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**INTEGRATIVE TENDENCIES IN NEW
PRIMARY EDUCATION SCHOOL PROGRAMS
IN BULGARIA AND THEIR INFLUENCE ON
MENTAL
DEVELOPMENT OF GROWN-UPS**

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The democratic changes in our society confirm the necessity of a modern system of primary education, based on the combination of human experience in the upbringing and education of the grown ups, in the contemporary scientific achievements and national experience, in trends and international cooperation of educational programs.

Modern tendencies in the overall educational process of youngsters in Bulgaria lead to reconstructional methods of approach in primary education. Pedagogic activity directs towards entire development of student personality and students integration in the social environment through emphasis on human values important in each person's life.

An ongoing educational reform in Bulgarian school is in progress. A team of experts of Ministry of Education and Science develops **new primary educational programs**, piloting this school year - **2002/2003**, according to Decree N4 from 02.09.1999. The programs specify the standards of the educational contents in all subjects. On Ministry of Education and Science instructions, a special attention has been paid on **school subjects relations and integrative trends**. The idea of integrative (overall) education emphasizes the fact that there are no school subjects in real life, but total objects, processes and events.

According to **P. Nikolov (1984)** the integral approach in its depth is a subjective scientific-cognitive activity, carrying out the "progress" of

knowledge of the integrity of the world, nature, human society, which integrity exists regardless of the subject.

Nowadays **M. Andreev (1996)**, **A. Momchilova, Sv. Bilchev (2002)** etc. examine the problems of integrative education in the context of the necessity to unite the processes of education and combine the knowledge in different subjects with the purpose of developing cognitive and creative skills in students.

This also determines the concept basis of new educational programs from first till fourth grade and the idea of unity in the process of integration of scientific knowledge. Along with the apparent support of the subjects system, actual tendencies for school subjects relations are present in the new educational contents.

The materialization of these tendencies is intended in two levels:

1. **Integrative tendencies and subject relations on the educational contents level;**
2. **Integrative tendencies and subject relations on the teaching level.**

The first level is a question of principles, methodology and opinion of the authors of the educational documentation. **Purposeful efforts of experts and teachers are needed for the realization of the subject integration in real school environment** in order to increase the cognitive effect of the interrelated activity. Naturally, the integration, by no means, should be an end in itself and eventually turn to an obstacle to the basic objectives in the education of a school subject. It should solve problems concerning development of cognitive skills of young students.

There is quite convincing evidence in school practice that Physical education and sports, which is entirely practical subject, could significantly contribute to the realization of the idea of subject integration, where experimental knowledge leads to abstract and logical generalization. Regardless of the fact that during physical activity and sports students satisfy their need of motor activity, this process of education expands their cognitive skills like each other school process. This is known to be one of the basic tasks of theoretical subjects, where nevertheless cognitive processes develop on a more abstract level, especially in mathematics. In sports students have the opportunity to perceive and give a meaning to a number of terms and qualities in a real environment, typical of this subject.

For a more complete understanding of the relations between activity and idea, abstraction and reality, it is essential to explain the essence of integra-

tion between the school subjects Mathematics and Physical education and sports. Mathematics in its essence, is a science using highly abstract and complex mathematical terms and methods, reflecting certain regularities and objective facts. In conformity with the specifics motor activity, mathematical knowledge can freely integrate with it. Students tend to more easily perceive a more complex information. Physical and psychical activity variously displays in cognitive practical actions. Mathematical knowledge supports the accomplishment of educational tasks and classes in Physical education and sports. The usage of exact terms revolutionizes the assimilation.

In a purely practical aspect, subject integration must be considered in the rationalization of some mathematic terms such as: quantitative meaning of numbers as a result of measurement; consecutive sense of numbers; geometric shapes, related to the space orientation of students from first till fourth grade etc.

Obviously, subject relations carry out in a practical motor activity environment, combined with verbal teaching methods: description, explanation, lecture, instructions. For example, learning formation exercises in primary school (forming in one, two, three or four rows, columns or circle, alignment in a straight row, counting etc., figure marching etc.) gives the opportunity to learn consecutive numbers, some basic geometric shapes – circle, semicircle, angle, triangle, square, quadrangle etc. During sports activities and games the knowledge received in mathematical lessons is being strengthened. Terms and qualities are being perceived such as: straight line, parallel lines, broken line, measuring length and height, pyramid, straight movements etc. The students compare and classify objects by their shape. During the classes of Physical education and sports they can practice and broaden their knowledge in basic units of measurement: length, weight, time, volume etc. Reporting the results of the tests for physical activity, students learn better the units of measurement: for time – seconds and minutes; for length – meter, decimeter, centimeter; for weight – gram, kilogram, etc. The reports and analysis of the functional impact of physical exercises over the constitution of the students conclude in number of repetitions, time, distances, kilograms etc. in other words in quantity results, expressed by numbers.

During their motor activities, young students can practice basic mathematic operations such as: addition, subtraction, multiplication, division, counting etc. The collaboration opportunities between Mathematics and Physical education and sports are numerous. This is a way of achieving abstract knowledge and establishing logical causal connections and relations.

The motor activity is better organized and perceived; reflection, attention and imagination in students are being stimulated; discipline, concreteness and objectivity are being taught.

All of the above determines the main objective of our experimental research: **persistent development of cognitive and creative skills of primary school students, by introducing mathematical terms, actions, ideas and knowledge in an environment of motor activity.** It is unacceptable to think, that the previously mentioned objective could be achieved by simply including some mathematical terms in the course of Physical education. It is necessary to establish and apply specific methods and organization of the lesson and extra-lessons activities (mobile, sport games), to make a concise choice of motor content, with the help of which subject relations can fully carry out and assure the unity of mind and activity.

