium

Sremska Mitrovica

Original Scientific Paper

UDC: 371.72

=====

EDUCATIONAL FUNCTION OF PREVENTIVE AND CORRECTIVE EXERCISES

Abstract: It is widely accepted that well – programmed systematic physical exercise is high on the scale of preventive measures aimed at preventing the changes in the body of a child resulting from negative effects of modern civilization. Posture is an essential precondition for good health, normal growth and development in general. Therefore, it is necessary to implement exercises and prevention at an early age. Programme contents of physical education are not only aimed at overcoming motor movement and development of physical and functional abilities, but at the entire development and all other components of pupil's personality: intellectual, working, moral, volitional and aesthetic. Accordingly, in order to provide systematic and positive impact of physical activity on the development of the body and the formation of the correct posture of primary school pupils and correction of improper posture, experimental program has been designed. Comprehensive preventive and corrective activities are based on the results of research from different scientific fields: results of theoretical and empirical research on the importance of preventive and corrective exercises. Results of statistical analysis on the impact of individual independent variables on the posture of pupils indicate that the internal program content of educational institutions represents an important moderator of pupils' posture. The results of our study suggest the need for cooperation between schools and parents in developing positive attitudes of pupils towards physical exercise. We can conclude that the complexity of educational work in general, and especially the specificity and complexity of work in a typical area of physical education imposes the need for a different approach to the student. This includes, in addition to cooperation with the parents, which should be part of the development plan of each school, individualized approach to the pupil.

Keywords: preventive and corrective exercises, physical education, students.

Introduction

Human knowledge about the process of exercising in the function of education ranged from empirical over abstract to philosophical and scientific. Therefore, it is especially important that all known philosophers of ancient times advocated essentially humanistic ideas about the need for a harmonious development of personality, the symbiosis of body and mind. From the ancient world of China and India, Assyria and Persia, Sumerian and Cretan and Mycenaean culture to Athens and Rome, besides the formation of certain human values , moral values contained in promoting truth, justice, courage and good manners, an integral part of education was physical exercise. Thoughts of Confucius,

Homer, Socrates, Plato and Aristotle could be summed up in the message that health and human development are necessarily associated with muscle activity (Dedaj, 2011, 346).

Numerous works of thinkers and educators, particularly of Jean- Jacques Rousseau, emphasize the need for harmonious development of personality and importance of the process of exercising for optimal and harmonious development of people, believing that "exercise is important for the body" and that the exercise helps in achieving educational components and aesthetic, emotional and moral values (Potkonjak, 2000, acc. ibid, 348). It should be emphasized that a large number of teachers and philosophers referred to Juveniles" sentence: *A healthy mind is in a healthy body*, emphasizing the major role of physical exercise in the formation of the correct posture of children and young people. Therefore, physical exercise must be retained as a conscious daily activity throughout life (acc., ibid 355).

The study of problems posture of primary school pupils and the role of prevention and corrective exercises are caused by a modest activity when talking about the role of teachers in the same. Summary of results of numerous previous studies suggests the need for further development of appropriate multi-disciplinary and interdisciplinary approaches. Performed theoretical analysis has shown that the concept of posture has been defined differently. This lack of uniformity in defining the concept of body posture mainly results from different approaches of the respective authors. However, most of the authors consider the posture to be anatomical basis for the development of psychomotor skills, and that the external shape of the body determines the position of internal organs and their activity.

Modern approach to the study of posture emphasizes that there are three important components within the motor learning: cognitive (the idea of purpose), conative (internal needs) and motor (plan of action). In the field of physical exercise learning model is used to influence on motor behaviour and the psychological response caused by it. Due to the fact that motor body posture and psychomotor abilities represent the fundamental core of human existence, this paper presents the movement treatment that reveals a clear experience of self to the pupil, a sense of themselves as individuals, perception and awareness of their place in the world, allowing them independence in their life according to their age.

Summary of theoretical studies and empirical research in the study of body posture, confirm the fact that physical exercise is a powerful tool for the prevention of improper posture. General characteristic of the previous research of this issue is that most researches statistically define deviation and analyze the causes of improper posture. These researches gave us information on some important factors related to the considered problem and imposed the need to implement the knowledge obtained by the authors who have dealt with the issue of (in)correct posture of pupils in school practice.

The importance of preventive and corrective exercises for the formation of correct posture

Erect attitude of man is quite lately acquired. Therefore, there is the need to pay conscious attention to achieve and maintain good posture, since the man who is standing has unstable balance. The balance can be achieved by correct location of parts of the body, which is achieved through the active work of muscles and passive tightening of ligaments. The habit of good and proper posture can be automated in the first place by insisting on the same.

Starting from the assumption that the susceptibility to some anomaly is conditioned by hereditary and environmental factors in the given situation, it is important to emphasize that the organism, with its strengths and maturing, corrects part of the appearance of improper posture. Unfortunately, this natural phenomenon is not present in all children, especially in the so-called "children at risk". For such children the system of preventive and corrective measures should be planned in order to prevent improper posture. Good posture should become a habit. Therefore, its formation requires time, patience, persistence and consistency by all factors. Only the frequent repetition of the proper posture can develop good posture.

The primary means of physical education is physical exercise, which includes any movement or motor activity that is consciously and in accordance with certain principles applied in order to achieve the goals and objectives of physical education (Krsmanović, 2000, 68). Each motor activity is composed of a number of movements and motions interconnected in a more or less comprehensive system. Movements which are controlled by reason are called voluntary movements and they are characterized by the following features (ibid. 69):

- they are always in a function of knowledge;
- they are the result of man's life experience (including learning process);
- movement learning increases the degree of its subordination to man's will.

From the *psychological point of view*, physical exercise is seen as voluntary movement. During the exercise there is always a conscious focus on reaching effect in accordance with the objectives of physical education. From *physiological point of view*, physical exercise is seen as a movement that causes the body from one to another, usually higher state of functioning. In the process of exercise design educational aspect is the most important for teachers. Physical exercise provides great opportunities for the development of functional and motor characteristics and capabilities, which in union with the formation and training of motor skills and habits represents the essence and meaning of physical education (ibid. 71).

Physical exercises have a great influence on human body, not only on the development of external, morphological, but also internal functions. Therefore, *exercises are used preventively*, in order to form the correct body posture, but *correctively too*, in order to correct improper posture. In order to apply exercises preventively, i.e. as a corrective tool, it is necessary to consider the following:

- assessment of pupils' posture helps us to properly design an exercise program;

- posture of children of the same generation makes more or less similar body image, so the programming model of exercise will not have greater differences within a group, having respected individual differences;
- at the beginning of the school year, each student should be subjected to the initial measurement and analysis of the body, and then further changes should be systematically monitored. In this way personal files are formed which monitor the entire anthropological status.
- it is necessary to carry out the exercises of muscle strength in order to determine which exercises will be applied: this test is performed manually, i.e. appropriate movement is asked for, and observation or palpation determines muscle strength.

Physical exercise, as an education system, and forming of regular motor habits of may be used for different purposes and in different ways. All those exercises that have a positive impact on posture are important for our research. Physical exercise should cover the entire musculature, especially the one that is most weakened. It should be a combination of all positive movements that will result in the formation of proper posture and correcting improper posture. The application of preventive and corrective work involves managing and mentoring on behalf of teachers. Corrective gymnastics represent the most appropriate form of physical exercise is aimed at creating a proper body posture. Corrective gymnastics is a set of physical exercises dosed according to the intensity, type and duration, which can be used preventively with children who are predisposed to the occurrence of improper posture and aim to increase muscle strength, amplitude and movement coordination. By connecting play and corrective gymnastics we strengthen preventive and therapeutic functions of physical exercise. Dealing with corrective exercises through play, children learn to use physical exercise for health and shaping of their own body, and see physical activity as a valuable and enjoyable.

In this sense, *corrective gymnastics* represents form of education which under family and other conditions provides support and facilitates normal physical and mental development of the child. The principles of corrective gymnastics are:

1. *The motivation principle* – it implies child’s interest to perform corrective exercises. This will be the easiest to achieve if the child is explained why he has to exercise and what exercises meant for his body, the development of the body and organs or to correct improper posture. In order to achieve this principle, it is necessary for parents to be engaged in the process of motivation, it will increase the motivation of a child the efficiency of the exercise.
2. *The principle of early start* – it implies that the prevention and correction should start on time, as certain exercises can help only if they are used at a younger age.
3. *The principle of exercise analysis* – it implies monitoring the effects of exercise and individualized exercises.
4. *The principle exercise understanding* - it is necessary to draw and in a simple manner explain the elements of the anatomy so that a child could understand the effects of exercise.
5. *The principle of avoiding pain* - children will readily accept exercises that are done

without pain, and it is important to use a system of warming and muscle relaxation.

