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EFFECTS OF PROGRAMMED EXERCISING TO MUSIC OF FEMALE PUPILS

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Abstract. *Former research has shown that present teaching curricula cannot provide the continuity of exercising and fulfillment of certain tasks in physical education teaching and that alterations are necessary. The following question arose as the consequence of the previous statement: Could aerobics be used in teaching physical education at primary schools, since it became a very popular form of exercising throughout the world, as well as in this country? The research was done on the sample of 95 female seventh grade pupils at primary school "Jovan Jovanović Zmaj" in Kanji`a. They were divided into three groups (two experimental groups and one control group). Especially programmed teaching of aerobic exercises to music according to "step" and "high-low" aerobics (which was the experimental factor) was conducted in experimental groups, while Physical Education Curriculum regulated by the Ministry of Education of Serbia was conducted in the control group. The effects of programmed exercise to music were followed in the following areas: the area of variables of morphological characteristics (seven variables); the area of functional abilities (three variables) and the area of motor abilities (sixteen variables).The results of the research showed that programmed exercising to music according to the models of "step" and "high-low" aerobics had increased the improvement of morphological characteristics, functional and motor abilities of the seventh grade primary school female pupils, in comparison to the pupils from the control group. The greatest improvement in both models of aerobic exercise was noticed in the maximal oxygen uptake and variables from the area of general coordination and coordination in rhythm. Gained results of the research indicate that aerobic exercising to music in physical education teaching can be applied in practice, in order to dosage exercises precisely and fulfil the aims and tasks of physical education.*

Key words: *physical education, morphological characteristics, functional abilities, motor abilities, "step" aerobics, "high-low" aerobics*

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1. INTRODUCTION

In its essence, education is a phenomenon that can be considered within various spheres of human knowledge. The core of education is represented by a human being, by his entity. A graduate and continuous alteration of an individual through education is realized also by goals of physical education. The role and importance of physical education have substantially altered because of global improvement of educational system including this country.

Today, physical education is not efficient enough to find solutions for achieving basic goals and tasks set to it or to satisfy students' interests and bents. Many believe (Saveljić, 1971; Reljić, 1979; Maksimović, 2000) that physical education "lags behind" contemporary social tendencies or students' needs.

The reason for such problems lies in the fact that within schools, problems are solved mainly in a classic and obsolete manner by following old-fashioned organizational forms or models of working and old technologies.

In their theoretical work dedicated to educational system, numerous pedagogues in physical culture (Višnjić, 1987; Kurelić, 1971; Matić, 1983), also treated problems of physical education the aim of which was to improve physical education curriculum based on a careful planning and conduct of classes, specific approaches and relationships with the students.

The interests raised by this subject lie in search for answers whether aerobics as a system of exercising, popular worldwide and in this country as well, could also be applied in physical education classes at primary schools in a form of exercising to music now practiced mainly on recreational level.

2. SUBJECT AND AIM OF THE RESEARCH

The basic educational tasks or tasks set to physical education imposed by the contemporary society cannot be fulfilled by using conventional educational steps and organizational models that call for innovations in teaching process.

The problem of dissatisfaction with the results of teaching physical education to students is some decades old.

3. RESEARCH HYPOTHESES

According to the subject, goal, the following hypotheses have been set:

H1 Programmed exercising to music will lead to improvement of morphological characteristics in seventh grade female students.

H2 Programmed exercising to music will lead to improvement of functional abilities in seventh grade female students.

H3 Programmed exercising to music will lead to improvement of motor abilities in seventh grade female students.

4. METHODS

4.1 Progress and procedures of the research

The experimental programme lasted for 8 weeks and was conducted within regular classes of physical education of seventh grade female students at primary school "Jovan Jovanovic Zmaj" in Kanjiza. The experimental programme was conducted three times a week in duration of one school class, in the school gym.

The students were divided into three groups. During the experimental programme, the first experimental group (E1) attended classes of programmed exercising according to the "step aerobics" model and the second experimental group (E2) according to the dance aerobics model (high-low). The control group (K) attended regular classes of physical education (teaching units of athletics and volleyball) based on the Physical Education Teaching Plan and Programme regulated by the Serbian Ministry of Education.

The total of conducted experimental programme consisted of 24 classes of aerobic exercising to music according to "step aerobics" model for the first experimental group (E1), 24 classes of aerobic exercising according to the "high-low" aerobics for the second experimental group (E2) and 24 classes of regular physical education for the control group (K).

