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OPTIMISING MOTOR SKILLS DEVELOPMENT THROUGH DIFFERENTIATING PROCEDURES IN THE PHYSICAL EDUCATION CLASS AT THE LEVEL OF THE 8TH GRADE (BOYS)

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Abstract
The present paper approaches various methods of improving the motor skills development process at the level of the 8th grade in the secondary school, a stage which corresponds to profound somatic-functional transformations recorded during puberty. We propose alternatives for carrying out the teaching undertaking in Physical Education class; namely, an approach which avoids frontal activities, laying emphasis on working with groups made up of students with similar biometric development level. The motor skills contents planning on separate learning units for each group was useful in covering the curriculum elements, and ensured the progress in physical training, avoiding the abandonment and providing an active and conscientious involvement in the class activities.
Keywords*: motor skills, level groups, accesibility, physical effort.*

INTRODUCTION

The motor skills play an important part among the content elements of the physical education pattern in secondary school. They represent the students' physical preparation level which determines the accomplishment of all the other pattern components specified by the curriculum. The motor skills are, in fact, a detailed subject, through "their major involvement in increasing the performance potential" [Alexei M/2006, Triboi V., Pacuraru A./2013].

Also known as motor abilities or biometric skills, they represent the fundamentals or the engine of movement, being strongly genetically determined. In practice, they usually occur in combinations: strength-speed or power, speed-endurance, strength-endurance [Bompa T.O/2002, Alexe N./1993]. Other authors also stress the hereditary factor which determines their manifestation, asserting that they can be approached as human predisposition /motive capabilities which constitute the ground for learnt motor skills. [Manno R./1992, Tudor V/1999, Rata G, Rata B.C./2006].

Rendering the Physical Education class in secondary school effective implies to know and abide by all the didactic principles: establishing the topic, the educational and operational objectives, selecting and planning the content elements specified by the curriculum, measuring the necessary timing for the links, reaching the optimal functional and motor densities, and integrating the lesson as an inseparable element within a cycle. The need to make judicious efforts is another important factor, an aspect characterised by high difficulty level in lessons where topics from motor skills are approached, which often produces the highest curves in the physical effort.

The process of motor skills teaching at the secondary school is carefully approached by the majority of experts, considering that they ensure the physical activities' efficiency and exploit the pubescent pupil's physiological potential [Fiedler P./1993]. Physical education at school determines an extended influence in teaching motor skills and it is a premise for acquiring subsequent greater performance in sports activities which use only certain manifestation forms and combinations. Due to the all-round tackling of skills, it avoids limitation triggered by an early specialisation. The planning of physical efforts on stages (systems or lesson cycles) together with the permanent change in the main parameters of the physical effort determine varied strains of the body, which trigger, in turn, the phenomenon of progressive adjustment to various stimuli and the long-term adjustment. By cumulated action of the organism's functions and systems (synergetic effect) takes place the accomplishment of the scheduled tasks, which increase in volume, intensity and complexity from one year to the next. The effort quantization at puberty is a difficult and important action with beneficial effects on the muscular and osteoarticular system, effects which are more and more difficult to attain in ulterior stages (bone structure, their thickness and solidity, endurance in tension and pressure, favouring the ossification processes can be attained through effort, movement, should the

best loads be established) [Dragomir M. /2001, Rinderu E.T., Rinderu I. /1997].
The students' main characteristic is heterogeneity, manifest through various aspects (somatic-functional or intellectual development, temperament type and, of course, the physical preparation level). Adding to these factors personal interests, skills and motivation, and the attitude towards physical education, which can influence either positively or negatively the teacher's undertaking, it results that the students need to be treated individually, while the effort needs to be quantified in the process of motor skills development in accordance with the level of each students category (defective, average, and well-trained) [Carp I. P./2006, Cârstea G. /2000, Marolicaru M. /1986].