6. *The principle of gradualism* – it implies that the exercise should be done from easier to more difficult, from simple to complex.

7. *The systematic principle* - it is necessary that each exercise is done according to established schedule, that the system of exercises is conducted in the prescribed manner regarding the duration and intensity, that the entire organ is treated systematically. Since each system operates in an organized and designed way, the goal of these exercises is to achieve preventive and corrective effects.

8. *The principle of continuity* – it implies developing habits of continuous and timely exercise. Continuity in children will be most easily accomplished if they get used to regular exercising. This habit is most easily achieved if we unite practice and play.

9. *The principle of active participation* – it includes cooperation and active participation of the child, child should exercise because it is convinced that it is a useful activity. Children are naturally active and willing to participate, they prefer to perform activities that they know to serve a given purpose or for the purpose they themselves determine.

10. *The principle of persistence* – it assumes persistence in exercising even after long periods of exercise. This principle can be best achieved if the child is convinced that exercising helps him. Persistence can be achieved and regularity, with a teacher's incentive.

11. *The principle of avoiding monotony* – it implies that the exercise should be carried out in different ways and in different situations. The play can be helpful, since children enjoy repeating the exercise.

12. *The principle of recording and control* - control is used to avoid unintended consequences, and the recording is used to be able to follow the continuity of exercises. Great importance is given to personal files of students that every teacher should record individually for each student (Živković, 2000, 54).

There are few activities that have such an important impact on quality of life that physical activity has. It is achieved by professionally designed training, the process of transformation of anthropological characteristics, motor skills and achievements. It also implies that the exercises should be appropriate developmental abilities of children, directed toward the optimal development and improvement of the knowledge, skills and qualities that are in a particular developmental period primary for pupils of younger and senior school-age.

METHODOLOGICAL FRAMEWORK

Prevention of improper posture of students includes, among other things, regular monitoring of growth and development, timely detection of the causes of disorders and health and education work with students on the principles of regular physical exercise. Teamwork of physical education teachers, school counselors, school doctors and parents is very important in the prevention and correction of changes in students' posture. PE teachers should emphasize to parents the new changes in their child, so that the child could apply the same or at least similar program at home, in addition to exercising at school. We believe that the only meaningfully implemented activities of a multidisciplinary team can have a significant preventive and corrective role. Due to this

fact, we have decided to focus on the following research problem: *whether and to what extent the proposed physical exercises affect the prevention of improper posture of primary school students?*

In accordance with the above stated research problem, based on its essential contents and their interactions, the aims and objectives of research are defined. **The aim of the study** was to determine the effect of a six-month experimental program consisting of a complex of physical exercises aimed at preventing improper posture of primary school students.

This aim is separated into hierarchical levels and operationalized through the following research tasks:

1 to identify the differences between experimental and control groups in the assessment of posture of students in the initial and final measurements;

2 to determine whether the age and gender of the examinees in the initial and final measurement represent determinants of (in) correct posture;

3 to determine whether a variable: the attitude of students to physical education classes has an impact on the (in) correct posture of students.

Based on a theoretical approach to the problem, aims and tasks of the study, the following hypotheses are formulated:

The most general hypothesis (H), which covers the entire investigated area read as follows:

(H) *Preventive and corrective exercises affect the appearance of distinctive features between the initial and final measurements regarding the formation of proper students' posture.*

Additional hypotheses:

H₁ Differences between examinees in the initial and final measurement regarding the posture are statistically significant;

X₂ Individual characteristics (age and gender) significantly differentiate examinees regarding the posture in the initial and final measurement;

X₃ There is a significant difference between the two sub-sample groups (poor posture and bad posture) for the characteristic: students' attitudes toward physical education;

Operational definition of the variables is a necessary condition of hypotheses testing. Determination of the key concepts covered by the formulation of research problems allows us to present a list of variables and to clearly and precisely define them in theoretical and operational levels. Operationalization of variables will be performed by experimental program implementation, as well as by a series of questions in the survey instruments.

Table 1 Variable sample

Variable	Number	Content
GENDER	1	Description of the sample of examinees according to gender. Nominal scale which differentiates two groups: male (1) and female.
AGE	1	Description of the sample of examinees according to age. Ordinal scale which differentiates four groups (grades): I-II (1); III-IV(2); V-VI(3); VII-VIII(4).

MNV_NV1 до MNV_NV8	5	Parameters that make the variable totality: type of posture (1-5 assessment scale).
PEV_PE1 до PEV_PE10	10	Parameters that make the variable totality: students' attitude to Physical Education classes (1-5 assessment scale).
PPPE_PPV1 до PPPE_PPV20	20	Parameters that make the variable totality: Preventive and corrective exercises program.
TOTAL NUMBER	37	

Legend of technical marks of variables:

MNV_N– Posture assessment by Napoleon Wolanski method

PEV_PE – Physical Education assessment scale

PPPE_PPV – Preventive and corrective exercises program

Research techniques and instruments

Scaling technique and instrument – assessment scale are applied in this research due to the specificity of the issue in accordance with the objectives, goals and tasks of research, and in accordance with the set of hypothesis. Assessment of students' posture was carried out by Napoleon Wolanski's method. Liquert's questionnaire was applied in this systematic experimental research study.

A sample of measuring instruments consists of:

1. Method of Napoleon Wolanski

Parameters which define posture are: head posture, shoulders posture, scapula holding, the chest, the deviation of the spine in the frontal plane, holding belly, shape of legs, foot arch, and type of posture, form and severity of the spinal curve in sagittal plane. According to Wolanski there are three grades: 0, 1, and 2.

- Score 0 is given for the posture when all parameters are within normal relations. Score 1 is a certain deviation from the normal posture and can be successfully rehabilitated through physical education activities.
- Score 2 is characterized by a distinct change in the status of body posture (Ulić, 1997, 54).

2. Scale of assessments for students (students' attitudes toward physical education)

- Physical education is not adjusted to the individual (PE1).
- Physical education teacher encourages physical exercise by his/her example (PE2).
- Physical education classes are well organized (PE3).
- Physical education develops a sense of the beauty of the body (PE4).
- We learn why it is important to exercise at physical education classes (PE5).
- Physical education contributes to building a positive character (PE6).
- Physical education, exercise and play help me in learning (PE7).
- Discipline should be the same as at other classes (PE8).
- The knowledge acquired at physical education classes is useful for my future life (PE9).
- Physical education, exercise and play are very enjoyable (PE10).

Defining the basic set and sampling plan

Mildly mentally retarded pupils of primary school age represent the population. We have defined it in three ways in order to determine it more clearly:

- **by content:** mildly mentally retarded students of primary school age;
- **by the scope:** the territory of the municipality of Bečej;
- **by time:** in the school year 2008/09 (six months).

We have chosen pupils of this age since it represents critical periods for the occurrence of improper posture. The study was conducted on the selected sample of 212 examinees, which consists of two sub-samples:

- experimental group (112 pupils),
- control group (100 pupils).

Table 2 The sample of examinees

Pupils (groups E-K)			Experimental		Control		Total	
			f	%	f	%	f	%
GENDER	1	Male	53	47,32	50	50,00	103	48,58
	2	Female	59	52,68	50	50,00	109	51,42
AGE	1	7-9	21	18,74	19	19,00	40	18,87
	2	9-11	28	24,99	23	23,00	51	24,06
	3	11-13	36	32,14	24	24,00	60	28,30
	4	13-15	27	24,11	34	34,00	61	28,77

Research strategy and research design (method)

In order to test theoretical hypotheses in this research we applied causal method - pedagogical experiment and descriptive method - method of theoretical analysis. Characteristic of the *pedagogical experiment* is to systematically examine the effectiveness of the proposed preventive and corrective exercises. The experimental group exercised three times a week for 30 minutes in regular physical education classes and twice a week for 30 minutes preventive and corrective exercises (movement therapy). The control group exercised three times weekly according to the curriculum.

Descriptive method - method of theoretical analysis (analysis of pedagogical documentation and relevant literature) was applied, too, in addition to experimental design. Theoretical analysis has provided a major contribution to the study of this issue in the form of science-based criteria of problem modelling, representing a necessary precondition for empirical test of hypotheses.