4.2 Sample of examinees

Sample of examinees was represented by seventh grade female students at "Jovan Jovanović" primary school in Kanjiža (N=95) average age 13, 5, divided into:

E1 – first experimental group (N=32);

E2 – second experimental group (N=32), and

K – control group (N=31).

Before the beginning of experimental procedure all female students were subjected to a systematic medical examination by a general practitioner and a specialist – cardiologist.

Experiment included female students without any kind of chronic diseases (of cardiovascular or respiratory system), spinal cord or extremity deformities, or diseases which do not allow physical activities, who voluntarily participated in the experiment with their parents' accord and who were not involved in any sport activities nor any free time activities.

4.3 Sample of variables

After establishing the subject and research goals as the starting point and taking objective possibilities and living conditions into consideration, the variables of the identical morphological nature and with attributes of criterion variables were examined. A selection in measuring instruments was performed according to research results obtained by domestic and foreign researchers, as well as to standard procedures applied in such researches.

In order to present variables in a systematic manner, they could be divided into following groups:

Morphological characteristics: body height, body weight, abdomen size, upparm size, forearm size, thigh size, calf size.

Functional abilities: pulse frequency at standstill, pulse frequency under effort, maximum oxygen uptake.

Motor abilities

Power: standing long jump, standing triple jump, squat in 30 seconds, crunch in 30 seconds, chin-up resistance.

General coordination: "eight-shape" run with bending, side steps, agility in floor exercises.

Coordination in rhythm: non-rhythmic drumming, drumming with legs and arms, hops in rhythm.

Flexibility of movement: tapping with leg, tapping with hand, skipping.

Flexibility: forward bend from a box, flexibility with bar.

4.4 Programme of experimental treatment

Programme of experimental treatment is designed for each teaching unit of "step" and "high-low" aerobics adapted to a 45-minutes class of physical education. Each teaching unit was divided into introductory, main and conclusive part of the class. The main characteristics of exercising in the introductory part of the class, designed to prepare those muscle groups which are engaged the most in the main part of the class, are basic steps and simple movement structures, work with small amplitude movements, stretching exercises, moderate pace of working, exercises with simple coordination, cranial-caudal and reverse sequence of exercises. This phase lasts from 8-12 minutes where frontal form of work with students is applied and teacher's engagement is of a conductor type.

The main part of the aerobics class consists of movements directed to the development of cardiovascular and respiratory abilities, development of endurance, strengthening of muscles of lower extremities (musculature) and the uptake of large energy in students. These movements are performed in spot or by moving in various directions, in different tempo or rhythm. Music tempo is faster than in the introductory part of the class, and depending on the type of aerobic exercise, it can reach between 122-155 heartbeats per minute ("step" 122-130, "high-low" 140-155). In the main part of the class, the choreographies were applied which consist of movements of arms and legs (high or low elements) combined into one unity. Choreographies of "step" aerobics consisted of steps belonging to following groups: "basic steps", "lift steps", "lunge" and "tap steps", whereas "high-low" aerobics choreographies consisted of movements from groups: "step touch", "lift steps", "march", "jumping", "lift jump/hop", "step jump/hop", "non-impact aerobics" and "dance steps". This part of the aerobics class lasted between 15-20 minutes with students being constantly active. After the choreography had been conducted, in the main part of the class the exercises were performed for abdominal muscles strenghtening, back muscles, arm and shoulders muscles, abductor and aductor muscles and gluteal muscles strenghtening.

During the exprimental procedure, in conclusive part of the class, a »soft« method of stretching exercises, founded by Bob Anderson, was applied.

Stretching exercises are performed according to the following scheme: »easy stretch«-relaxing-»developmental stretch«. Music in this part of the class was obligatorily soothing and relaxing.

4.5 Statistic data processing

All data gathered by the research were processed following the procedures of descriptive and comparative statistics.

During numeric data processing, by the discriminative analysis of initial values, a need occurred to establish a progression index in order to eliminate damaging factor existing in a form of non-homogenous groups (E1, E2, K). Namely, a statistically considerable differences in average values occurred, mainly in the relations between experimental groups. Introduction of progression index represented an attempt to eliminate damaging factors existing in a form of non-homogenous groups.