PROBLEM STATEMENT

The scientific problem is the insufficient use of varied forms of exercising in the process of training motor skills in the physical education class, which would determine significant improvement at the level of physical training indices, considering that the frontal approach has led to unsatisfactory results in this respect. The need for fast adjustment of the young generation to the changes imposed by society and the speeding up of living rhythm have led to the reassessment of the physical education's role and importance, as integrated part of the general education. The teaching methodology has to be made efficient in order to facilitate the optimisation of the motor skills recorded by students.
The research object is the planning process for motor skills development and the methodology for drafting and applying the contents of the experimental curriculum in view of training combined motor skills in the Physical Education classes in the 8th grade.

STUDY AIMS.

The research aims *at* scientifically arguing and improving the educational process for physical education on the grounds of treating the students differently. It is directed at making the undertaking of motor skills development more effective during the 8th grade.
Assumption: working with differentiated groups in the process of developing motor skills at the secondary school, based on differentiating planning of the physical effort in experimental classes would lead to the successful accomplishment of tasks, to improvements in effort abilities and physical training level and would facilitate the acquirement of better results compared to those obtained by using the frontal approach.

METHODS

The scientific research has made recourse to the following methods:
Questionnaire and interview survey. The teachers' answers have facilitated the drafting of the experimental curriculum by selecting means in accordance with the students' possibilities.
Pedagogical observation – allowed the teaching process systematic analysis in order to acquire information, without direct personal intervention.
Measuring and testing method: The students have been subjected to a series of tests for the assessment of the development level for all motor skills. The set consists in 19 tests addressing strength, speed, endurance, coordination and versatility. Some of them are Eurofit tests, while others are S.N.S.E. 1999 tests (from the Romanian national evaluation system) or tests selected from the literature in the field. Most of the tests concern the assessment of strength and coordination, due to their interdependence with the rest of the motor skills. Due to space considerations, they will be only enumerated here and not described. 1. Press-ups (S.N.S.E.trial), 2. Bent Arm Hang Test (Eurofit test), 3. Throwing the ball (S.N.S.E.), 4. Dynamometry (Eurofit test), 5. Trunk lifting from a back lying position countertime 30" (S.N.S.E. and Eurofit), 6. Leg lift-ups from a back lying position countertime 30"(S.N.S.E.), 7. Trunk lifting from a face-down lying position countertime 30"(S.N.S.E.), 8. Basin lift-ups from a sitting position countertime 30"(S.N.S.E.), 9. Long Jump (S.N.S.E. and Eurofit), 10. Jumps over the gym bench 30"(S.N.S.E.), 11. Relay race 5x10m. (S.N.S.E.), 12. Sprint, 50 m. (test S.N.S.E.), 13. Endurance run 1000 m (S.N.S.E.), 14. Scapulohumeral mobility, 15. Coxofemoral mobility in sagittal plane, 16. Place Tapping Test (Eurofit test), 17. Matorin trial, 18. Flamingo Balance test (Eurofit test), 19. Square Test.
Pedagogical experiment: The research has been conducted during the physical education classes at School no. 33, Galati, a school with good material resources which allowed the implementation of the curriculum and the carrying out of the activities in three groups (low, average and high level) for the experimental lot of 30 boys in the 8th grade. The results have been subsequently compared to those of the witness group (other 30 boys who carried out the frontal activities provisioned by the classical curriculum and its associated planning).
Mathematical and statistic methods for calculation and interpretation of results. The data statistic processing and interpretation has been conducted with the help of Microsoft Office Excel 2007 software, using the student test for independent samples and interpreting the significance of the recorded differences.

DRAFTING THE EXPERIMENTAL CURRICULUM

At the level of the experimental classes, the contents from motor skills prevailed and the yearly planning was different from those for the witness classes, even though the number of physical education classes per week was the same (2/week). The learning units represent open and flexible structures with a uniform thematic, planned continuously on time intervals, which ensures tackling of various contents from the curriculum [Scarlat E., Scarlat M.B. /2002]. Considering their importance, complexity and the time interval allotted, they are primary and secondary. The secondary ones mainly approach topics from motor abilities and do not constitute a purpose in themselves. They are allotted a smaller time frame than the one allotted for motor skills, being placed before or during the skills cycles which they support and condition as execution level (e.g., the development of the reaction and repetition rate before the sprint units, training coordination elements during handball units, etc). The thematic cycles regarded as primary lay emphasis on the muscular force development due to the fact that the evaluation system provides two grades of this quality in the calculation of mean for physical education). The number of units is reduced for speed and endurance, given that powerful effects are felt in the case of athleticism lessons based on these skills. These aspects are presented in table 1.

