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INFLUENCE OF CURRENT PHYSICAL EDUCATION VARIABLE MODULES CURRICULUM ON SPEED INDICATORS DEVELOPMENT AMONG 5TH – 9TH GRADES SCHOOLCHILDREN

ABSTRACT. The article presents the results of educational experiment concerning implementation effectiveness of variable modules curriculum in track and field and gymnastics at physical education lessons for 5th – 9th grades schoolchildren. Speed development dynamics among children of middle school age under modules curriculum conditions has been analyzed. Comparative analysis of speed development among schoolchildren according to the current and previous curriculum has been conducted.

***Key words**: schoolchildren, current curriculum, physical education, speed development, 5th – 9th grades schoolchildren.*

I. Introduction.

The problem of schoolchildren physical education improvement has become a subject of discussion at numerous theoretical and practical conferences and seminars. Both objective and subjective reasons have emerged for reforms in the system of physical education. They are the following: the transition from a 12-year education system to an 11-year one; critical situation with younger generation state of health; number of deaths at physical education lessons during 2008-2009 school year, shortcomings of traditional educational system that did not take into consideration the interests and inclinations of children; need for change in approaches to physical education at schools for the content of educational programmes of the late XX century did not account for studying children's interests to this or that kind of sport, anatomico-physiological and individual peculiarities of schoolchildren as well as the best of European experience.

One of the key stages of physical education reform in Ukraine was to develop and implement a conceptually new curriculum of physical education for 5th – 9th grades schoolchildren [5] which based on changing approaches to teaching physical education as a discipline. However, its development and implementation has not been accepted unanimously by scientists and physical education practitioners. Some believe that the implementation of the programme will improve physical education of schoolchildren (Krutsevych T. Yu., Diatlenko S. M. Lysak I. V.) [1, 2], others argue that the programme contains several shortcoming that will lead to lowering educational standards and loss of interest in motor activity (Solomonko V. V., Shyian B. M.). Therefore, **the purpose**

of the research is to study the influence of physical education variable modules curriculum content on speed development among schoolchildren of middle school age.

The tasks are the following:

1. To study the content of variable modules curriculum: that of track and field and gymnastics and its influence on speed development among 5th – 9th grades schoolchildren.
2. To conduct a comparative analysis of speed development among schoolchildren according to the current and previous curriculum.

Methods and research organization:

theoretical analysis and generalization of methodological literature, educational observation and experiment, mathematical statistics methods. The educational experiment was conducted at secondary school № 50 (experimental group, hereinafter – EG), specialized secondary school №2 (EG_2), secondary school № 36 (EG_3) in Lviv, and a comparison group (CG) in secondary school № 1 in Chervonohrad. At experimental groups training was carried out according to the current programme, while at the comparison group the children were trained according to the previous physical education curriculum.

Children of EG_1 mastered track and field, basketball, volleyball and football; children of EG_2 – football, gymnastics, basketball, handball and track and field; childfen of EG_3 – badminton, track and field, swimming, gymnastics, basketball, volleyball and football. Those of CG mastered track and field, gymnastics, basketball, volleyball and football, without choosing these kinds of sport themeselves. In total 600 5th – 9th grades schoolchildren were involved in the educational experiment (150 pupils from each school, 75 girls and 75 boys).

III. Results.

Speed i shuman ability to perform motor actions during a minimally short period of time [4].

Speed indicators research was conducted basing on educational standards of track and field and gymnastics variable modules. Speed control toolkit in track and field was 30 m running exercise and in gymnastics – lifting the body to sedentary position within 30 seconds exercise.

During the educational experiment the results in running 30 m among 5th grades schoolchildren improved in all experimental groups, while speed indicators in the comparison group became worse.

Reliable changes occurred only in experimental groups. Thus in EG_1 speed indicators improved by $0,1 \pm 0,75$ sec (from $5,77 \pm 0,07$ at the beginning of the experiment to $5,67 \pm 0,08$ at the end of it). In EG_2 the results improved by $0,5 \pm 0,085$ sec (from $5,83 \pm 0,1$ to $5,33 \pm 0,07$). The largest increase of speed indicators at 5th grades occurred in EG_3 by $0,14 \pm 0,075$ sec (from $5,74 \pm 0,06$ to $5,6 \pm 0,09$) at $P<0,05$.

In the comparison group speed indicators became worse by 0,02 ± 0,07 sec (P>0,05): from 5,62 ± 0,07 sec to 5,64± 0,07 sec. Notably track and field variable module content of the curriculum has influenced speed development positively among 5th grades schoolchildren in comparison with that of the previous programme.