Progression index is calculated as a quotient of difference between initial and final measurements and the results of initial measurement, that is, according to the formula:

$$\text{Index} = \frac{\text{Fin. measurement-Init. measurement}}{\text{Init. measurement}} \times 100\%$$

Taken from the field of comparative statistics, for the progression index the following were applied: discriminative statistical procedures, variance analysis according to the ANOVA-Repeated Measures model and during comparison of results and a specific T-test to establish the source of variability.

All data were processed in the IT-department at the Faculty of Sports and Physical Education in Belgrade, using Pentium III PC and SPSS application.

5. RESEARCH RESULTS

After the experimental treatment, in experimental groups, very significant and positive changes occurred in seventh grade female students. The measured changes can best be noticed by the progression index analysis.

Table 1 shows the average values (M) of progression index of morphological and functional abilities in experimental (E1, E2) and the control (K) group, and their result of total (F test) and partial variability (T test).

Table 1. Progression index of morphological characteristics and functional abilities in experimental (E1, E2) groups and the control (K) group.

Variables	M-E1	M-E2	M-K	F	p	T_{E1-E2}	T_{E1-K}	T_{E2-K}
Body height	1	0.4	0.4	9.8	0.0001*	3.9*	3.8*	0.3
Body weight	0.8	2.4	–1.7	25.8	0.0001*	2.8*	4.4*	7.1*
Abdomen size	1.1	1.1	–0.5	33.1	0.0001*	0.1	7.1*	7*
Forearm size	1.2	1.3	–0.4	18.2	0.0001*	0.2	5.1*	5.4*
Upparm size	0.3	0.4	0.5	2	0.1473	0.6	1.3	1.9
Thigh size	1	1.3	–0.9	41.3	0.0001*	1.3	7.2*	8.5*
Calf size	0.8	0.6	0.2	3.3	0.0412*	0.7	2.5*	1.8
$Fr_{stand.}$	9.3	6.4	2.5	18.7	0.0001*	2.6*	6.1*	3.5*
Fr_{effort}	3	0.6	0.7	8.2	0.0005*	3.6*	3.3*	0.2
VO_2max	11	11.2	–1.4	135	0.0001*	0.3	14.1*	14.4*

The results of the progression index (Table 1) show the improvement in each individual group under the influence of a specific programme (experimental and physical education teaching).

According to the progression index (Table 1, Graph 1) of variables within morphological characteristics and functional abilities in experimental groups, considerably greater improvement of functional abilities occurred in comparison to morphological characteristics.

Under the influence of aerobic exercising to music, the greatest improvement in seventh grade female students is noticed in maximum oxygen uptake (Inx_{E1} = 11%; Inx_{E2} = 11, 2%). Gained results show that various models of aerobic exercising, «step» and «high-low», influence the improvement of maximum oxygen uptake to a similar extent (for 0,2%). Comparison of physical education teaching and experimental programme and their influence on the maximum oxygen uptake lead to a conclusion that students from a control group achieved poorer results than students from experimental groups (Table 1, Graph 1), which means that aerobic exercising to music three times a week, in duration of one school class, improved the results of maximum oxygen uptake.

Gained research results stand within the framework of results obtained by other researchers as well. In researches such as Zagorc, & Bergoč (2000a), Clearly, Moffatt, & Knutzen (1984) it is stated that exercising which is performed for 20-60 minutes in the aerobic regime, 3-5 times a week, influences the improvement of cardiovascular endurance that is of cardiovascular system (Watterson,1984; Eickhoff, Thorland, & Ansorge,1983; Blyth, & Goslin,1985).

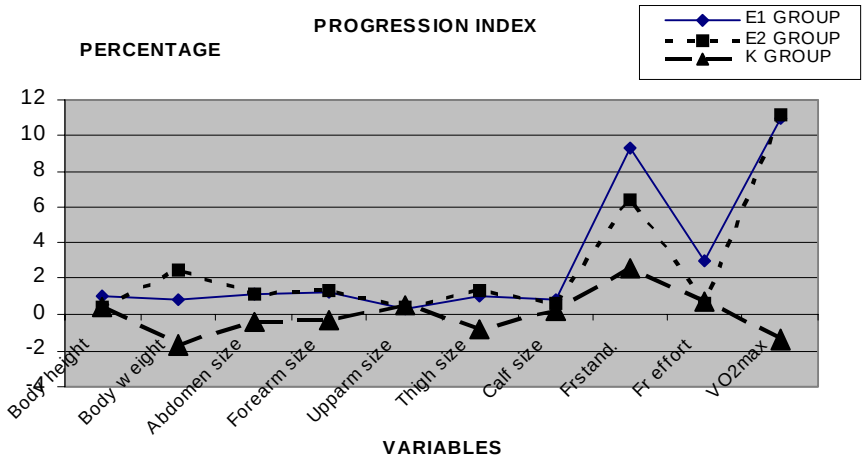
After the experimental procedure of aerobic exercising to music, changes were noticed in *body height* and *body weight* of seventh grade female students. The gained results show that the body height of examined students does not deviate from recognized and valid standards for the observed age group, although the accelerative events are evident, as well as effects of puberty.