Table 1. Summary of learning units per lessons number for the experimental lot

Contents	*Learning units*	*Units number*	*No. of lessons 1st Semester Primary/ Secondary*		*No. of lessons 2nd Semester Primary/ Secondary*		*total no /year*
Motor abilities	Speed and combinations	2	-	4	-	6	10
	Coordination and combinations	2	-	10	-	10	20
	Strength and combinations	2	8	-	8	4	20
	Endurance and combinations	1	-	9	-	-	9

The speed has been scheduled on two distinct thematic cycles, approaching various manifestation forms at the beginning and the end of the school year. The first cycle is scheduled in September, consists in four lessons and traces the reaction and execution rate in complex acts and the movement rate in deftness conditions. At the end of this learning unit, the gains recorded are transferred to the lesson system dedicated to the athletic trial (sprint), in which the students are tested in sprint (50 meters) and relay race (5 x10m). The second cycle has been scheduled in May and consists in six lessons, focusing on the motion speed development in various circumstances, on progressive distances, and combined with endurance, aspects relevant for optimizing performance in the 1000 meter boys and 800 meters girls trials, in which the higher anaerobic lactacid capacity allows sustained finishes.

The coordination ability has also been planned in two distinct systems scheduled in the two semesters in view of supporting the sports taught (sport game and acrobatic gymnastics, respectively). The first cycle consists in ten lessons, focusing on the deftness development in speed, as well as the specifics – movement precision, movements transformation and combination, sense of rhythm, spatial-temporal orientation, ambidexterity applied in various circumstances, etc. The second cycle is also made up of ten lessons, however, it is combined with strength exercises and acrobatic gymnastics elements. It takes place indoor. The coordination ability elements in focus are: the segment coordination, precision and deftness specific to gymnastics, which also requires good balance and control. We have included the specific trials (plate tapping and square test) at the end of the first semester cycle and Matorin trial and the Flamingo Balance test for the second semester.

The concern for the strength development focuses on different segments and muscular groups, tested with combined tests at the end of the two thematic cycles (lower and upper limbs for the first cycle, back and abdomen for the second). The first cycle has been scheduled for November-December and consists in eight lessons. The manifestation forms

approached are the upper limbs explosive strength and the lower limbs expansion in dynamic conditions). The second thematic cycle has been scheduled for January-February, allotted time: 8-10 minutes, combined with acrobatic gymnastics and coordination ability. In the case of the circuit working at the end of this lessons cycle, the time is increased to 10-12 minutes and the number of stations varies from one group to another: 5 for the low level group, 7 for the average and 8 for the well-trained.

We have allotted only one lessons cycle for *endurance* in the first semester, grouping it with the themes in coordination and sport games. The manifestation forms approached are the aerobe and mixed cardio-respiratory endurance specific to sports branches and trials in coordination conditions. There is still preoccupation with endurance for the second semester, in the case of the cycle dedicated to endurance run, which will assess this skill performance at the end of May. If at the low level groups focus is laid on aerobe endurance and at the average groups on mixed endurance, in the case of the advanced groups, anaerobe lactoacid endurance can be also trained.

FINDINGS AND RESULTS

The results recorded after the implementation of the experimental curriculum are depicted in Table 2, together with the values of the student test and the associated significance limits. In the case of initial testing, the differences between the performance abilities of the two lots are insignificant (**t** values correspond to P>0.05 significance limits for all the tests). These results confirm that the initial training stages at the beginning of the 8th grade are generally equal, with no major differences in physical training of the samples, which would affect the final results. For the final testing, the experimental group scores significantly higher than the witness group in the entire set of tests (**t** values correspond to P < 0.05 significance limits).

