APPLICATION OF PROBLEM-BASED TEACHING METHODS IN THE DEVELOPMENT OF MATHEMATICAL THINKING SKILLS OF STUDENTS

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ABSTRACT

This article provides a pedagogical analysis of the theory of formation and development of pupils' contemplating activities in primary school mathematics, and describes the uzbek methodology of teaching pupils the practice of multiplication.

Keywords:

contemplating, development, mathematical contemplating, verbal reproduction.

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Introduction

In developed countries, education is recognized as a key factor in ensuring sustainable development, and the new concept of education, defined by international organizations and most countries in the world until 2030 identifies priority tasks of "improving the process and tools of teaching quality assessment, implementation of mechanisms to determine the results achieved." This, in turn, contributes to the early development of mathematical thinking activities in primary school students; development of a methodology that serves to form the activity of mathematical thinking in students through oral exercises with the potential of personal development of primary education; There is a true necessity for the development of mechanisms that assist to design and implement the ways and methods of using oral exercises in the development of the student's personality during math classes at primary schools.

Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No. PD-4947 "On the Strategy of Actions of further development of the Republic of Uzbekistan", the Cabinet of Ministers of the Republic of Uzbekistan dated April 6, 2017 No.187 "On approval of state educational standards of general secondary and secondary special, vocational education", Resolution of the President of the Republic of Uzbekistan dated May 7, 2020 No. PR-4708 "On measures to improve the quality of education and development of research in the field of mathematics", Decree of the President of the Republic of Uzbekistan dated January 25, 2018 PD-5313 "On measures to radically improve the system of general secondary, secondary special and vocational education", President Decree No. PD-5712 of April 29, 2019 "On the Concept of Development of the Public Education System until 2030" and other relevant legal acts in this area serve a founding base for the following research and methodology that authors attempt to propose in this work assists to realize those tasks identified in the legal acts to a certain degree.

Scientific research on the development of mathematical thinking in students around the world pays special attention to the effectiveness of the educational process, emphasizing the need to develop a methodological system for the formation of mathematical thinking in primary school students. In their studies scholars mainly focus on the formation and development of mathematical thinking in primary school students, the creation of a methodological system for the formation and development of mathematical

thinking in primary school students based on person-centered learning technologies, identification of factors influencing it, the formation of independent thinking skills, mathematical communication and formation of self-development competencies.

Materials and methods

The basics of the fundamentals of developmental education in math teaching were developed in the research works of of L.G Peterson, H.J. Ganeev, N.B. Istomina, Z.I. Slepkan, I.G. Lipatnikova.

A range of scholar such as A.M.Pishkalo, N.U.Bikbaeva, E.Yangabaeva, B.S. Abdullaeva, B.R. Adizov, Sh.R. Rayhonov, A.Xalillaev, M. Jumaev, M.A.Zayniddinova, O.R.Roziqov, R. Ibragimov, F. Kasimov, Sh. Yunusova and others studied different aspects of teaching mathematics in the primary grades of secondary schools.

The interaction of organizational and methodological approaches to improving the teaching process of mathematics with the general process of reforms in the secondary education system is scientifically proved by foreign academicians such as T.Sakomoto, B.S.Bloom, C.W.Cobb, P.H.Douglas, G.Pimbley, V.Greaney, T.Kellaghan, P.Santiago, D.Nusche, T.Radinger, and C.Shewbridge.

In order to increase the effectiveness of education in 2000-2010, there was a need to use developmental educational technologies in educational process. Developmental educational technologies include problem-based, interactive, pedagogical skills, a complex of textbooks and teaching methods, the development of a culture of design and thinking. Early development of mathematical thinking in primary school students in 2007-2010 as a result of conducting survey on educational technologies in more than 20 schools of the country, the development of educational and methodological complex, design and thinking culture; development of a methodology that serves to form the activity of mathematical thinking in students through oral exercises with the potential of personal development of primary education; authors found that it was necessary to develop mechanisms for the improvement and introduction of ways and methods of using oral exercises in the development of the student's personality in mathematics lessons.

L.M. Friedman states: “Mathematical thinking has its own characteristics. It has distinctive features that distinguish it from thinking processes in other disciplines ... The specificity of mathematical thinking should be sought not in its methods, but in its objects, which are now widely used in other disciplines and are therefore more widely recognized as a general method of teaching [4]. He concludes that mathematical thinking is a highly abstract thinking.

We also heavily relied on D. Poe's ideas in our research work regarding math teaching methodology. According to him, a math teacher with a high level of professional competence can create a favorable environment for students to work independently and research. Conversely, an inexperienced teacher weakens students ’interest by giving students sample assignments.

V.A Krutetsky's idea also enriches the above-mentioned idea. The mental activity of the student occurs as a result of the transition from performing the actions assigned to him by the teacher to performing actions independently, creatively searching for problems and solving them independently. The discovery by the student of what is known to mankind but unknown to himself is a subjective creative process.