A conclusion follows that the experimental procedure and physical education teaching both contribute to uninterrupted growth and development of seventh grade female students.

According to the progression index of circular body dimensions (Table 1, Graph 1), it can be stated that aerobic exercising to music based on the "step" and "high-low" aerobics models has a statistically significant influence on reduction of *abdomen size, upper arm size, calf size and thigh size*, and at the same time, that the difference between the models of aerobic exercising is not statistically significant (T test).

According to the progression index (Table 1, Graph 1), which eliminated initial differences of experimental (E1, E2) and the control (K) groups, it can be concluded that aerobic exercising to music based on the "step" and "high-low" aerobics models has positive effects on morphological characteristics and functional abilities of seventh grade female students.

Graph 1 presents the average values (M) of progression index of morphological and functional abilities in experimental (E1, E2) and the control (K) groups.



Graph 1. Average values (M) of progression index of morphological and functional abilities of students from the first experimental group (E1), second experimental group (E2) and control group (K).

Gained results show that, when designed in this way, the programme of aerobic exercising to music according to the «step» and «high-low» aerobics models is allowed and desirable out of following reasons:

- students are in a puberty phase which is liable to aerobic activities since body is in the phase of intensive growth and development and such forms of exercising can have a stimulative effect on it and
- possibility of prevention of damaging effects in the form of a bad body posture.

Such form of exercising is in no way dangerous to health of students in this period. However, even this form of exercising needs to have its limitations, since too high an intensity of aerobic effort can have a contra productive effect on the students' organisms.

Table 2 shows average values (M) of progression index of variables within motor abilities in experimental (E1, E2) and the control (K) groups, and their result of total (F test) and partial variability (T test).

The results of progression index of variables within motor abilities show the improvement of each individual group under the influence of specific exercising, except in *chin-up resistence, non-rhythmic drumming* and *forwad bend from a box* in students from the control (K) group.

Aerobic exercising to music according to the «step» and «high-low» aerobics influences the improvement in results of variables of dinamic muscular potential in lower extremities (*standing long jump* Inx_{E1}=2,7%; Inx_{E2}=2,4%; *standing triple jump* Inx_{E1}=6,2%; Inx_{E2}=6,2%) and is statisticaly significantly different in comparison to the control group. Presented restults show that the experimetal procedure had an effect on the improvement of results in *standing long jump* and *standing triple jump* of seventh grade female students but no statistically significant differences were noticed between aerobic exercising to music according to the «step» or «high-low» aerobics models. The progression index shows that students from experimental groups improved more in *standing triple jump* in comparison to *standing long jump.* This improvement can be explained by the

fact that standing triple jump depends, to a certain degree, on coordination, as well as coordination in rhythm. Bearing in mind that the students improved in this type of abilities, the measured improvement can be justified.

Table 2. Progression index of variables within the motor abilities in experimental (E1, E2) groups and the control (K) group.