Among 6th grades schoolchildren reliable changes in 30 m running occurred in EG_2, EG_3 and CG (P<0,05) while in EG_1 no reliable changes appeared. At the same time the largest increase was among CG schoolchildren – 0,18 ± 0,75 sec (from 5,64±0,07 to 5,46 ± 0,08). In EG_2 speed indicators improved by 0,29±0,06 sec (from 5,5 ± 0,07 sec at the beginning of the experiment to 5,21 ± 0,05 sec at the end of it); in EG_3 – by 0,16 ±0,09 sec (from 5,56 ± 0,09 to 5,46±0,09). In EG_1 no reliable changes occurred, speed indicators increased insignificantly – by 0,09 ± 0,75 sec (from 5,53 ± 0,07 at the beginning of the experiment to 5,44 ± 0,08 at the end of it). For 6th grades schoolchildren the content of current curriculum turned out to be less effective in comparison with the previous one.

For 7th grades children the experiment showed that reliable changes occurred only in EG_2 and CG. Among other groups (EG_1 and EG_3) no reliable changes were observed. The largest speed indicators increase was observed in EG_2 by 0,25 ± 0,05 sec (from 5,24±0,05 to 4,99±0,05). In CG results improvement at the beginning and at the end of the experiment was observed by 0,17 ± 0,075 sec (5,46 ± 0,08 and 5,29 ± 0,07 respectively) at P<0,05. In EG_1 and EG_3 insignificant speed indicators changes: EG_1 - 0,08 ± 0,45 sec (5,13 ± 0,04 and 5,05 ± 0,05); EG_3 – 0.09 ± 0,07 sec (5,89 ± 0,07 and 5,80 ± 0,07).

Among 8th grades schoolchildren reliable changes in speed indicators were observed only in one group – EG_2. Indicators increase was 0,22±0,075 sec (5,1±0,07 at the beginning and 4,88±0,08 at the end of the experiment). At the same time among other groups (EG_1, EG_3 and CG) no reliable changes were observed. In EG_1 speed indicators improved by 0,06 ± 0.68 sec (6,02 ± 0,16 and 5,96 ± 0,18); in EG_3 – by 0,14 ± 0,07 sec (5,67 ± 0,07 and 5, 63 ± 0,07). In CG indicators increase was similar to that of EG_3 – by 0,14 ± 0,08 sec (5,18 ± 0.08 and 5,04± 0,08).

Among 9th grades children in two groups (EG_2 and EG_3) significant speed indicators increase was observed: by 0,27±0,65 sec (5,02±0,06 and 4,75± 0,07) and 0,29 ±0,11 sec (5,60 ± 0,11 and 5,31 ± 0,11) respectively by P<0,05. In CG speed indicators changed insignificantly – by 0,12±0,095 sec (5,16±0,09 and 5,04±0,1). Speed indicators became worse in EG_1 by 0,04±0,11 sec (4,52±0,1 and 4,56±0,12).

The results of the educational experiment are shown in Table 1.

Table 1 Average indicators in 30 m running, sec (n=600)

Experimental group	Test period	Grades				
		5th grade, (sec) (n=30)	6th grade, (sec) (n=30)	7th grade, (sec) (n=30)	8th grade, (sec) (n=30)	9th grade, (sec) (n=30)
		Arithmetic mean				
EG_1 (n=150)	Before the experiment	5,77±0,07	5,53±0,07	5,13±0,04	6,02±0,16	4,52±0,10
	By the end of the experiment	5,67+0,08	5,44±0,08	5,05±0,05	5,96±0,18	4,56±0,12
	Increase	**-0,1±0,75***	**-0,09±0,75**	**-0,08±0,45**	**-0,06±0,68**	**0,04±0,11**
EG_2 (n=150)	Before the experiment	5,83±0,1	5,50±0,07	5,24±0,05	5,10±0,07	5,02±0,06
	By the end of the experiment	5,33±0,07	5,21±0,05	4,99±0,05	4,88±0,08	4,75±0,07
	Increase	**-0,5±0,085***	**-0,29±0,06***	**-0,25±0,05***	**-0,22±0,075***	**-0,27±0,65***
EG_3 (n=150)	Before the experiment	5,74±0,06	5,56±0,09	5,89±0,07	5,67±0,07	5,60±0,11
	By the end of the experiment	5,60±0,09	5,40±0,09	5,80±0,07	5,53±0,07	5,31±0,11
	Increase	**-0,14±0,075***	**-0,16±0,09***	**-0,09±0,07**	**-0,14±0,07**	**-0,29±0,11***
CG (n=150)	At the beginning of school year	5,62±0,07	5,64±0,07	5,46±0,08	5,18±0,08	5,16±0,09
	At the end of school year	5,64±0,07	5,46±0,08	5,29±0,07	5,04±0,08	5,04±0,10
	Increase	**-0,02±0,07**	**-0,18±0,75***	**-,17±0,075***	**-0,14±0,08**	**-0,12±0,095**

Note: * – indicators reliability at P<0,05

As it is shown in Table 1 systemic reliable changes in speed indicators among 5th -9th grades schoolchildren occurred in EG_2. In EG_3 such changes occurred among 5th, 6th and 9th grades children, in EG_1 – only among 5th grades children, in CG – among 6th and 7th grades schoolchildren.

