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"FIVE STEP" AND "THREE STEP" METHODOLOGIES

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INTRODUCTION. In fact, in the introduction of the updated education system, it is necessary to form and nurture the professional competence of each future teacher in his subject and the education of the mature generation, and to have the skills to use them consistently in pedagogical activities. is an important requirement of today.

For this reason, the ability of the future elementary school teacher to skillfully use his mathematical knowledge in the course of his work is one of the main tasks to be solved in our research work.

We considered that the role of constructive issues in the development of mathematical competence of future elementary school teachers is incomparable in order to perform this task at the required level.

In order to understand the constructive problem sentence, let's first look at the terms "constructive" and "construction".

Constructive. 1. structural defects of the building.

Construction [lat. Construction - collection, assembly, construction, construction].

1. max. The structure of a structure, mechanism, work, etc., the mutual arrangement of parts, complex structure, mechanism, etc. itself. Old construction. New construction aircraft. Construction of the bridge. Reinforced concrete construction. Complex construction.

2. tlsh. Two or more words that are grammatically interconnected and form a syntactic combination. Generally, a combination of words. Syntactic construction. Construction with an excerpt[8; p. 401], means the same.

So, we can consider the issues of collecting, assembling, structuring and building as a constructive issue. Below, we will analyze the state of research of such constructive issues on the example of our country and foreign countries.

RESEARCH METHODS. M.K. Mamadzhanova [7; p. 24] In the educational manual entitled Logical, combinatorial and non-standard problems, on the topic of solving logical problems related to casting, you can find the following constructive problems related to liquids:

Issue 1. How can you get 5 liters of water from a drinking water tank using 7 liter and 3 liter containers? There is a water trough for draining the water in the dishes.

Issue 2. How can you get 1 liter of water from a drinking water tank using 5 liter and 3 liter containers? There is a water trough for draining the water in the dishes.

Issue 3. Is it possible to measure 4 liters of water using 9-liter and 12-liter containers?

The author used the analysis method (returning from the end to the beginning) in constructing the solution of these problems and reached the solution of the 1st problem in 8 steps and the solution of the 2nd problem in 4 steps. It is possible to perform these problems based on a strict algorithm through the methodology we have proposed, in which it is enough to take the water tap as the 1st container, the large container in the given problems as the 2nd container, and the smaller one as the 3rd container. The solution to problem 1 can be achieved in 10 steps, since the sum of the numbers 7 and 3 is 10.

The solution to the 3rd problem cannot be determined, you can come to this conclusion using the methodology we suggest, on the other hand, the amount of containers is not odd.

The same problem as above can be found in the researches of N. Guliyev, the problem is given as follows: "Is it possible to get 12 liters of water in a 13-liter container using 11- and 13-liter containers?" [3; p. 47]

In Belarusian elementary school mathematics textbooks, we find issues related to the construction of fluid, the expression of the concept of an equation in a circuit scale (T.M. Chebatarevskaya, V.V. Nikolayevich).

Matter. The first tank contains 100 liters of gasoline. How to measure 10 and 50 liters of benzene using empty 30 and 70 liter containers[9]?

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In our research work, we proposed the rules used for the solution of this problem, if the student uses the stated rules appropriately, he will not face any difficulties in finding the solution of the problem. In the proposed rule, the quantities are reduced by 10 times and presented as 10, 7 and 3 liters, the rule is also appropriate for the above issue.

The mathematical competence of the future elementary school teacher to take appropriate positions in today's innovative, increasingly digitized educational system that requires high pedagogical skills, constructive issues recommended for students of the 2nd - 4th grade of specialized schools and it would not be an exaggeration to say that it will be strengthened once again by the process of their dissolution.

The following constructive problem given in the manual "Addition from mathematics, problems, exercises and examples" created by O.P. Boboyev and G.F.Shamsiyeva for students of the 2nd - 4th grade of specialized schools is unfamiliar to future elementary school teachers. should not be.

Matter. There are 10 liters of water in a bucket, how can you leave 5 liters of water in a bucket using 4 liter and 3 liter containers[2; p. 75]?

The solution of this structural problem can be achieved through the methodology used for the 1st general type of fluid structural problems described in our research work. This represents the relevance and importance of the methodology proposed in the research.

Also, in this manual of the authors, "out of 21 khums of the same capacity, 7 are full, 7 are half filled with oil, and 7 are empty. 3 businessmen want to divide oil and humus equally. How to evenly distribute oil and humus without pouring oil into containers?[2; p. 119]" is also a constructive issue.

In each class, there are few, but talented students who have a strong desire to learn mathematics. If it is not possible to organize additional classes with such students, then classes with such students will become boring and the students' abilities will fade. Of course, if the teacher organizes additional classes with special attention to such students, he will achieve good results. Due to the fact that the current textbooks are shallow in working with such students, in order to expand the possibilities of teachers[2; p.120], in our research work, methods were developed that ensure easy access to the solution of constructive problems related to liquids.

