

## **ANALYSIS OF THE MATH CURRICULUM IN THE PRIMARY EDUCATIONAL CYCLES**

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### **Abstract**

This paper is going to analyze the new math curriculum in the primary educational cycle that is taken over and adopted by the Biro of Development and Education from the Cambridge International Examination. In the beginning we are going to make a comparison between the old curriculum and the new one, and we are going to try to find and answer why they are actually taken over (copied) from another country. Also, we are going to try to find out why there weren't any pilot researches through the country that were going to show us the problems in the practice, so we could intervene in due time.

In this paper we are also going to try to explain the need for taking over complete curriculum from a foreign country and the possible application of those programs to the home educational system. The end is going to consider the procured results from the research of the primary education teachers and the level of their satisfaction of their work with the students, but also the challenges (problems) they are facing through the educational practice. The advantages and the disadvantages of the curriculum, the possibility of its realization, the implications on the teachers it has and the possibilities for progress are going to be pointed out through concrete examples. Also we are going to give an answer whether and how much the Biro of Development and Education is ready and competent to give training.

**Key words:** Curriculum, Mathematics, Cambridge, Teachers.

The Bureau for Development of Education 2014/2015 began the academic year with the study of the subjects mathematics and science curricula adapted according to the International Centre for curricula of Cambridge (Cambridge International Examination Centre).

The main features of the adapted curricula subjects in mathematics are :

Spiral Curriculum - Students learn a certain subject, but later in the instruction are going back to the same topic again and are taught the same subject at a higher level and in a different context. Studying in this way it allows students to consolidate and build the knowledge which they learn. Research - The purpose of this feature is to steer students on the right path to become future "scientists." The programs include studies that encourage students to ask questions themselves that are responded by the support of the teachers. This is a proven method by which lessons in the subjects mathematics and science become interesting for the students, and the knowledge which they learn remains permanent. Also, this curricula allows students to develop critical thinking, to think, and to use evidence.

Problem solving - Students easily learn that math and science are important and will help in solving problems in everyday life.

The curriculum in Mathematics is divided into six areas: Numbers, mathematical operations, geometry, measurement, Working with data and problem solving, and will realize a fund of 5 hours per week, or 180 hours per year. This curricula focuses on principles, schemes,

systems, functions and relationships so that students can apply mathematical knowledge and develop a comprehensive understanding of the subject.

For successful application of the adapted curricula in mathematics from first to third grade the Bureau for Development of Education held training for primary school teachers in the country, build according to the program and agenda aligned with the International Centre for curricula of Cambridge (Cambridge International Examination Centre ).

The teachers got a "Guide for Teachers" with tips for quality planning and implementation of lessons and guidance for planning their teaching during the school year.<sup>111</sup>

The manual gives a clear introduction to the themes of teaching, helping teachers to optimize student learning. At the same time, it offers advice and monitoring for the activities of the group or individuals in the implementation of the curriculum. Great emphasis is placed on the feedback received by the teacher from the students for particular educational purposes. The feedback shows how the student is progressing in terms of the curriculum and is a good indicator for both the teacher and the parents.

The manual is complemented by this accessories:<sup>112</sup>

- Creation of planning;
- Preparation and transmission of the lesson;
- Sharing of learning objectives;
- Developing the criteria of success with students;
- Determination of existing skills for formative assessment;
- Effective use of questions.

The ideas and the designs of the BDE are good and progressive if not taking into account one large and important defect; namely, the designs of the BDE are not taking into account the developmental characteristics of the children, as the original Cambridge curricula do. The UK children begin compulsory education at the age of four, and in the Republic Macedonia at six years. This suggests that our students lag behind in preparations for the mathematics for two years. In these two years, children need to adopt the fundamentals of mathematical literacy, and this applies primarily to the sets and operations with sets, the formation of the notion of number ... who are substantial for the development of basic mathematical thinking. Therefore, as an introduction to this paper, we should first recall the developmental characteristics of children in the first educational cycle of the nine-year primary education, which covers the period from 6 to 9 years of age.

1. Sensorimotor phase from birth until the end of the second year;
2. Preoperational stage or preparation stage of the concrete operations of the second end until the end of the sixth (middle of seven);
3. Stage of concrete operations, from seventh to eleventh (twelve) years. and
4. Stage of formal operations or etc. deductive phase (of eleven years. adulthood).<sup>113</sup>

From this categorization we can conclude that children in the first education cycle (6 -9 years), are in the second and third phase.

A feature of the second phase or the preoperational phase is the intuitive thinking; this fact indicates that the opinion of the children in this age is syncretic, and according to Piaget, syncretism is the spontaneity of the child to observe globally and the inability to distinguish

<sup>111</sup> <http://bro.gov.mk/?q=mk/node/163>

<sup>112</sup> <http://bro.gov.mk/?q=mk/node/163>

<sup>113</sup> Malinović, T., Malinović – Jovanović, N. (2002), Metodika nastave matematike, Učiteljski fakultet, Vranje, str.26-27

details. Because syncretism essentially means a tendency in thinking in which “everything connects to everything.”

The third stage or stage specific operations is characterized by the development of a logical view, or the so-called operational intelligence. This transition from intuition to logical thought or mathematical operations is conducted with the help of education by grouping the students and group learning.