For the sprint trial relay race 5x10m, the witness group acquires an average of $\overline{X}$=15.33±0.34 in final testing, below the average of the experimental group $\overline{X}$=14.39±0.30, resulting a difference of 0.94 sec. The significance of the difference is expressed by **t**=2.08 value >2.002, the difference is therefore significant (P < 0.05). For the endurance test 1000 m running, the witness group acquires a $\overline{X}$=284.00±6.00 average value in final testing, below the average of the experimental lot, $\overline{X}$=267.00±5.88, with a 17 seconds difference. The significance of the difference is expressed by **t**=2.02 value >2.002, the difference being significant (P < 0.05). For the coordination assessment through the square test, the witness group records an average of $\overline{X}$=7.39±0.14 in final testing, below the average of the experimental group $\overline{X}$=7.03±0.10, a 0.36 seconds difference. The significance of the difference is expressed by **t**=2.11 value>2.002, which is a significant difference (P < 0.05). For the assessment of strength in upper limbs endurance through press-ups trial, the witness group acquires an average of $\overline{X}$=13.36±0.23 in final testing, below the average of the experimental group, $\overline{X}$=14.00±0.20, with a difference of 0.64 press-ups. The significance of the difference is expressed by **t**=2.13 value>2.002, therefore the difference is significant (P < 0.05).

All these significant differences are explained through the efficiency of the experimental curriculum implemented at the level of the three dynamic groups (the students can move from one group to another according to their training level in the thematic approached and to their progress), which confirms the research hypothesis. The higher outcomes recorded in physical training trials in experimental classes are also the result of the sustained working volume (out of 68 lessons per year, 42 contain topics from motor skills, which represents 61.7%). Often, two themes from different skills are practised during the same lesson.

Table 2. The significance of the difference between initial and final testing on different groups (Boys, independent samples)

Nr crt.	Test name	Initial testing		t	P	Final testing		t	P
		Witness group n=30	Experimental group n=30			Witness group n=30	Experimental group n=30		
		$\overline{X} \pm m$	$\overline{X} \pm m$			$\overline{X} \pm m$	$\overline{X} \pm m$		
1	Sprint 50m (sec.)	8.14±0.09	8.17±0.10	0.23	>0.05	8.02±0.08	7.80±0.07	2.07	<0.05
2	Relay race 5x10m (sec.)	15.76±0.36	15.89±0.37	0.25	>0.05	15.33±0.34	14.39±0.30	2.08	<0.05
3	Endurance 1000m (sec.)	291.00±6.08	294.00±6.09	0.34	>0.05	284.00±6.00	267.00±5.88	2.02	<0.05
4	Coxofemoral mobility (cm.)	53.73±1.04	53.50±1.03	0.15	>0.05	54.83±1.00	57.64±0.91	2.08	<0.05

5	Scapulohumeral mobility (cm.)	84.13±2.62	83.80±2.57	0,09	>0.05	82.63±2.41	76.13±2.12	2.02	<0.05
6	"Plate Tapping" test (sec.)	17.45±0.53	17.37±0.51	0,11	>0.05	16.74±0.50	15.35±0.48	2,01	<0.05
7	Matorin Trial (grade)	307.66±6.60	309.50±6.71	0,19	>0.05	319.00±6.30	336.50±5.85	2.03	<0.05
8	Flamingo Balance Test (no.attempts.)	3.33±0.29	3.43±0.31	0,23	>0.05	3.03±0.27	2.31±0.22	2.05	<0.05
9	Square Test (sec.)	7.72±0.15	7.55±0.16	0,77	>0.05	7.39±0.14	7.03±0.10	2.11	<0.05
10	Press-ups (nr.rep.)	13.12±0.27	13.09±0.24	0,08	>0.05	13.36±0.23	14.00±0.20	2.13	<0,05
11	Bent Arm Hang (sec.)	27.95±0.77	28.23±0.82	0.25	>0.05	28.73±0.71	30.86±0.70	2.13	<0.05
12	Throwing the ball(m)	33.70±0.96	33.66±0.98	0.03	>0.05	34.77±0.92	37.30±0.83	2.04	<0.05
13	Dynamometry (kg/f)	31.80±0.92	31.53±0.91	0.21	>0.05	32.91±0.88	35.33±0.80	2.03	<0.05
14	Trunk lift-ups from a back lying position (no.rep.)	23.83±0.66	24.76±0.68	0.99	>0.05	25.30±0.60	26.91±0.53	2.01	<0.05
15	Leg lifting from a back lying position (no. of repetitions)	9.50±0.25	9.76±0.27	0.72	>0.05	10.10±0.24	10.78±0.23	2.06	<0.05
16	Trunk lift-ups from a back lying position (no.rep.)	24.26±0.66	24.23±0.65	0.03	>0.05	25.12±0.63	26.90±0.58	2.09	<0.05
17	Basin lift-ups from a sitting pos. (no. rep.)	15.16±0.42	15.43±0.43	0.45	>0.05	16.13±0.41	17.26±0.39	2.02	<0.05
18	Long jump (cm.)	183.00±3.58	184.06±3.56	0.21	>0.05	188.86±3.39	198.66±3.08	2.14	<0.05
19	Jumps over the gym bench (no.rep.)	20.50±1.17	20.30±1.17	0.12	>0.05	21.84±1.08	24.90±0.99	2.09	<0.05