The derivative goal of our research work is to adapt the mathematical knowledge of elementary school students to today's development atmosphere, for this we focused on developing the mathematical competence of future elementary school teachers.

In the research, we describe the constructive problems related to water (liquid) in primary school mathematics textbooks, which help to develop the mathematical competence of future primary school teachers, and their solutions. Constructive problems, the construction of which depends on water, can be found enough in elementary school mathematics textbooks. In most cases, the solution to these structural problems is done by pouring the liquid from one container to another. The gratifying aspect of the mentioned issues is that the problems (issues) that can be expected in our daily life are skillfully embedded in the essence of these constructive issues.

For example, along with such problems, we also find the theoretical part of liquid problems described in the researches of M. A. Mirzaahmedov, whose theoretical part is represented by the equation, "There is 3 times more milk in one can than in another. 6 liters of milk were poured into one canister with a lot of milk, and 7 liters into another, so that the milk in the first canister was twice as much as the second one. At first, how many liters of milk were in each can?

It should be noted that the number of literatures in which the solutions to the constructive problems described in our research work are comprehensively covered is insufficient. Therefore, the problems similar to the constructive problems mentioned in paragraph 2.3 were removed from the 2019 edition of the 3rd grade mathematics textbook. In fact, these problems were available in the 2016 edition of this textbook (referring to problem 836 of this textbook). The main reason for the removal of problematic issues from textbooks is that our personnel (in this case, future primary school teachers) are not familiar with the methods of solving the mentioned constructive issues. Taking into account the above, 2016 grade 3 mathematics [1; p.154], the problem of determining the most convenient method leading to the solutions of structural problems given in the textbook was considered as a problem in our research, and a rule was developed for fluid structural problems.

Methodological issues arise in every lesson, however, as a rule, they do not have a one-size-fits-all solution. In order for the teacher to be able to quickly find the most suitable solution for the given educational situation of the methodical problem that arises in the lesson, it is necessary to have a wide enough training in this field [5; p. 5].

Taking this into account, the future elementary school teacher should be aware of technologies such as "5 steps", "3 steps", "dividing the liquid in a container with a volume equal to the volume of two odd-volume containers into two equal parts", mathematical competence determines that it is at the level of demand.

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Pupils should, as far as possible, independently open legal relations, make generalizations as much as they can, and also learn to make oral and written conclusions [6; p. 13].

For this reason, the future elementary school teacher will learn the laws of the problems of "5 steps", "3 steps", "dividing the liquid in a container with a volume equal to the volume of two odd-volume containers into two equal parts", that is, how many steps to the solution of the problem he should leave it up to his students to achieve in steps.

Zucco's reader will surely follow the rules and will notice that he has made some kind of mistake if he does not reach the solution of the problem in the even-volume container step, or in five and three steps. This helps the student's self-evaluation and the teacher's productivity.

A student who understands the rules leading to the solution of the problem can now independently create an algorithm leading to the solution.

It is not possible to create an algorithm for all issues. For example, it is not possible to develop an algorithm for creating expressions (equations) on the spheres of arithmetic problems, numerical data, expressions (text problems on equations), short writing conditions of text problems [6; p. 71]. However, it is possible to design the solution of constructive problems solved by the "3-step" technology according to the algorithm, in which it is enough to pour the liquid from the 1st container to the 2nd container, from the 2nd container to the 3rd container, from the 3rd container to the 1st container, i.e. follow this algorithm doing will lead to the solution of the problem.

THE MAIN PART. The issue of developing the mathematical competence of future elementary school teachers was selected as the relevance of the topic, and the methods proposed in the research were developed. These methods were created in order to easily achieve the solution of the two general problems given below.

Below, we will describe the constructive issues related to water (liquid) in elementary school mathematics textbooks, which help to develop the mathematical competence of future elementary school teachers, and their solutions[4; p. 62].

General issue 1. A $3n-2$-liter container contains $3n-3$ liters, a $2n$-liter container contains $n+1$ liters of liquid, divide the liquid in the containers into two equal parts using an empty n-liter container. Here $n>2, n\epsilon N$.

We offer to solve structural issues related to this type of liquid using the "***5 steps***" method.

The volume of given liquids $((3n-3)+(n+1)=4n-2)$ is equal to the volume of the largest and smallest containers $((3n-2)+n=4n-2)$.

Reminder. Problem 809, which is available in the 2016 [2.67] edition of the 3rd grade mathematics textbook, is a special case of the above general problem 1 (the case with $n=3$) and is not available in the new editions of the textbook. The main reason for the problem is that future elementary school teachers have not fully developed the competence to solve constructive problems at this level. We will analyze the method of solving this constructive problem below.
We use the following methodology to determine the solution to the 1st general problem

Table 1

Dishes	$3n-2$ liter container	$2n$ liter container	n liter container	Solution scheme
The amount of liquid in the containers	A $3n-2$ liter container contains $3n-3$ liters of liquid	A $2n$ liter container contains $n+1$ liters of liquid	n liters an empty vessel	
step 1	$3n-3$	$n+1$	0	$2\rightarrow 3$
step 2	$3n-3$	1	n	$3\rightarrow 1$
step 3	$3n-2$	1	$n-1$	$1\rightarrow 2$
step 4	$n-1$	$2n$	$n-1$	$2\rightarrow 3$
step 5	$n-1$	$2n-1$	n	$3\rightarrow 1$
solution	$2n-1$	$2n-1$	0	

"***5 step***" ***methodology***. Determining the solution of the problem by the proposed method is carried out in the following steps.