The research is based on both quantitative and qualitative data analysis. The analysis was carried out in three steps: testing hypotheses about the similarities or differences, determining measures of difference with the definition of characteristics and graphics. The scaling of data in contingency tables was done in order to avoid losing information and find the closest relations on nonparametric sizes. We applied Roy's test, Pearson's

contingency coefficient (χ), the coefficient of multiple correlation (R) were applied from univariant method. The applied mathematical and statistical methods have the ultimate goal of proving or refutation of set hypotheses).

Analysis and interpretation of research results

The analysis of the survey results and their interpretation will be carried out in order to emphasize the discriminatory effect of the independent on the dependent variable, and their connections as a broader term that defines the relationship between the applied variables.

The research problem will be observed through the following criteria characteristics: posture, age and gender. We will start presentation of research results by operationalizing the dependent variable: posture of students, and then we will analyze the relationship of independent variables to the dependent in order to determine whether they affect the appearance of (in) correct posture of pupils.

Analysis of the posture of the examinees

In accordance with previously established research design we will analyze thematic unit of posture estimation on a sample of 212 examinees consisting of two groups: experimental (112) and control (100), at the initial and final measurement.

This variable is made of the following five characteristics: *very bad posture*, *bad posture*, *good posture*, *very good posture*, *excellent posture*. Assessment of posture has been based on eight parameters: head posture, keeping their shoulders, keeping the blades, chest, lateral curvature of the spine (scoliosis) , keeping the front wall of the abdomen, leg shape score - seen from the front , keeping the feet. The analysis of these parameters according to the three modes: normal (score 0), deviation (score 1), significant deviation (score 2), indicates the deviation of certain parameters, i.e. *the type of posture of examinees*.

In determining the significance of differences between the posture of experimental and control groups at the initial and final measurement, the groups were divided according to the following levels (Table no. 3).

Table 3 Division of groups according to the levels

Level I	Level II	Level III	Level IV
Experimental Initial	Control	Experimental final	Control final
112	100	112	100

Numerical (n) and percentage (%) representation of posture on the initial and final measurement in groups (E-K) is shown in Table 4.

Table 4.

Groups (E-K)	Very bad posture		Bad posture		Good posture		Very good posture		Excellent posture	
	H	%	H	%	H	%	H	%	H	%
LEVEL I	13.	11,6*	99.	88,4*	0.	.0	0.	.0	0.	.0
LEVEL II	0.	.0	5.	5,0	13.	13,0*	69.	69,0*	13.	13,0*
LEVEL III	0.	0.	5.	4,5*	27.	24,1*	76.	67,9	4.	3,6
LEVEL IV	0.	.0	0.	.0	11.	11,0	64.	64,0	25.	25,0*

At the initial measurement in the experimental group *very bad posture* occurs in 11.61 % of examinees, which is significantly higher than the prevalence in the control group (.00 % $p = .001$). While at the final measurement representation of this type of posture is as follows: experimental (.00 % $p = .000$) and control group (.00 % $p = .001$). It can be observed with great precision, that the examinees in the experimental group, where *bad posture* was found in the initial (87.50 %) of the final measurement, showed improvement in posture in the final measurement (4.46 % $p = .000$). One can also see the difference between the data obtained in the initial (3.00 % $p = .000$) and final measurement (.00 % $p = .000$) in control group. Good posture, which is found in the experimental group at the final measurement (24.11 %) indicates that it is significantly more than the presence of good posture, in the control group at the initial measurement (13.00 % $p = .040$). The same type of posture appears in the control group in the final measurement in larger numbers (11.00 % $p = .014$) compared with its appearance in the experimental group at the initial measurement (.89 % $p = .000$). Analysis of the data obtained in this study indicates that in the control group at the initial measurement very good posture (71.00 %) is mostly represented which is significantly higher than in appearance of the same type of posture in the experimental group during the initial measurement (.00 % $p = .000$). *Excellent posture* is present in control group at the final measurement (25.00 %), indicating a high prevalence of this type of posture in relation to the examinees in the control group at the initial measurement (13.00 % $p = .032$) and the experimental group at final (3.57 % $p = .000$) and initial measurement (.00 % $p = .000$).

It is observed that there is a significant difference from the type of posture in both groups (experimental and control) at the initial and final measurement, i.e. there is a difference between the experimental group at the initial measurement, the control group at the initial measurement, the experimental at the final measurement and control groups at the final measurement in relation to the type of posture of pupils.

As $p = .000$ χ^2 - test, and $\chi = .703$ we can say there is a strong correlation between the experimental and control groups and posture. This means that at the final measurement, the experimental group students came closer to the control group according to the characteristics of the type posture. It can be noticed that the value of the Fischer distribution $F = 494$ 186, for two levels (E - K) indicates the existence of significant differences between groups for posture variable with concluding reliability of $p = .000$. This means that, according to the results of the MANOVA analysis, there is a significant difference between the two groups in the observed area and the hypothesis H, which

states: "The differences between examinees in the initial and final measurement regarding the posture are statistically significant" can be accepted."

The significance of differences between groups of examinees (E - K) in relation to the assessment of posture on the initial and final measurement is shown in Table 5.

Table 5

Groups	χ	R	F	p	Discrimination coefficient
Posture - initial measurement	.690	.954	2100.734	.000	10.172
Posture - final measurement	.338	.359	30.848	.000	.220

According to the value of the Fischer distribution (F) with high concluding reliability ($p < .1$ for observed characteristics) the hypothesis H1 can be accepted, which means that there is a significant difference between these two groups of examinees in relation to posture at initial measurement (.000) and type of posture at the final measurement (.000). We can say that between some parameters of body posture in both groups, there are statistically significant differences, and clearly defined boundary.

We see that the values of discrimination coefficients for this variable (posture) are very high, which means that they make the most distinctive difference of groups of examinees in the initial (10,172) and final measurement (.220). 112 examinees have the defined characteristics of the *experimental group* at the initial measurement. This indicates that the homogeneity of the group is high 100 %. 95 out of 100 examinees have the defined characteristics of the control group at the initial measurement. The homogeneity of the group of 95.0 % is high. A small number of examinees of the group (5) show characteristics of another group. 107 out of 112 examinees have the defined characteristics of the experimental group at the final measurement. The homogeneity of the group of 95.5 % is high, since five examinees show characteristics of another group. 100 out of 100 examinees have the defined characteristics of the control group at the final measurement. This data indicates that the homogeneity of 100.0 % is high, because all participants have the same characteristics. (See Table 6).

Table 6. Homogeneity of groups in the period between the initial and final measurements

Groups-level	m/n	%
Experimental group (I)	111/112	99,11
Control group (I)	95/100	95,00
Experimental group (F)	107/112	95,54
Control group (F)	100/100	100,00

Legend: (I)-initial measurement
(F)-final measurement

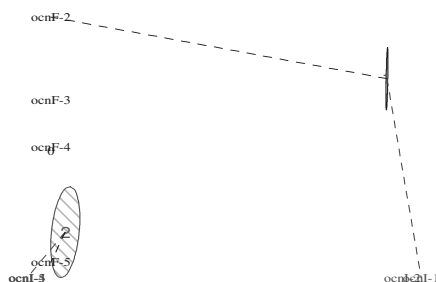
Based on these results, we can conclude that the significant differences between the initial and final measurements are noticed in the experimental group in assessment of posture of pupils. Based on the results of the pupils of both groups at the final measurement, we get a whole new picture of their posture (see Table no. 7).

Table 7 Characteristics of groups (E-K) at the initial and final measurement

	Discr. Coeff.	Exper.	Contr.
Posture-initial measurement	10.172	very bad posture*, bad posture*	good posture*, very good posture*, excellent posture*
Posture – final measurement	.220	bad posture*, good posture*	excellent posture*, good posture

Students in the experimental group at the initial measurement had the following types of posture: * very bad posture, bad posture *, while the final measurement showed the following types of posture: bad posture*, *good posture, very good posture. This means that there are significant differences in the assessment of posture on the initial and final measurement in the experimental group of pupils. The results of this study are consistent with data obtained in Ulić's master thesis, (1983, 96) "The possibility of eliminating poor posture by means of physical education", where also statistically significant differences between the results of the experimental and control group were defined, in favour of the experimental. Also, in general, we can say that the pupils in the control group at the initial measurement had the following type of posture: Good posture*, very good posture*, good posture*, and at the final measurement: excellent posture*. The control group was involved in the implementation of the regular physical education program. It can be seen that even in this group of students there was an improvement in posture, but to a lesser extent. This fact proves that movement, as a primary means of physical education, is the basis of preventive measures - especially for students of school age.