One more test exercise that was used during the experiment for testing speed development was lifting the body to sedentary position within 30 seconds. Such test exercise was included in variable module in gymnastics.

After conducting the experiment the following results were obtained: reliable speed indicators changes occurred in EG_2; in EG_3 reliable changes were observed in 7-9th grades and CG in 8th grade. Insignificant changes occurred among EG_1 children of 5-9th grades. It can be explained by the fact that variable module in gymnastics was not introduced in EG_1 as well as the abovementioned test exercise was not used while mastering other variable modules. In all experimental groups positive dynamics in indicators increase was observed; in the comparison group of 5th and 9th grades children reduction of speed was ascertained. Generalized results of the experiment are shown in Table 2.

Table 2 Average indicators in lifting the body to sedentary position within 30 seconds, (n=600)

Experimental group	Test period	Grades				
		5th grade, (times) (n=30)	6th grade, (times) (n=30)	7th grade, (times) (n=30)	8th grade, (times) (n=30)	9th grade, (times) (n=30)
		Arithmetic mean				
EG_1 (n=150)	Before the experiment	24,07±1,17	23,83±1,12	24,83±0,93	24,10±1,03	24,04±0,95
	By the end of the experiment	25.83±1,19	25,67±1,15	25,57±0.98	24,90±1,01	24,37±0,96
	Increase	**1,76±1,18**	**1,84±1,14**	**0,74±0,96**	**0,8±1,02**	**0,33±0,96**
EG_2 (n=150)	Before the experiment	15,07±1,15	23,37±0,58	23,80±0,71	24,13±0,62	25,17±0,79
	By the end of the experiment	20,63±1,26	25.53±0,55	25.43±0,67	27.13±0,57	26,87±0,90
	Increase	**5,56±1,21***	**2,16±0,57***	**1,63±0,69***	**3±0,60***	**1,7±0.85***
EG_3 (n=150)	Before the experiment	25,13±0,91	25,50±0,56	26,67±0,92	25,17±0,67	25,87±0,83
	By the end of the experiment	26,67±0,79	27,27±0,69	29,60±1,14	27,23±0,77	28,20±0,83
	Increase	**1,53±0.85**	**1,77±0.63**	**2,93±1,03***	**2,06±0,72***	**2,33±0,83***
CG (n=150)	At the beginning of school year	39,20±1,27	37,87±1,20	39,47±1.15	40,23±1,08	42,50±1.16
	At the end of school year	38,10±1,20	39,47±1,15	40.10±1,07	42,50±1,16	41,13±1,26
	Increase	**-1,1±1,24**	**1,6±1,18**	**0,63±1,11**	**2,27±1,12***	**-1,37±1,21**

Note: * – indicators reliability at P<0,05

Analyzing the data it may be stated that the largest speed indicators increase while lifting the body to sedentary position within 30 seconds among 5th grades children was observed in EG_2. The indicators improved 5,56±1,21 times as much (from 15,07±1,15 to 20,63 ±1,26). The results improved insignificantly in two other experimental groups: in EG_1 the indicators improved 1,76±1,18 times as much (from 24,07±1,17 to 25,83 ±1,26); in EG_3 – 1,53±0,85 times as much (from 25,13±0,91 to 26,67±0,79), at P>0,05. However in CG at 5th grade the indicators became worse 1,1 ± 1,24 times less (from 39,2 ± 1,27 to 38,1 ± 1,20). At 6th grade reliable changes occurred only in EG_2. The indicators of abdominal muscles speed improved 2,16±0,57 times as much (23,37±0,58 times as much at the beginning of the experiment and 25,53 ± 0,55 times as much at the end of it). In two other experimental groups and the comparison group no significant changes occurred: the lowest increase was observed in the comparison group – 1,6 ±1,18 times as much (from 37,87±1,20 to 39,47 ± 1,15); in EG_1 the results improved 1,84 ± 1,14 times as much (from 23,83±1,12 to 25,67±1.15); in EG_3 speed indicators improvement increase while performing lifting the body to sedentary position within 30 seconds was

rather lower than in EG_1 – 1,77± 0,63 times as much (at the beginning of the experiment 25,5± 0,56 times as much and 27,27±0,69 times as much at the end of it).