Variables	M-E1	M-E2	M-K	F	p	T_{E1-E2}	T_{E1-K}	T_{E2-K}
Long jump	2.7	2.4	1.1	4.1	0.0205*	0.6	2.7*	2.1*
Triple jump	6.2	6.2	0.6	27	0.0001*	3.2	6.4*	6.4*
Squat	8	8.3	2.8	19.5	0.0001*	0.3	5.2*	5.6*
Crunch	13.6	16.8	4.8	16.7	0.0001*	1.5	4.1*	5.6*
Chin-up	10.4	4.3	3.8	2.4	0.1008	1.8	2	0.2
"Eight-shape"	10.9	10.4	2.2	36.2	0.0001*	0.4	7.6*	7.2*
Side step	12.7	15.7	11.4	4.5	0.0137*	2.1*	0.9	2.9*
Agility	9.5	6.6	2.8	5.1	0.0081*	1.4	3.2*	1.8*
Drumming $_{nonrhyth}$	66	46.2	–7.4	74.2	0.0001*	3.2*	11.8*	8.6*
Drumming $_{leg/arms}$	68.2	65.4	2.1	43.8	0.0001*	0.4	8.3*	7.9*
Hops in rhythm	122.9	99.5	27.6	9.3	0.0001*	1	4.1*	3.1*
Tap L	12.9	12.2	3.8	40.3	0.0001*	0.6	8.1*	7.5*
Tap H	11.7	28.1	3.9	40.7	0.0001*	6*	2.9*	8.8*
Skipping	37.2	34.5	10.3	42.7	0.0001*	0.9	8.4*	7.6*
Forward bend	6.2	4.7	–0.8	19.7	0.0001*	1.3	6*	4.7*
Flexibility with bar	10.5	8.5	3.3	10.5	0.0001*	1.3	4.4*	3.2*

In accordance with the progression index of variables in repetitive muscular potential, the initial differences and damaging factor existing in the form of non-homogenous groups were eliminated.

The results of the progression index of variables in repetitive muscular potential of students in experimental groups, under the influence of experimental procedure, show a greater improvement in comparison to the physical education teaching. However, no statistically significant differences occurred between the two models of aerobic exercising to music, "step" and "high-low" aerobics.

Gained results of the research stand within the framework of the results obtained also by other researchers. Thus Zagorc, & Bargoč (2000a) states that aerobic exercising to music maintains and develops strength of the whole body in connection to its constitution and also states that, according to Sekulić (1997), using a modified step aerobics the development of explosive power (mainly bound) can be influenced.

According to the progression index and F test, aerobic exercising to music based on the "step" and "high-low" aerobics, had no statistically significant effect on the improvement of results in endurance in the elbow joint flexors according to the progression index and F test.

In accordance with the progression index of variables in coordination area (*side steps, agility in floor exercises),* the initial differences and damaging factor represented in form of non-homogenous groups were eliminated.

The results of the progression index of variables in coordination area show the improvement of results in experimental and the control groups under the influence of applied programmes (experimental and physical education teaching). However, the improvement of results under the influence of aerobic exercising to music according to the

"step" and "high-low" aerobics models led to statistically more significant differences in comparison to improvement of results under the influence of physical education teaching. Comparison of the two models of aerobic exercising to music, "step" and "high-low" aerobics, shows statistically significant difference in improvement of results in *side steps,* which means that "high-low" aerobics had statistically more significant effect on the improvement of results (Inx_{E1} = 12,7%; Inx_{E2} = 15,7%).

The research results stand within the framework of conclusions of some researchers in the field of aerobic exercising to music. Thus Zagorc, Zaletel, & Ipavec (2000b) states that aerobic exercising to music develops almost all types of coordination and that the improvement of results of coordination in "step" aerobics comes as a result of applied choreographies, consisting of a large number of ascending and descending a stepper to a set rhythm and various movement structures with both legs and arms. Statistically significant improvement of results in coordination area, in comparison to physical education teaching, is in accordance with a statement of Zagorc, Zaletel, & Ipavec (2000b) that "step" aerobics represents the easiest way to improve coordination of basketball, volleyball and football players, sport dancers, gymnasts, alpine skiers, tennis players etc.

According to the progression index results, the greatest improvement is noticed in the results gained within variables for coordination-in-rhythm estimates (hops in rhythm, drumming with legs and arms, non-rhythmic drumming) in students from experimental groups (E1, E2). Such high results of the progression index (mainly in the hops in rhythm test) can, on one hand, be explained by the positive effects of aerobics classes, but on the other hand, one should allow for the possibility that the students found the task at the final measurement easy. It can be assumed that the results of the final measurement are the result of exercising set movement structures (choreographies) in defined rhythm structures of three-four time.

Taking into consideration that aerobic exercising to music is characterized by performing movements and moving of the whole body to the set rhythm, that is music; we can assume that aerobic exercising to music classes will have a positive effect on memory (memorizing), attention forming and rhythm perception that are responsible for successful conduct of test for coordination-in-rhythm estimate.