Ellipses show the relationship and the characteristics of each of the two groups (experimental (1) and control (2)), compared to the two most discriminating features of type posture: at the initial (I) and final measurement (F).



Graph 1 Location and characteristics of the groups at the initial and final measurement

Legend: Experimental (1) control (2); very bad posture (I-1), bad posture (I-2), good posture (I-3), very good posture (I-4), excellent posture (I-5), good posture (F-2), good posture (F-3); very good posture (F-4), excellent posture (F-5).

The horizontal axis represents the type of posture at the initial measurement (I) and has a five-level assessment scale, and the vertical axis represents the type of posture of the examinees at the final measurement (F) and a four-level assessment scale.

After examining the graph 1, it can be noticed that *good posture* is most represented in control group (2), whereas *very bad posture* is most represented in experimental group (1) regarding the posture type axis in initial measurement. *Excellent posture* is most represented in control group (2), whereas *bad posture* is most represented in experimental group regarding body posture axis in final measurement.

Another indication of similarity or difference is obtained by calculating the Mahalanobis distance between the groups of examinees. Results from Table 8 indicate that the minimum distance between the groups is as follows: experimental in final measurement and experimental in initial (6.60), and maximum distance is between control group in initial and experimental in initial measurement (6.74). The differences indicate that the experimental group made more progress regarding correcting improper posture, compared to students in the control group. We cannot say that the control group did not progress in this regard, but this information is significant to a lesser extent.

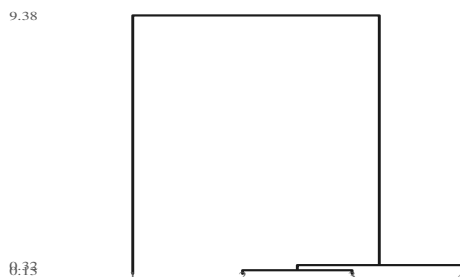
Table 8 Distance (Mahalanobis) between the groups of examinees in relation to the assessment of posture in the initial and final measurement

Groups	exp.in.	contr. in	exper. fin	contr. fin.
Experimental(I)	.00	6.74	6.60	6.96
Control(I)	6.74	.00	.13	.23
Experimental (F)	6.60	.13	.00	.36
Control (F)	6.96	.23	.36	.00

Legend: (I)-initial measurement
(F)-final measurement

The fact that the examinees in experimental group in the final measurement by all parameters, i.e. type of posture, showed positive changes, can be interpreted as follows: it is assumed that the preventive and corrective exercises influenced on correcting improper posture of primary school pupils.

It can be said that the examinees in the experimental group significantly improved in the formation of proper posture, than those of the control group. We cannot say that the control group did not progress in this regard, but that information was not show statistically significant. Based on the distance it can be seen that there is greater difference between the initial and final measurements in the experimental group, while the difference in the control group is much smaller. This means that the body posture of the experimental group improved more than in the control, or that the experimental treatment had a greater effect than the control treatment. Grouping by proximity is shown in the following dendrogram:



Graph 2 Grouping by proximity

Analysis of assessment of posture of examinees in the initial and final measurements by age

The assessment of posture in initial and final measurement by grade (age) will be analyzed on the sample of 112 students (I-II (21), III-IV (28), V-VI (36), VII-VIII (27)), in accordance with previously established research design.

The variable age of students is operationalized through age and class the examinees are attending. Their structure according to the age is shown in Table 9.

Table 9 Age-grade of students by levels

Level	Age	N	%
I	7-9	21	18.74
II	9-11	28	24.99
III	11-13	36	32.14
IV	13-15	27	24.11

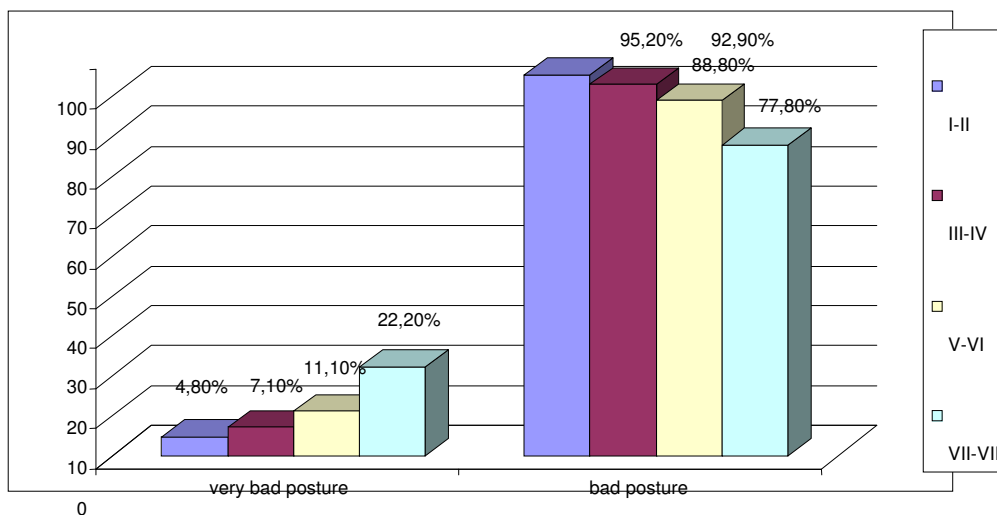
We classified all examinees who attend first and second grade of primary school (21) in level I, a level II students who attend third and fourth grade (28) are classified in level II. Students who attend the fifth and sixth grade (36) of primary school are classified in level III, and examinees who attend seventh and eighth grade (27) are classified in level IV. We will point out significant differences between and within the levels.

Table 10 provides an overview of the presence of the type of body posture in initial measurement. If we analyze the results in the table below, we can see that very *bad posture* is most represented among the pupils of VII and VIII grades (22.22 %), which is significantly higher than the prevalence among students of I and II grades ($p = 4.76 \% \cdot 0.096$). *Bad posture* is more common in pupils of I and II grades (95.24 %), which is significantly higher than the prevalence among the pupils of VII and VIII grades ($77.78 \% p = .096$).

Table 10 Overview of presence of the posture in initial measurement

CLASS	VERY BAD POSTURE		BAD POSTURE	
	N	%	N	%
I-II	1.	4.8	20.	95.2*
III-IV	2.	7.1	26.	92.9
V-VI	4.	11.1	32.	88.9
VII-VIII	6.	22.2*	21.	77.8

According to these results it is possible to extract features of each class in relation to the type of posture in initial measurement. It can be concluded that the feature *bad posture* is more prominent with pupils of I and II grade, whereas *bad posture* feature is more prominent with pupils of III and IV grade. *Very bad posture* is more prominent with pupils of fifth and sixth grades, whereas *very bad posture** is more prominent with pupils of VII and VIII grades. Due to $p\text{-value} = .214$, it can be said that χ^2 –test did not show correlation between the grade the pupils attend and the type of posture in initial measurement.



Graph 3 Overview of presence of the posture in initial measurement

Table 11 Overview of presence of the posture in final measurement

CLASS	BAD POSTURE		GOOD POSTURE		VERY GOOD POSTURE		EXCELLENT POSTURE	
	H	%	H	%	H	%	H	%
I-II	0.	.0	2.	9,5	19.	90,5*	0.	.0
III-IV	0.	.0	2.	7,1	24.	85,7"	2.	7,1
V-VI	1.	2,8	7.	19,4	26.	72,2	2.	5,6
VII-VIII	4.	14,8*	16.	59,3*	7.	25,9	0.	.0

Inspection of the Table 11 shows that *bad posture* is more prominent with pupils of VII and VIII grades (14,81%) compared to the pupils of V and VI (2.78 % $p = .085$), I and II (.00 % $p =$

.072) and III and IV grades (.00 % $p = .039$). Good posture is most represented among pupils of VII and VIII grades (59.26 %), followed by students of V and VI grades (19.44% $p = .002$), and II grade (9.52 % $p = .001$), III and IV grade (7.14 % $p = .000$). Very good posture is most prominent with pupils of I and II grades (90.48 %), which is significantly higher than its prominence with the pupils of in seventh and eighth grades (25.93 % $p = .000$). Excellent posture is most frequent with pupils of III and IV grades (7.14 %).

Based on these results it is possible to extract the characteristics of each group (grade) in relation to the type of posture in the final measurement. Very good posture* is more frequent with the pupils of I and II grades. Excellent posture, very good posture" are prominent with pupils of III and IV grades. Good posture and excellent posture are frequent with pupils of V and VI grades. Bad posture*, good posture* are frequent with pupils of VII and VIII grades. It can be concluded that there is a moderate correlation between the grade and posture in final measurement, with the reliability of $p = .000$ of χ^2 -test, with reliability interval (.423; .616) which does not contain zero.