We know that the learning process has its own stages. Problem-based teaching method has a special place in the formation and development of mathematical thinking activities in students. The problem of problem-based learning is theoretically proved by M.I.Makhmutov [3].

The goal of problem-based learning is not only to acquire knowledge, but also to develop the ability to look for ways to apply it. In the process of problem-based learning, there are opportunities to develop students' intellectual, motivational, emotional and other areas. Accordingly, the

general development of students is achieved using this method.

A methodology for using problem-based teaching methods in the formation and development of students' thinking activities in primary school mathematics lessons has been developed.

We propose to teach verbal multiplication of numbers greater than 5 in a non-traditional way, without denying the introduction of the practice of multiplication in traditional teaching methods [5]. Here is an example of multiplication using the fingers of the hand:

1) Multiply by 9 using the fingers of the hand.

Raise the fingers of the left and right hands and number the fingers in the direction from left to right (see Figures 1 and 2).

Figure 1.

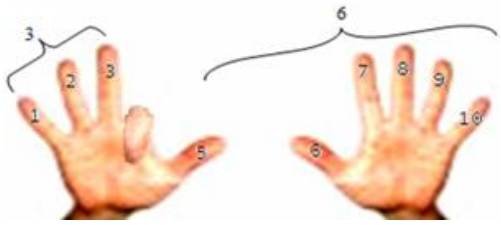

Figure 2.

To multiply the number 9 by the numbers until 10, we bend the numbered finger with the desired number. As a result, the fingers split in two. The number of fingers to the left of a bent finger represents tens, and the number of fingers to the right represents units.

Hence: To multiply a one-digit number by 9, this number is subtracted together, followed by the filler to 9.

For example: 8 * 9 = 72, 6 * 9 = 54

To multiply a two-digit number by 99, this number is reduced together, with a filler written next to 99.

63 * 99 = 62 37, 80 * 99 = 79 20

To multiply a three-digit number by 999, this number is reduced together, with a filler written up to 999 next to it.

636 * 999 = 635 364, 806 * 999 = 805 194.

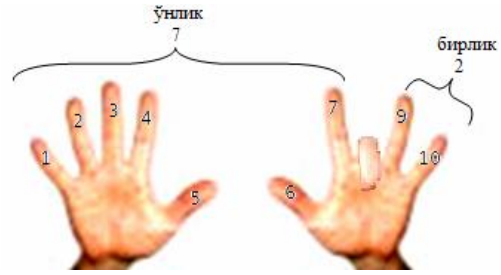

Figure 3.

Figure 4.

When multiplying numbers from 6 to 10, the fingers are numbered as shown in Figure 4, and the multiplication of the numbers is done in the following order.

Figure 5.

Figure 6.

6 x 6 = 2 x 10 + 4 x 4 The first multiplier bends the sixth finger from the left hand, the second multiplier bends the sixth finger from the right hand. The number of bent fingers on both hands represents decimals, and the number of unbent fingers on the left hand and right hand represents units. The result is that the number of bent fingers is added to the tens by multiplying the number of units in the left and right hand by each other, i.e.

2 decimals + (4 units) x (4 units) = 20 + 16 = 36 (Figure 5).

If the numbers are in one decimal and the sum of the numbers in the unit room is 10, then the numbers in the unit room are multiplied and written at the end of the number, the number in decimals is multiplied by the next number and written at the beginning of the number.

For example: 23 * 27 = 6 21, 32 * 38 = 12 16, 44 * 46 = 20 24, 45 * 45 = 16 25, 61 * 69 = 42 09, 112 * 118 = 132 16

Analyzing the process of performing the multiplication operation using the fingers, we propose the following verbal calculation method of multiplication:

First you need to consider multiplying the numbers in 10 by adding 10. For example, let's look at 7 x 8, first we write 7 and 8, then we write the fillers for 10 under them:

7	X	8
-3		-2

Now we divide the resulting numbers diagonally (7-2) or (8-3), the difference is the number in the decimal place of the result, we multiply the given numbers by 10 3 x 2 = 6, this number is the number in the unit of the result. So:

7	x	8	=	56
-3		-2		

96 x 94

Since these numbers are around 100, we perform the calculation as follows.

96 X 94

-4 -6

(96-6)=90 or (94-4)=90.

90 x 100 =9000

4 x 6 = 24

9000 + 24 = 9024, ie

96 x 94 = 9024

-4 -6

The use of similar verbal multiplication methods in mathematics lessons shapes and develops the verbal arithmetic skills of primary school students, developing students 'thinking activities. Increases their interest in the science of mathematics. Develops the ability to perform calculations quickly and correctly in their daily lives and practical activities in the future.

Such methods serve to improve the state educational standards for the content and quality of primary education in the formation and development of mathematical thinking in primary school students, in improving the methods of primary education, pedagogical theory courses, advanced training programs. It also enriches the pedagogical skills of primary school teachers with advanced practices and innovative methods.

References

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