For the above-mentioned tests to assess coordination in rhythm, structuring of a set sequence of movements into one unity is obligatory. After the measurements (*drumming with legs and arms; non-rhythmic drumming)* and establishing the progression index, it is noticed that the students improved most in expressing the ability to create such rhythm which would suit the set movement structure mainly depending on their "inner" rhythm. Unlike the two tests to assess the coordination-in-rhythm, in the test of *rhythm hops,* which includes performance of movements (in equal intervals) in accordance with the outer rhythm, even greater progression is noticed (Inx_{E1} = 122,9%; Inx_{E2} = 99,5%). Performing of this type of movements is characteristic also of the aerobic exercising to music.

The aerobic exercising to music is characterized by the ability to perform movements and moving (defined in time, space and by stepper) of the whole body to set music (rhythm, tempo).

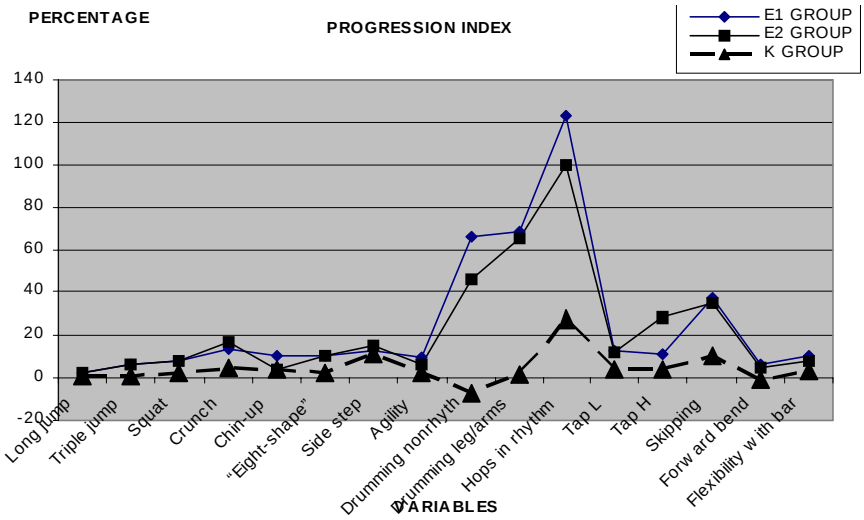
According to the progression index of variables within area of frequency of movements (*hand tapping, skipping)*, a conclusion can be made that the applied programmes (experimental and physical education teaching) resulted in improvement of results in experimental and the control group.

Under the influence of the aerobic exercising to music according to the "step" and "high-low" aerobics models a statistically more significant improvement of results occurred in variables within the area of frequency of movements in comparison to physical education teaching. However, the two models of aerobic exercising had statistically more significant effect on the improvement of results in *hand tapping,* that is, "high-low" aerobics influences greater improvement in frequency of movements in comparison to "step" aerobics (Inx_{E1}=11,7%; Inx_{E2}=28,1%). This difference can be explained by the fact that "high-low" aerobics is characterized by music with more beats (faster tempo) and non-existence of the "limiting factor" – stepper, which has an influence on both frequencies of leg and arm movements.

The results of the progression index of variables within the flexibility area show the improvement of results under the influence of experimental programme in seventh grade female students. The results show that that aerobic exercising to music according to the "step" and "high-low" aerobics models, alongside with stretching exercises applied during the conclusive part of the class, influence the improvement of results and also, that this improvement is statistically more significant in comparison to the improvement under the influence of the physical education teaching.

Bearing in mind that within "step" and "high-low" aerobics similar stretching exercises were applied, it can be stated that no statistically significant differences between these two models of aerobic exercising to music were noticed.

Graph 2 presents average values (M) of progression index of motor abilities in experimental (E1, E2) and the control (K) group.



Graph 2. Average values (M) of progression index of antropomotoric abilities of students from the first experimental group (E1), second experimental group (E2) and control group (K).

Classes of aerobic exercising to music according to the "step" and "high-low" aerobics models during experimental procedure are characterized by sounds of music, merry atmosphere, active participation of all students throughout the class, possibility of adapting the exercises to students' abilities and rhythmic work to sounds of music. This form

of aerobic exercising, according to the gained results, has an obvious positive effect on the total motor range.

Results gained by this research undeniably confirm that the effects of physical education teaching where traditional and usual form of classes was applied, were considerably weaker in comparison to classes conducted according to the experimental programme. Unsatisfactory effects of physical education teaching can be attributed to various factors and circumstances originating from teaching, school system and society.