Table 12 The significance of differences between groups in relation to the type of posture in the initial and final measurement

analysis	H	F	p
MANOVA	2	10.584	.000
Discriminant	2	11.900	.000

Multivariate analysis of variance indicates a significant difference between groups in the period between the initial and final measurements. As $p = .000$, the hypothesis $H_{2,1}$, which reads: " Posture is subjected to age variations and there are differences in different age groups" can be accepted. Therefore, the discriminant analysis shows that there is a significant difference and clearly defined boundary between groups (grades) in the initial and final measurement regarding the posture.

Table 13 The significance of differences between groups in the period between the initial and final measurement

Groups	χ	R	F	p
Type of posture (I)	.196	.200	1.513	.215
Type of posture (F)	.519	.592	19.598	.000

Based on the fact that $p < .1$ it can be stated that there is a significant difference between the four groups in the type of posture in the final measurement (.000).

Table 14 Discrimination coefficient between the groups in the period between initial and final measurements

Groups	DISCRIMINATION COEFFICIENT
Type of posture at the final measurement	.613
Type of posture at the initial measurement	.141

The coefficient of discrimination informs us that the greatest contribution to discrimination between groups in assessing the posture at the final measuring is .613, whereas it is .141 in the initial measurement. With very high reliability, we can conclude that there is clearly defined boundary between the four age groups of examinees regarding given characteristics (type of posture). As $p = .000$ it is possible to determine the characteristics of the age groups (grades) in relation to the assessment of posture in the initial and final measurements.

Table 15 Characteristics of group (age) in the period between the initial and final measurements

groups	Discr. coeff.	Class I –II	Class III-IV	Class V-VI	Class VII-VIII
Type of posture (F)	.613	very good posture*	excellent posture, very good posture"	good posture, excellent posture	bad posture*, good posture*
Type of posture (I)	.141	bad posture*	bad posture	very bad posture	very bad posture*

The results show that the differences in posture between the four groups of examinees divided according to grade can be observed. It can be concluded that very bad posture is noticed with pupils of senior grades (V, VI, VII, VIII) at the initial measurement. Since the analysis of the data showed that improper posture increases with age and coincides with period of puberty - it is assumed that this is one of the causes of improper posture. Data in Table 16 indicate that the discriminant procedure showed minimum distance between the pupils of the following grades: VII and VIII, and I and II (.00), and maximum distance between the pupils of VII, VIII and V,VI grades (1.63).

Table 16 Distance (Mahalanobis) between groups in the period between the initial and final measurements

Class	I-II	III-IV	V-VI	VII-VIII
I-II	.00	.32	.45	.00
III-IV	.19	.00	.45	1.63
V-VI	.32	.45	.00	1.63
VII-VIII	.00	.45	1.63	.00

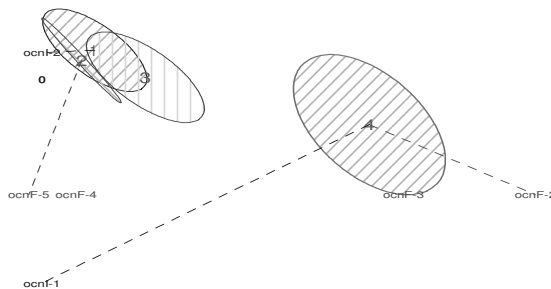
Based on the results obtained from research on a selected sample, we believe that there is a correlation between some indicators of improper posture and age. It is confirmed with the results of other researchers. Research results by N. Mijailović and M. Zečević (2006), indicate that the bad posture increases with age. Z. Kosinac (2002) found a high correlation between improper posture and students in the period of puberty according to the results of his research. The author believes that the correlation between growth and progression of improper posture is usually the starting point in describing the origin and development of improper posture. At the age between 5 and 10, when growth is slower, improper posture is less frequent, but at the beginning of the puberty can expect a deterioration in the current improper posture, as well as the detection of new cases, can be expected. Therefore, the author of this paper emphasizes that improper posture can be avoided or mitigated by active exercise program.

Table 17 The homogeneity of the groups in the period between the initial and final measurements

GRADE	M/N	%
I-II	19/21	90,48
III-IV	26/28	92,86
V-VI	31/36	86,11
VII-VIII	20/27	74,07

Nineteen (19) out of twenty-one (21) children have the characteristics of the first group (I and II), defined on the basis of the previous analysis. The homogeneity of the group of 90.5 % is high. This means that a small number of examinees (2) have other characteristics and not the characteristics of the group. Twenty-six (26) of twenty-eight (28) children have the characteristics of second group (III and IV grade). The homogeneity of the group of 92.9 % is high. A small number of examinees (2) have other characteristics. Thirty-one (31) of thirty- six (36) children have characteristics of the third group V and VI grade). The homogeneity of the group of 86.1 % is high, since five children have other characteristics. Twenty (20) of twenty-seven (27) children have the characteristics of the fourth group (VII and VIII grade). The homogeneity of the group of 74.1 % is high. This means that seven children have other characteristics.

Ellipses (grades which examinees attend) in the Graph 4 show the relationship and characteristics of groups ((1) class I- II, (2) class III -IV, (3) class V- VI, (4) Class VII- VIII), regarding two most discriminating characteristics of posture: in final (F) and initial (I) measurements.



Graph 4 Differences between the groups (age) in posture in the period between the initial and final measurements

Legend: Grade I- II (1) grade III -IV (2) grade V- VI (3) grade VII-VIII (4), bad posture (F- 2), good posture (F -3); very good posture (F- 4), excellent grip (F- 5), very bad attitude (I- 1), bad posture (I - 2). Horizontal axis shows the type of posture at the final measurement (F) and has a four-level assessment scale and vertical axis shows the type of posture in initial measurement (I) and has a two-level assessment scale.

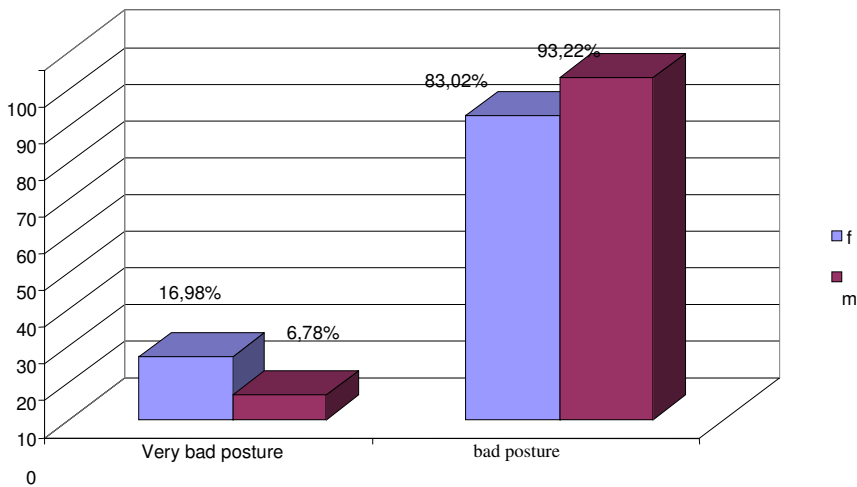
After examining Graph 4, it can be seen that *excellent posture* is most frequent in second subsample (III and IV grades) in relation to the axis that represents posture in final measurement, whereas *bad posture* is most frequent in the fourth subsample (VII and VIII grades). *Very bad posture* is most frequent in the fourth subsample (VII and VIII grades), whereas *bad posture* is most frequent in I and II grades (1) in relation to the axis that represents posture in initial measurement.

The analysis of assessment of posture of examinees in initial and final measurements by gender

Among the factors that are cited in references gender is usually mentioned as important determinants of (in) correct posture. The variable posture of pupils will be analyzed in initial and final measurements by gender.

Division of examinees by gender is shown in Table 8

Gender	N	%
Female	59	52,68
Male	53	47,32
N= 112		



Graph 5 Pupils' posture at the initial measurement

Table 19 Numeric (n) and percentage (%) representativeness of the posture of pupils in the initial measurement by gender

Groups	very bad posture		bad posture	
	H	%	H	%
Male	9.	17,0*	44.	83,0
Female	4.	6,8	55.	93,2*

Very bad posture is more frequent with boys (16.98 %) than girls (6.78 % $p = .095$). It can be noted that *bad posture* is more frequent with girls (93, 22%) than with boys 83, 02% $p=.095$). Greatest differences between the genders in relation to the type of posture are observed in *very poor posture** for boys, and in *bad posture** for girls. Based on these results it is possible to extract the characteristics of each group by gender in relation to the type of posture in initial measurement. It is observed that *very bad posture** characteristic is more frequent with boys, whereas *bad posture**, *very bad posture* features are more frequent with girls. It can be said that there is a correlation between the groups (gender) in relation to the type of posture, but with an increased conclusion risk since $p = .092$.