If these categorizations are compared with the objectives and the contents of the math curricula of the first grade of primary education, we are going to find many contradictory results. In addition we will quote some of them:

Aims and objectives of teaching mathematics in R. Macedonia: ... among others:

- Collect three digit numbers whose sum is 6,7,8, 9 and 10;
- Beginning to use even numbers whose sum is 10 for addition / subtraction with transition to 20;
- Division of numbers to 10 to determine which numbers are even and which are odd;
- Appoint and allocate 2D shapes and differentiates the number of countries, making schemes and models;
- Specifies and stands 3D shapes ...
- Compares length, weight
- Begins to understand and use some units of time, minutes, hours, days, weeks, months and years;
- Use charts, cryptogram conversation and Carol Venn diagram;
- Solves simple problem presented verbally, and double checks them.<sup>114</sup>

As for comparison will list the extended part of the Cambridge and taught children six years of age:

Preschool age (before pre – kindergarten):

- New skills, such as ordering objects by size, length and height, comparing more and less.

Pre – kindergarten age

- New skills, such as symmetry, measurement and graphics.

Kindergarten

- Major areas of study include: numeration, geometry, data and opportunity, and reference measurement, algebra, patterns, frames and features.<sup>115</sup>

To support these ambiguities, we have done a little research in the municipality Karpoch, which was intended for teachers in first grade, and refers to several questions which we hope will give us answers to some of the problems we are facing in the implementation of mathematics teaching.

**Table 1**

	Question number 1									
	I accepted the news for the Cambridge program with pleasure									
	I agree		Partly agree		irresolute		partly disagree		disagree	
Schools from municipality Karpoch	f	%	f	%	f	%	f	%	f	%
	/	/	22	34,9	30	47,6	11	17,5	/	/

<sup>114</sup> <http://bro.gov.mk/?q=mk/node/163>

<sup>115</sup> <http://www.cie.org.uk/programmes-and-qualifications/cambridge-primary/>

The table. 1 shows the responses of the teachers about how they accepted the new curricula. It can be observed that 34.9% of respondents gladly accepted the news, 47.6% are undecided, while 17.5% only partially agree. These data can safely be concluded that teachers have a positive attitude to the introduction Cambridge programs and the prevailing partial split in their views:

**Table 2**

	<b>Question number 2</b>					
	<b>Do you think that the previous Mathematics curriculum had more shortcomings than the new curriculum?</b>					
	Yes, I think that the previous curriculum had more shortcomings.		I am not sure, why?		No, I do not think that the previous curriculum had more shortcomings.	
Schools from municipality Karpush	f	%	f	%	f	%
	16	25,3	5	7,9	42	66,7

The question, however, whether the previous curriculum in mathematics had more weaknesses of the new curriculum for "Cambridge" 66.7% of respondents believe that "Cambridge" program has more weaknesses than the previous curriculum, 7.9% are undecided only 25% of teachers believe that the previous curriculum has more weaknesses. From the collected data it is concluded that the majority of teachers have objections regarding the "Cambridge" and would like to work under the old curriculum in mathematics.

**Table 3**

	<b>Question number 3</b>					
	<b>Do first grade students come with certain foreknowledge in Mathematics ?</b>					
	Yes		Partially		No	
Schools from municipality Karpush	f	%	f	%	f	%
	/	/	63	100	/	/

**Table 4**

	<b>Question number 4</b>					
	<b>Do you think that first grade students could master the contents planned from the Cambridge program?</b>					
	Yes, I think that the students could master the contents		I am not sure, why?		No, I do not think that the students could master the contents	
Schools from municipality Karpush	f	%	f	%	f	%
	51	80,9	12	19,1	/	/

Asked whether children before getting in first grade have some previous knowledge, all teachers, ie 100% answered that students have prior knowledge regarding partial Course mathematics.

80.9% of respondents, however, believe that the contents provided in the new curriculum for "Cambridge" students acquire while 19.1% are not sure.

**Table 5**

Schools from municipality Karposh	Question number 5					
	Did you have enough preparation for the Math curriculum before you realized it?					
	Yes		Partially		No	
f	%	f	%	f	%	
/	/	33	52,4	30	47,6	

Asked if the teachers are trained to implement the curriculum in "Cambridge" table No.5 can notice its division in the responses. Namely, 52.4% of respondents consider to be partly trained, while 47.6% think they are qualified to deliver the objectives and contents of teaching mathematics in the new curricula.

**Table 6**

Schools from municipality Karposh	Question number 6					
	Do you think you need further preparation from the BDE?					
	Yes		No			
f	%	f	%	f	%	
28	44,4	35	55,6			

The question, however, whether they need additional training by the BRO, the majority of surveyed teachers or 55.6% think that they don't, and 44.4% of teachers think that they do. They can be seen the contradictory claims of teachers. Namely, most of the surveyed teachers are partially or not at all trained for implementation of the mathematics curriculum in first grade, a high percentage, or 55.6% of them do not want to have additional training in strama BDE. This indicates only the bad training previously realized, hence their distrust of BDE and manner of conducting the training.

The last seventh question was open and which reads as follows: What are the problems commonly encountered in the implementation of the program in mathematics, the most common response from those surveyed teachers is the lack of textbooks; then give a response to the failure of the curriculum content in the textbook and lack of instructional / teaching aids. Conclusion can give some recommendations to those responsible for designing educational policies.

### Recommendations:

- Before you introduce innovations natavata, first to make a pilot study, which is not unfamiliar with the pedagogical theory;
- Adhering to the developmental characteristics of children;
- Mandate a large group in preschool institutions;
- Teachers gradually / progressively introduced in the news;
- Training by the BDE to be continuous;
- BDE take care of real needs in planiranjetona training

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