Note: n=30 P - 0.05 0.01 0.001

t = 2.002 2.664 3.505

CONCLUSIONS AND RECOMMENDATIONS

- The only way to make up for the reduced amount of Physical Education classes is to valorise the time frame allotted to each lesson by creating superior motor and physiological densities, aspects that can be partially solved through differentiating procedures.
- As the experimental curriculum comprised acting systems of polyvalent nature, this aspect favoured the simultaneous training of the motor skills. For example, the applicative tasks and the technical structures allowed influence on speed, coordination ability elements, explosive strength, and muscular endurance through directed adjustments of the effort's parameters.
- The tests set used was diverse, reflecting the development level for more manifestation forms and motor skills combinations. This led to an objective assessment of the strong and weak points in the students' physical training. There are only a few students with a high development level for all motor skills (balanced development): good results in speed do not necessarily mean good results in strength tests as well, those who have good coordination do not necessarily have good stamina, etc.
- The effort's quantization for each group favoured the elimination of the negative situations encountered in frontal work, allowing the low trained students to take advantage of more reduced tasks, in accordance with their true possibilities and to the best of them to avoid self-sufficiency or regress through tasks of average difficulty.
-Apart from topics dealing with motor abilities, the differentiation is also recommendable for topics dealing with motor skills, learning rhythm and retention of information varying from one student to another. It is useful to train the students to determine and interpret the values of cardiac frequency in effort conditions in order to control and be aware of the degree of strain and to avoid over-straining the organism.
- It is advisable that the strict effort individualisation – which presupposes efforts on the part of the teacher in adjusting the planning documents – to be applied only for the extreme cases (very good students who can pursue an individual training programme and the weak ones, who need permanent assistance and special effort conditions to make up for the lack of physical training).
- It is advisable to use various means included in the experimental curriculum for each motor skill

and level group, as well as relative quantization, with upper and lower limits (e.g., 2-4 series x 6-10 attempts) which allow the teacher to adjust the education process to the available material resources, and especially to the students' response to these means.

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A COMPARATIVE STUDY ON THE DEVELOPMENT LEVEL OF THE COORDINATION ABILITY ON FEMALE STUDENTS OF PHYSICAL EDUCATION AND SPORTS FACULTY (F.E.F.S) AND AUTOMATION, COMPUTERS, ELECTRICAL ENGINEERING AND ELECTRONICS FACULTY (A.C.I.E.E.)

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Abstract
The study aims to do a comparative analysis on the development level of elements of the coordination skills, on female students of different specialties: Physical Education and Sports Faculty and Automation (FEFS), Computers, Electrical Engineering and Electronics Faculty (ACIEE). As coordination skill is considered a fundamental element of motor aptitudes, which conditions and takes motility to its highest level, the results of this study help interpreting the performance level obtained by both groups, the reasons that caused them and the measures that need to be taken to improve motor activities.
Keywords*: coordination skills, specific tests, motor potential, adjusting and adapting movevements.*

INTRODUCTION

For the majority of specialties in the academic system, physical education is focused on students' aptitudes and needs for different physical activities and sports. At this level of education, meeting