Table 20 Numeric (n) and percentage (%) representativity of posture in initial measurement by gender

Groups	Bad posture		Good posture		Very good posture		Excellent posture	
	H	%	H	%	H	%	H	%
Male	5.	9,4*	19.	35,8*	28.	52,8	1.	1,9
Female	0.	.0	8.	13,6	48.	81,4*	3.	5,1

At the final measurement the assessment of posture in relation to gender is as follows: *bad posture* is more represented with boys (9, 43%) than with girls (.00 $p=.017$). *Good posture* is more represented with boys (35,85%) than with girls (13,56% $p=.007$). *Very good posture* is more represented with girls (81,36%) than with boys (52,83% $p=.002$). *Excellent posture* is more frequent with girls (5,08%). Since $p = .001$ χ^2 - test, and $\chi=.348$, it can be concluded that there is low correlation between gender and type of posture in the final measurement. This means that boys have worse, and girls have better posture.

Table 21 The significance of differences between groups (gender) in relation to the assessment of posture in the initial and final measurements

Analysis	H	F	P
MANOVA	2	9.452	.000
Discriminant	2	9.771	.000

MANOVA procedure confirms that there are significant differences ($F = 9.452$, $p = 0.000$) in the posture of students regarding gender in the initial and final measurements. Therefore, the hypothesis $H_{2,2}$ which reads: "Posture is subjected to gender variations and there are significant differences in this characteristic between participants of both genders" can be accepted. Univariate analysis of variance has also been shown significant differences ($p = .000$) in the posture of students regarding the gender in the initial and final measurements.

Table 22 The significance of differences between groups (gender) in relation to the assessment of posture in the initial and final measurements

Groups	χ	R	F	p
F- posture at the final measurement	.157	.159	2.828	.095
I- posture at the initial measurement	.348	.372	17.465	.000

The value of Fischer distribution is $F = 2.828$ and $F = 17.465$, and reliability (p) ranging from .000 to .095 indicate that there is a significant difference between groups (gender) in the initial and final measurements.

Table 23 Discrimination coefficient between groups (gender) in relation to the assessment of posture in the initial and final measurements

Groups	Discrimination coefficient
F	.155
I	.021

The coefficient of discrimination suggests that the greatest discrimination is expressed in the assessment of posture regarding the gender in final measurement (.155) and the lowest at the initial measurement (.021). With very high reliability ($p = .000$), we can say that there is clearly defined boundary between students regarding the gender, and it is possible to determine their characteristics in relation to the type of posture in the initial and final measurements.

Table 24 Characteristics of groups (gender) in the period between the initial and final measurements

Groups	Discr.coeff.	male	female
F	.155	bad posture*, good posture*	very good posture*, excellent posture
I	.021	very bad posture*	bad posture*, very bad posture

Based on assessment of posture in the initial and final measurements, it can be said that:

- Boys have the following types of posture in final measurement: *bad posture**, *good posture**, *very good posture*, whereas they showed following characteristics in initial measurement: *very bad posture**, *bad posture*.
- Girls have the following types of posture in final measurement: ** very good posture**, *excellent posture*, *bad posture*, whereas they showed following characteristics in initial measurement: *bad posture**, *very bad posture*. It is observed that the treatment had a greater impact on girls, and it is assumed that their diligence and persistence, among other things, contributed to this fact.

Table 25 Homogeneity of groups (gender) in the period between the initial and final measurements

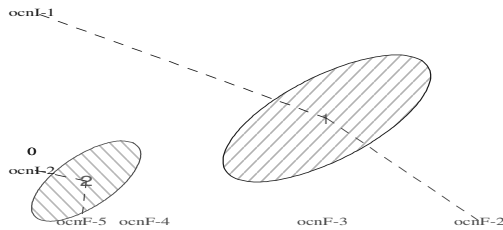
Groups	M/H	%
male	24/53	45,28
female	51/59	86,44

24 out of 53 examinees have the characteristics of the first group (boys), defined on the basis of previous analysis. The homogeneity of the group of 45.3% is small, i.e. 45% has not progressed. This means that a larger number (29) has other characteristics. 51 of 59 examinees have the characteristics of the second group (girls), defined on the basis of previous analysis. The homogeneity of the group of 86.4% is high, i.e. 86.4% of girls have improved their posture. This means that a small number (8) has other characteristics and the characteristics of their group. The distance between the groups in the period between the initial and final measurements indicates that the distance between the genders of the pupils (boys and girls) is moderate (Table 26).

Table 26 Distance (Mahalanobis) between groups in the period between the initial and final measurements

Groups	Male	Female
Male	.00	.84
Female	.84	.00

Ellipses (gender of examinees) in the Graph 6 show the relationship and characteristics of groups by gender (boys (1) girls (2)) regarding two most discriminating characteristics of posture: posture in final (F) and initial (I) measurements.



Graph 6 Differences between groups (gender) in posture in the period between initial and final measurements

Legend: boys (1); girls (2); bad posture (F-2); good posture (F-3); very good posture (F-4); excellent posture (F-5); very bad posture (I-1); bad posture (I-2)

X-axis (horizontal axis) represents the posture at the final measurement (F) and has a four-level assessment scale, and the ordinate (vertical axis) represents posture in initial measurement (I) and has a two-level assessment scale. After examining the graph 6, it can be seen that in relation to the axis which represents the posture at the final measurement, *excellent posture* is most frequent in the subsample - girls (2), whereas *bad posture* is most frequent with subsample-boys (1). *Bad posture* is most frequent with subsample-girls (2), whereas *very bad posture* is most frequent with the subsample-boys (1) in relation to the axis that represents posture in the initial measurement.

The analysis of students' attitude towards physical education regarding the posture

Table 27 Numerical (n) и percentage (%) occurrences of parameters : PEB_PE1 to PEB_PE10 regarding body position of pupils

parameters (features)	posture	abs disagree		most disagree		part agree		most agree		abs agree	
		f	%	f	%	f	%	f	%	f	%
PE1	Very bad posture	0.	.0	4.	30,8*	5.	38,5	4.	30,8	0.	.0
	Bad posture	0.	.0	1.	1,0	30.	30,3	48.	48,5	20.	20,2*
PE2	Very bad posture	0.	.0	1.	7,7*	6.	46,2	6.	46,2	0.	.0
	Bad posture	0.	.0	1.	1,0	27.	27,3	44.	44,4	27.	27,3*
PE3	Very bad posture	0.	.0	1.	7,7	3.	23,1	8.	61,5	1.	7,7
	Bad posture	0.	.0	1.	1,0	23.	23,2	47.	47,5	28.	28,3
PE4	Very bad posture	0.	.0	0.	.0	3.	23,1	7.	53,8	3.	23,1
	Bad posture	0.	.0	0.	.0	20.	20,2	41.	41,4	38.	38,4
PE5	Very bad posture	0.	.0	0.	.0	8.	61,5	4.	30,8*	1.	7,7
	Bad posture	5.	5,1	31.	31,3*	47.	47,5	13.	13,1	3.	3,0
PE6	Very bad posture	2.	15,4*	2.	15,4	4.	30,8	5.	38,5	0.	.0
	Bad posture	2.	2,0	19.	19,2	22.	22,2	46.	46,5	10.	10,1
PE7	Very bad	0.	.0	3.	23,1*	5.	38,5	5.	38,5	0.	.0

	postur e										
	Bad postur e	0.	.0	8.	8,1	50.	50,5	37.	37,4	4.	4,0
PE8	Very bad postur e	1.	7.7*	1.	7,7	5.	38,5	4.	30,8	2.	15,4
	Bad postur e	0.	.0	4.	4,0	21.	21,2	44.	44,4	30.	30,3
PE9	Very bad postur e	0.	.0	2.	15,4	6.	46,2	3.	23,1	2.	15,4
	Bad postur e	0.	.0	12.	12,1	20.	20,2	40.	40,4	27.	27,3
PE10	Very bad postur e	0.	.0	1.	7,7	6.	46,2*	5.	38,5	1.	7,7
	Bad postur e	0.	.0	6.	6,1	18.	18,2	39.	39,4	36.	36,4*

Legend:

PE1- Physical education is not adjusted to the individual

PE2- Physical education teacher encourages physical exercise by his/her example

PE3- Physical education classes are well organized

PE4- Physical education develops a sense of the beauty of the body

PE5- We learn why it is important to exercise at physical education classes

PE6- Physical education contributes to building a positive character

PE7- Physical education, exercise and play help me in learning

PE8- Discipline should be the same as at other classes

PE9- The knowledge acquired at Physical Education classes is useful for my future life

PE10- Physical education, exercise and play are very enjoyable.