Among 7th grade schoolchildren the largest indicators increase was observed in EG_3 - 2,93± 1,03 times as much (26,67 ± 0,92 times as much and 29,6 ± 1,14 times as much); in EG_2 - 1,63 ± 0.69 times as much (23,8±0,71 and 25,43 ± 0,67). Speed indicators increase occurred at P <0,05. Unreliable changes occurred in EG_1 and CG. Thus, in EG_1 the results among 7th grades children improved 0,74±0,96 times as much (from 24,83±0,93 to 25,57±0,98). The lowest speed development increase while performing lifting the body to sedentary position within 30 seconds exercise was observed among CG schoolchildren – 063±1,11 times as much (39,47 ± 1,15 at the beginning of the school year and 40,1 ± 1,07 at the end of the school year).

Among 8th grades schoolchildren reliable changes were observed in two experimental groups – EG_2, EG_3 – and CG children. In EG_1 no reliable changes observed as well as in previous grades. The best results were obtained in EG_2. During the experiment children's results improved 3±0,6 times as much (from 24,13±0,62 to 27,13±0,57). High indicators of the results increase occurred in CG – 2,27±1,12 times as much (from 40,2 ± 1,08 to 42,5±1,16). In EG_3 abdominal muscles speed indicators improved significantly – 2,06 ± 0,72 times as much (from 25,17±0,67 to 27,23±0,77). The lowest results increase indicators were observed in EG_1 – 0,8±1,02 times as much (24,1±1,03 at the beginning of the experiment and 24,9±1,01 at the end of it).

Among 9th grades schoolchildren reliable changes occurred in EG_2 and EG_3. Thus, in EG_3 speed indicators increase was the highest – 2,33±0,83 times as much (25.8 ±0.83 at the beginning of the experiment and 28,2±0,83 at the end of it); in EG_2 indicators increased – 1,7±0,85 times as much (from 25,17±0,79 to 26,87±0.9). Unreliable changes were observed among EG_1 schoolchildren whose indicators improved insignificantly – 0,33 ± 0,96 times as much (from 24,04 ±0,95 to 24,37±0.96, at P>0,05) as well as CG schoolchildren whose speed indicators became worse – 1,37±1,21 times less (з 42,5±1,16 до 41,13±1,26).

Thereby systemic reliable changes of lower extremities and abdominal muscles speed indicators occurred in EG_2 in 5th – 9th grades. Systemic speed indicators changes occurred partially among EG_3 schoolchildren: during 30m running exercise – among 5th – 6th grades and 9th grade schoolchildren; while performing lifting the body to sedentary position within 30 seconds exercise – among 7th – 9th grades children. No reliable changes ascertained among EG1 schoolchildren of 5th – 9th grades while performing lifting the body to sedentary position within 30 seconds exercise. It can be explained by the fact that variable module in gymnastics was not introduced in this educational establishment. At the same time reliable speed changes in 30 m running exercise occurred only among 5th grades children. Among CG schoolchildren (previous educational programme was used and the children did not have an opportunity to choose variable modules) reliable speed indicators changes were observed among 8th grades schoolchildren while performing lifting the body to sedentary position within 30 sec-

onds exercise and 6th – 7th grades schoolchildren while performing 30m running exercise. It should be noted that CG children mastered track and field and gymnastics. For reasons given it may be stated that the content of the current programme influences speed development among schoolchildren of middle school age more positively than the previous one. Choosing variable modules by children displays dynamics of physical fitness indicators directly proportional.

IV. Conclusions.

The conducted educational experiment allows to state that the content of variable modules of the current programme (in track and field and gymnastics) influences speed development positively among 5th – 9th grades schoolchildren. It is proved by the fact that at middle school age in all experimental groups physical qualities indicators have been higher than those among CG schoolchildren.

The most efficient choice of variable modules in educational programme was ascertained in EG_2. The children of that group mastered track and field, football, gymnastics, basketball and handball.

Among EG_2 children average speed indicators increased by 0,5±0,085 sec at 5th grade; 0,29±0,06 sec at 6th grade; 0,25±0,05 sec at 7th grade; 0,22±0,075 sec at 8th grade and 0,27±0,65 sec at 9th grade while performing 30 m running exercise. Similar tendency was observed while performing lifting the body to sedentary position within 30 seconds exercise. Systemic reliable speed changes in abdominal muscles contractions was observed among EG_2 schoolchildren: average speed indicators improved 5,56±1,21 times as much at 5th grade; 2,16±0,57 times as much at 6th grade; 1,63±0,69 times as much at 7th grade; 3±0,60 times as much at 8th grade and 1,7±0,85 times as much at 9th grade.

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