6. CONCLUSIONS

According to the analysis of the research results, the following conclusions can be made:

1. The research results show statistically considerable improvement of morphological characteristics, from the initial to final measurement, in experimental groups. No statistically significant improvement occurred in the forearm size. These results confirm the first hypothesis (H1), which means that, programmed exercising to music led to improvement of morphological characteristics of seventh grade female students.
2. According to the research results, statistically considerable improvement is noticed of chosen functional abilities (variables $Fr_{stand,}$ $Fr_{effort,}$ VO_{2max}), from the initial to final measurement in experimental groups. Of all chosen variables within the functional abilities area, the greatest improvement, from the initial to final measurement, was achieved in the *maximum oxygen uptake,* which is the basic goal of aerobic exercising. According to the research results, it is noticed that different models of aerobic exercising to music have equal influence on the improvement of maximum oxygen uptake in seventh grade female students. The gained results confirm the second hypothesis (H2) which claims that programmed exercising to music led to improvement of functional abilities of seventh grade female students.
3. The experimental procedure of aerobic exercising to music according to "step" and "high-low" aerobics models influenced the improvement of motor abilities of seventh grade female students. The research results show statistically considerable improvement of results of all chosen variables, except chin-up resistance, from the initial to final measurement in experimental groups. These results confirm the third hypothesis (H3) which means that programmed exercising to music led to improvement of motor abilities of seventh grade female students.

Results of this research confirm the assumptions and claims that under the influence of physical exercising greater changes occur in those morphological characteristics, motor and fictional abilities that are genetically determined to a lesser degree.

Generally speaking, it can be concluded that after eight weeks of the experimental programme of aerobic exercising to music the improvement occurred in morphological characteristics, motor and functional abilities of the seventh grade female students. The results show that different models of aerobic exercising to music influence almost equally the chosen variables in seventh grade female students.

Finally, it should be emphasized that the results of this research refer to a strictly selected population and as such can be studied or used for comparison, as being relevant, in those studies where the examinees' sample is formed according to the same or similar criteria.

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EFEKTI PROGRAMIRANOG VEŽBANJA UZ MUZIKU KOD UČENICA

Sanja Mandarić

Dosadašnja istraživanja su pokazala da aktuelni programi nastave ne mogu obezbediti kontinuitet vežbanja i ostvarenje pojedinih zadataka nastave fizičkog vaspitanja i da su potrebne inovacije u nastavnom radu. Saglasno prethodnoj konstataciji postavilo se pitanje, da li aerobik kao sistem vežbanja koji je doživeo veliku popularnost u svetu i kod nas može kao takav biti primenljiv i u nastavi fizičkog vaspitanja osnovne škole. Istraživanje je primenjeno na uzorku 95 učenica, sedmih razreda osnovne škole "Jovan Jovanović Zmaj" iz Kanjiže, koje su bile podeljene u tri grupe (dve eksperimentalne i jedna kontrolna). Eksperimentalni faktor predstavljala je posebno programirana nastava aerobnog vežbanja uz muziku po modelu "step" i "high-low" aerobika, koja je sprovedena u eksperimentalnim grupama, dok je u kontrolnoj grupi sproveden Nastavnim plan i

program fizičkog vaspitanja, propisan od Ministarstva prosvete Republike Srbije. Efekti programiranog vežbanja uz muziku praćeni su: u prostoru varijabli morfoloških karakteristika (sedam varijabli); u prostoru funkcionalnih sposobnosti (tri varijable) i prostoru motoričkih sposobnosti (šesnaest varijabli). Rezultati istraživanja su pokazali da je programirano vežbanje uz muziku po modelu "step" i "high-low" aerobika uticalo na poboljšanje morfoloških karakteristika, funkcionalnih i motoričkih sposobnosti učenica sedmih razreda osnovne škole, u odnosu na učenice kontrolne grupe. Najveći napredak, kod oba modela aerobnog vežbanja, uočen je u maksimalnom utrošku kiseonika i varijablama iz prostora opšte koordinacije i koordinacije u ritmu. Dobijeni rezultati istraživanja ukazuju na praktičnu primenljivost aerobnog vežbanja uz muziku u nastavi fizičkog vežbanja, u cilju preciznog doziranja vežbanja i ostvarenja cilja i zadataka fizičkog vaspitanja.

Ključne reči: *fizičko vaspitanje, morfološke karakteristike, funkcionalne sposobnosti, motoričke sposobnosti, "step" aerobik, "high-low" aerobik*