72 students (64.29%) believe that Physical Education is not adjusted to the individual (PE1). It is observed that 30.8% of students who have very bad posture believe that physical education is not adjusted to the individual, while another group of students in a smaller percentage (20.2%) have a positive opinion on a given parameter. As $p = .000$ χ^2 - test, and $\chi = .437$ we can say that there is a moderate correlation between body posture and the assessment of given characteristics. V. Findak (1984,343) came to the following conclusion: in order to determine the effects of physical exercise, each student should be systematically monitored and checked and program correction should be done on the basis of the results, according to the obtained parameters. In fact, without permanent notification of the changes that are happening under the influence of physical exercise it is impossible to manage the physical exercise, adjust the process to individual characteristics and needs of students, and expect their correction. This enables every

pupil to monitor the changes and his own development and make sure about the need and usefulness of physical exercise.

One of the important components of the habits and behaviours in relation to the health of children and young people is the importance of physical activity (PE5). This is extremely important concerning the impact that the habits acquired in the children's age and adolescence can have on behaviour in adulthood. Inspection of the Table 27 shows that students who have bad posture consider to be taught about the importance of exercise in physical education classes at school (30.8%), while the second group mostly disagrees with that (31.3%). As $p = .083$ χ^2 – test ($\chi = .262$), it can be said that there is correlation with an increased risk of conclusion between the groups in the assessment of a given parameter. Having considered overall sample, we can say that 21 pupils (18.75%) consider to be taught why exercise is important in physical education classes. 32.14% of them are of the opinion that they were not given information about the importance of exercise in physical education classes.

When comparing students' opinions in relation to the type of posture that was defined at the initial measurement, it can be seen that both groups of students (bad posture 27, 3% and very bad posture 46, 2%) agree that the teacher encourages physical exercise by his/her example (PE2). Only in one case, a student believes the opposite (7.7%). Most of students, 77 of them (68.75%) believe that teacher encourages students to be physically active by his/her example. 33 pupils (29.46%) partially agree, a small number of them, 2 pupils (1.79%) students think the opposite. Since $p = .050$ χ^2 - test, and $\chi = .255$, it can be said that there is low correlation between the groups in the assessment of a given characteristic.

Table 28 Characteristics of groups according to the most discriminating features of PE

Characteristics	Discr. Coeff.	Very bad posture	Bad posture
PE 1	.191	most.disagree*, part.agree, most.agree	most..agree, abs.agree*, most.disagree
PE5	.025	part.agree, most.agree*, abs.agree	abs.disagree, most.disagree*, part.agree
PE 2	.010	most.disagree*, part.agree, most.agree	abs.agree*, most.disagree, part.agree

Most students, 84 of them (74.99%) believe that physical education classes are well organized (PE3). 26 of them (23.21%) partially agree; only two of them (1.79%) believe that it is not well organized. If we compare students' answers regarding the type of posture, it can be said that χ^2 – test did not show correlation between the groups in assessing the feature PE3 ($p = .157$).

Of the total sample (112), 33.03% consider that physical education, exercise and play are very enjoyable (PE10). 21.43% partially agree, a smaller percentage of students mostly disagree with a given statement (6.25%). As $p = .069$ we can say that there is a correlation with an increased risk of conclusion between the groups in the assessment of this feature. Students who have very bad posture in most cases, 46.2% partially agree that

their physical activity provides pleasure, while students who have bad posture absolutely agree (36.4%) that their physical activity provides pleasure.

Relatively high percentage of students (64.29%) is of the opinion that the physical education classes are useful (PE9), and 23.21% of the students is of the opinion that physical education classes are partly useful for students. 12.5% of the students has opinion about the usefulness of physical education. Comparison of answers related to the type of posture by χ^2 -test did not show correlation ($p = .175$). Based on the results it is possible to assume that the students who in physical education classes realized certain values of physical education for the modern man, which should contribute to an increase in their interests and opinion about the usefulness of physical education.

Most students (71.43%) consider that discipline in Physical education classes should be the same as in other classes. Only one student, who has poor posture, considers there is no need for that. Positive attitude of students towards discipline in physical education classes does not testify about the attitude towards the subject, but also about the assumption that only in such circumstances the student feels safe and satisfied. This data indicates the severity of understanding of the subject and content of the work in class. This means that students in such circumstances are allowed to freely perform physical activity. Analysis of the data within the groups by the given characteristics of $p = .029$ χ^2 - test, and $\chi = .297$, show that there is a low correlation. χ^2 - test and Physical appearance becomes the foundation on which identity is built, and most students, 89 of them (79.46%) believe that physical education develops sense of the beauty of the body (PE4). 23 pupils (20.53%) partially agree with this statement. Analyzing the differences within the groups and having considered that $p = .550$, we can say χ^2 -test did not show correlation between the groups in the assessment of PE4 feature.

Inspection of the Table 27, shows that students who have bad posture generally find that physical education contributes to building positive character (46.5%), while 15.4% of them disagree or partially agree (30.8%) with this statement. Having considered that $p = .104$, it can be said that χ^2 -test did not show correlation between the groups (type of posture) and the assessment of a given parameter. 61 student (54.46%) consider physical education to contribute to building a positive character (PE6), 26 of them (23.21%) partially agree, and 25 of them (22, 32%) absolutely disagree.

Having considered the students' answers about the posture, it is evident that physical activity generally helps students who have poor posture (37.5%) and bad posture (30.8%) in learning. Students who have bad posture (23.10%) think differently, which is significantly higher in comparison to students who have bad posture (8.1%). Since $p = .321$, it can be said that χ^2 -test did not show correlation between the groups in the assessment of PE7 characteristic. Taking both groups into account, it can be concluded that 41.07% of students believe that their physical education, exercise and game help in learning. 55 of them (49.11%) partially agree with the given parameter, while 11 of them (9.82%) do not consider physical activity to be beneficial for their learning.

Table 29 The significance of differences between groups of students for PE characteristic

Characteristics	χ	P	F	p
PE 1	.437	.486	33.380	.000
PE 2	.255	.264	8.103	.005
PE 3	.211	.216	5.277	.024
PE 4	.103	.103	1.166	.283
PE 5	.262	.271	8.582	.004
PE 6	.253	.262	7.942	.006
PE 7	.174	.177	3.483	.065
PE 8	.297	.311	11.559	.001
PE 9	.206	.210	5.002	.027
PE10	.244	.252	7.317	.008

The data analyzed in Table 29, indicate that the largest contribution to the discrimination between groups regarding the posture is observed at the following characteristics: PE1 (.191), PE5 (.025), PE2 (.010), PE3 (.005), PE10 (.001), PE9 (.001), PE8 (.001), PE4 (.000), PE6 (.000), PE7 (.000).

Table 30 Homogeneity of groups in the space between PE characteristics

Groups	M/H	%
Very bad posture	4/13	30.77
Bad posture	98/99	98.99

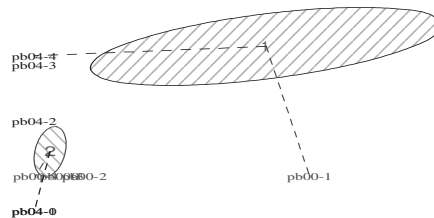
Four of the thirteen students have characteristics of a group of students who have poor posture, defined on the basis of the previous analysis. The homogeneity of the group of 30.8% is small, which means that 9 students have other characteristics. 98 of 99 children have Characteristics of the group of students who have poor posture, defined on the basis of previous analyses. The homogeneity of the group of 99.0% is high, because there is only one pupil with other characteristics.