Organization and Methods

The experimental work was processed during 2002/2003 school year with the participation of experimental and controlling groups of students **from first till fourth grade at Secondary School of Education SOU "Bratia Miladinovi" and SOU "Vassil Aprilov" Rousse.** The experimental groups worked with the specified school programs. The difference between groups was as follows: in experimental groups – school content was enriched with the inclusion of integrative connections with Mathematics. We used age orientated systems of specifically selected games (mobile, sport-preparatory, sports) with mathematical approach. The content of the games intended to help practicing the knowledge received during mathematical lessons concerning:

1. **Terms** – natural number, a series of natural numbers, relation of order in a multitude of numbers, counting skills (quantity and series) by determining mutual and simple conformity of multitudes.
2. **Operations** - addition, subtraction, multiplication, division in the multitude of natural numbers, basic algorithms of these operations;
3. **Basic units of measurement** and creating skills of measuring quantities and solving problems with units of measurements and quantities;
4. **Moulding** basic practice situations by means of Mathematics.
5. **Mathematical terms and ideas** and their implementations in students vocabulary.

Logical thinking and overall physical and intellectual development of

students are stimulated by practicing these games.

The methods of the experimental work are closely related to the problematic of Physical education, concerning the activation of mentality of students from first till fourth grade. Creating the need of seeking solution of mathematical problems during motor activity provokes the cognitive skills of the students. As a result an objective necessity emerges to fill in the insufficient knowledge through optimal influence and communication with the teacher and other students of the same age.

Developing correct thinking, as a precondition for creative activity during education, was essential for the realization of the provocative heuristic and cognitive functions of the problematic situations. For example, suitable for young students turned out to be games including problematic education (of practical and logical type): "Sparrows and crows", "Jumping in columns", "Attacked ball", "Cat and Mouse", "Jumping from circle to circle", "Jumping circle", "Exact shot", "Fishermen", "Tails", "Clearing the playground of balls", "Who will throw faraway", "Game with geometric shapes", "Dangerous zone" and many more.

For older students from third and fourth grade the selected games helped for a better understanding of mathematical knowledge in a real environment. Suitable for this age turned out to be: "Who will step into the circle?", "Jumping circle", "Two balls chasing in a circle", "Circle race", "Capitals" "White bears", "Moving target shooting", "Race Mail", "Chess board", "Make a shape" and many more.

We shall list some examples of subject relations and collaboration between Physical education and Mathematics:

1. **For speed development** – students are divided in two teams, formed in two facing rows (straight lines) at a distance not more than 10-15 meters. There is a ball in middle. Students count each other in a row. The teacher chooses and cries out a number and the students of the two rows (teams) who have this number rush to take the ball and return in the row. The student who first grabs the ball wins one point. The number the teacher chooses is given indirectly (2+6), (20-5), (3x5), (16:2) etc. Some mathematical operations are required before making the physical movement (rushing for the ball).
2. **For dexterity development** (improving the ability to catch and handle an object). Students are divided in four rows (columns). There are 12 lathes in one end of the rows, 4-5 of which are with the same length and

the rest - with different length. The task is to create a curtain shape by handling the laths from one side of the row to the other. The task can also be "Take only the number of laths that comprise a triangle (equilateral, isosceles, scalene), or quadrangle (square, rhomb, rectangular, rhomboid etc.).

3. **For reaction speed development and attention stability** – students form a circle. They count each other. The teacher stands in the middle of the circle, throws the ball up and cries out a number. The student with this number should catch the ball in the air before it hits the ground. The number may be named directly or indirectly as mentioned above.

Results analysis

The results of the experiment researching the mental ability of the students of first till fourth grade, evaluated with the test "Correct operation solved in 3 minutes" reveal that the volume of the work has increased in both groups, but to a different degree. **The boys in the experimental groups from first till fourth grade** have approved their results with respectively **47%, 39%, 42%, 35%**. The results within the controlling groups of the students of their age are insignificant.

The same changes have been observed with **girls from I – IV grade**. The increase in the experimental groups is respectively: **58.03%, 45.6%, 51%, 47.8%**. The mental ability of the girls of the controlling groups has increased with **28.69%, 31.2%, 24.3%, 27.3%**. The positive effect of the implementation of integrative relations with Mathematics in the lessons and extra-lesson work of Physical education results in the increase of the volume of work with students. Their attention is activated, they become more focused, their mental activity is more organized, their perception of motor tasks has a more systematic nature, which is very fruitful for the intellectual skills of the students.

Conclusions

1. Integrative tendencies in the process of primary school education are a natural result and function of the intensive communication in all spheres of human social realization. There is an obvious necessity to increase and enrich these tendencies. Receiving the knowledge of nature, humans and society is actually a single integral process, with its components basically carried out in the different school subjects. Nevertheless, all different subjects pursue a common objective – development of men-

- tal, moral and physically healthy young generation. Subject relations between Mathematics and Physical education and sports contribute to the achievement of this goal.
2. The lessons and extra-lesson activity of Physical education related to Mathematics influences the expansion of mathematical ideas, terms, etc., the functional and structural building of the student's organism, the improvement of mental opportunities, self-dependency, self-control and programming of motor activity.
 3. Subject relations with Mathematics contribute to the intellectual growth of the students. Uniting the knowledge of the techniques for performing motor tasks, the sports game terminology and the knowledge in Mathematics reveals enormous opportunities for improving mental ability and stimulating the logical and operational irregular thinking.

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