Table 31 The significance of difference between the groups in the space between PE characteristics

Analysis	H	Φ	p
MANOVA	10	3.480	.001
DISCRIMINANT	10	3.445	.001

Fischer distribution value is $F = 3.480$ and $f = 3.445$, and the reliability (p) in the range of .000 to .001 indicate that there are differences between the groups in the space between PE characteristics. With high reliability ($p < .1$) we can conclude that there is a difference between the groups of students regarding the posture in the following features: PE1 (.000), PE2 (.005), PE3 (.024), PE5 (.004), PE6 (.006), PE7 (.065), PE8 (.001), PE9 (.027), PE10 (.008). There was no significant difference for the feature PE4 (.283). Since $p = .001$ the hypothesis H_3 , which states: "There is a significant difference between the two subsamples for the characteristic students' attitude to physical education classes" can be accepted. Values of Fischer distribution obtained by a multivariate analysis of variance (MANOVA) and discriminant analysis show the difference.

Ellipses (groups of students: very bad posture (1), bad posture (2)) in the Graph 7 show their attitude to three most discriminating features: PE1 (n600), PE5 (n604), PE2 (n601).



Graph 7 Differences between the groups in the space between the three most discriminating feature
 Legend: very bad posture (1); bad posture (2); most.disagree (pb00-1); part.agree (pb00-2); most.agree(pb00-3); abs.agree (pb00-4); abs.disagree(pb04-0); most.disagree (pb04-1); part.agree (pb04-2); most.agree (pb04-3); abs. agree(pb04-4)

X-axis (horizontal axis) represents variable PE1 (pb00) and it has a four-level scale, and the ordinate (vertical axis) represents variable PE5 (pb04) and has a five-level scale. After examining the graph 7, it can be seen that regarding characteristics of PE1, the subsample of students who have bad posture (2) have mostly chosen *abs.agree* modality, whereas the subsample of pupils who have very bad posture (1) have mostly chosen *most.disagree* modality. Having considered PE5 characteristics, it can be concluded that *abs.disagree* modality is dominant in the subsample 2, whereas *abs.agree* modality is dominant in the subsample 1.

Conclusions and educational implications

Based on a theoretical approach to the problem of research, performed research results and their interpretation and discussion, in accordance with the goals, objectives and hypotheses, it is possible to give a general conclusion of our empirical study that reads as follows: general hypothesis, covering the entire investigated area H: "Preventive and corrective exercises, affect the appearance of distinctive features between the initial and final measurements regarding the formation of proper posture of students" is accepted.

Physical activity is one of the important components of habits and behaviour that is related to the health of children and young people. This is extremely important considering the impact that the habits acquired in the children's age and adolescence can have on behaviour in adulthood. School, along with family, peers and mass media represents major point where habits in relation to physical activity are acquired. Special classes of physical education, incorporated into school curriculum and schedule can be crucial in the longer term impact of school on the correction of improper posture. It turned out that, in addition to the pedagogical and sociological significance, play has a preventive and corrective role. Properly selected and planned play can have positive influence on relief of structures which support and are responsible for upright posture

and posture in general. Play contains valuable therapeutic and corrective contents, and at the same time it motivates a child who has a bad posture for an active and conscious participation, and eliminates a sense of inferiority due to the negative physical self-concept of a child.

It should be taken into account that the humanist conception of physical educational area is based on meeting the essential and existential needs of each student. It is impossible to manage the physical exercise, adapt this process to individual characteristics and needs of students, and expect their correction without permanent notification of the changes that are happening under the influence of physical exercise. This enables each pupil to monitor the changes and his or her development and makes sure about the need and usefulness of physical exercise. Our commitment to pay special attention to the individualization process of teaching originates from this belief. One of the conditions for the individualization process of physical education is to establish a system for continuous monitoring of physical and functional abilities. This system of monitoring children's development, contributes to the establishment of a permanent access to physical development, physical and functional abilities; to program teaching process according to objective insight and to timely take appropriate measures to improve the planning and direction of physical education.

We can conclude that the complexity of educational work in general, and especially the specificity and complexity of work in a typical area of physical education necessitates a different approach to the student. This includes, in addition to cooperation with parents, who should be part of the development plan of each school, individualized approach, taking into account students' needs, interests and abilities in general. Therefore, it is necessary to plan physical education contents so that the student perceives the meaning, value, and feels pleasure in exercise and thus become motivated to exercise and develop their motor skills. Only then, improper posture would not occur. It is necessary to motivate students to actively participate in personal useful activities and patiently build positive attitudes toward exercise.

We believe that the results of this study can serve as a valid basis for setting new hypothesis that could, with greater precision, focus further researches oriented towards the same goal. Our research has opened new research problems - one of the most important is the students' motivation for physical activity. The problem of children's motivation for physical activity, could be solved in schools by incorporating the principles of modern physical vitality in physical and health education programs in which the emphasis would be on sports that everyone could play, since timely and adequate fulfilment of sports and recreational interests of young people leads to the acquisition of habits of physical activity (Kosinac, 2002, 200).

REFERENCES:

- Bjeršković, G. (2000), *(Ne)pravilno držanje tijela: roditelji-vaspitači, telesni razvoj, zdravlje, ljepota izgleda vašeg djeteta je u vašim rukama*, Srpsko Sarajevo: Fakultet fizičke kulture.

- Боранин, С. (1979), *Реедукација психомоторике и однос према физичком васпитању, корективној гимнастици и физиотерапији*, Београд: Наша нада.
- Говедарица, Т. (2000), *Општа реедукација психомоторике*, Београд: Институт за ментално здравље.
- Грандић Р. (2001), *Теорија физичког васпитања*, Нови Сад: Савез педагошких друштава Војводине.
- Грандић, Р., Шпајзер, Р. (1993), *Формирање правилног држања тела*, Нови Сад: Педагошка стварност, 1-2,16-22.
- Дедај М. (2011): *Значај физичког васпитања за здравље деце и младих - историјски преглед*, бр.2, Београд, Педагогија, стр.346-356.
- Јововић, В. (2000), *Корективна гимнастика*, Подгорица: Самостално ауторско издање.
- Карпов, С. А., Шлемин, А. М., и сар. (1969), *Правилно и лепо држање тела*, Београд: Партизан-Новинска издавачко-пропагандна установа.
- Kosinac, Z. (1997): *Igra i šport-prestižna metoda rada kod djece razvojne dobi nepravilna tjelesnog držanja*, Split, Školski vjesnik, 2, 157-162
- Kosinac, Z. (2002), *Kineziterapija sustava za kretanje*, Split: Udruga za šport i rekreaciju djece i mladeži grada Splita.
- Крсмановић, Б. (1999), *Теоријске основе и функције физичког васпитања у основној школи*, Београд, Настава и васпитање, 1-2, 24-41.
- Крсмановић, Б. (2000), *Теорија физичке културе*, Београд: Виша школа за спортске тренере.
- Мијаиловић Н., Зечевић, М. (2006), *The early detection of scoliosis in school children: gender and age differences at cross-sectional screening*, Medicus 7, 32-34.
- Улић, Д. (1983), *Мозгућност отклањања лошег држања тела средствима физичког васпитања*, Београд: ФФК - Магистарски рад,
- Улић, Д. (1997), *Основе кинезитерапије*, Нови Сад: Факултет физичке културе.
- Wolanski, N. (1975), *Telesni rast i razvoj s praćenjem držanja tela*, Beograd: Fakultet za fizičku kulturu.
- Живковић, Д. (2000), *Теорија и методика корективне гимнастике*, Ниш: СИА.

Biographical note

Marta Dedaj was born in 1973 in Novi Sad. She graduated from the Philosophical Faculty in Novi Sad in 1998 (Pedagogy Department). She has gained her professional experiences since 1998 working in the School for primary and secondary education "Bratstvo" in Becej as a professional associate – pedagogue. She has passed her licence exam and obtained the title school pedagogue. Apart from working as a school pedagogue, she also worked as a school principal assistant since the academic year of 2006/07. She enrolled master degree studies at the Philosophical Faculty in Novi Sad (general pedagogy) in academic 1999/2000 year. She obtained master degree in 01.02.2010. She worked as a school principal of the School for primary and secondary education "Bratstvo" in Becej in the

between 01.06.2011 and 08.07.2012. Since 09.07.2012 she has been a lecturer for the professional-scientific field Pedagogic group of subject at the Preschool Teacher Training College in Sremska Mitrovica. She teaches the following courses: family pedagogy, kindergarten curriculum development, inclusive education and family counselling. She is the member of the Committee for preschool teacher licences. In February 2013 she was certified as a Family psychotherapist. She defended her doctoral thesis in 15.04.2013 at Philosophical Faculty in Novi Sad and gained the academic title of *Doctor of pedagogical sciences*. Dr Marta Dedaj is an author of a number of scientific texts. She presented her papers at conferences and participated in professional gatherings in Serbia and abroad.