Stage 1. Name the containers in the problem given in step 1 as follows.

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- The largest container of $3n-2$ liters is the first container.

- $2n$ liter container - the second container.

- the smallest container of n liters is the third container.

Stage 2. At this stage, determine the solution to the problem by following the rule below.

The rule. Pouring liquid from one container to another, start from the second container first.

Step 1. Transfer the liquid from the second container to the third container

Step 2. From the third pot to the first pot

Step 3. From the first container to the second container

Step 4. From the second pot to the third pot

Step 5. Pour from the third container into the first container.

If you follow the rule exactly, you will reach the solution of the problem in the fifth step.

Table 1 describes the construction model of the mentioned rule.

Thus, the given problem was completely solved by the recommended methodology. The given $4n-2$ liters of liquid was divided into $2n-1$ liters in the first and second containers.

General issue 2. A $3n+2$ liter container contains $2n+2$ liters, a $3n+1$ liter container contains $2n$ liters of liquid, divide the liquid in the containers into two equal parts using an empty n liter container. Here is $n\epsilon N$.

Table 2

Dishes	1st container of $3n+2$ liters	$3n+1$ 2 liter container	n 3-liter container	Solution scheme
The amount of liquid in the containers	A $3n+2$ liter container contains $2n+2$ liters of liquid	A $3n+1$ liter container contains $2n$ liters of liquid	n liters an empty vessel	
step 1	$2n+2$	$2n$	0	$1\rightarrow 2$
step 2	$n+1$	$3n+1$	0	$2\rightarrow 3$
step 3	$n+1$	$2n+1$	n	$3\rightarrow 1$
solution	$2n+1$	$2n+1$	0	

Constructive problems related to this type of liquid are solved by the "***3-step*" *methodology***.

We use the following methodology to determine the solution to the 2nd general problem.

"3 step" method. Determining the solution of the problem through the recommended methodology is carried out in the following steps.

Stage 1. Name the containers in the problem given in step 1 as follows.

- The largest container of $3n+2$ liters is the first container.

- $3n+1$ liter container - the second container.

- the smallest container of n liters is the third container.

Stage 2. At this stage, determine the solution to the problem by following the rule below.

The rule. Start pouring the liquid from one container to another first from the first container.

Step 1. Transfer the liquid from the first container to the second container

Step 2. From the second pot to the third pot

Step 3. Pour from the third container into the first container.

If you follow the rule exactly, you will reach the solution of the problem in the third step.

The solution. Table 2 shows the algorithm for determining the solution to the problem.

Theoretical description of the solution of the problem, based on Table 2

Step 1. (from the first container to the second container) We first fill the 2nd container from the liquid in the 1st container, so that $n+1$ liters of liquid remain in the 1st container.

Step 2. (from the second container to the third container) we pour the liquid in the 2nd container into the 3rd container, in this case the 3rd container is full, and in the 2nd container

$2n+1$ liters of liquid remain.

Step 3. (from the third container to the first container) We pour all the liquid in the 3rd container

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into the 1st container, while the amount of liquids in the first and second containers is equal.

It is also worth noting that the solution to the 2nd general problem can be built using the "5 steps" methodology.

In the process of using the methods recommended in the research work, several constructive problems were analyzed, and the following results were obtained, since the algorithm for building a problem solution was the same in all of them.

RESULTS AND DISCUSSIONS. For an arbitrary natural number greater than 2, when there are $3n-3$ liters in a $3n-2$-liter container, and $n+1$ liters in a $2n$-liter container, the problem of dividing the given liquid into two equal parts using an empty n-liter container is determined in 5 steps .

A $3n+2$-liter container contains $2n+2$ liters, a $3n+1$-liter container contains $2n$ liters of liquid, and using an empty n-liter container, the liquid in the containers can be divided into two equal parts, this process is carried out in 3 steps.

CONCLUSION. We can consider both analyzed problems as constructive problems, because the solution of each problem is being built in a sequence of steps, which means construction. In other words, constructions leading to a solution were proposed.

Only if the number of future elementary school teachers who have mastered the methods recommended in the research work increases, there will be no need to remove constructive problems from textbooks, which are considered problematic to solve.

Through the wide promotion of this research work, our personnel (future elementary school teachers) will not have problems in constructing solutions to the constructive problems presented in the research, which will help to solve the constructive problems similar to the solutions shown in the article. It is the basis for inclusion in first grade mathematics textbooks (grades 3-4).

It is also worth noting that in the essence of the research work, it is possible to create several constructive problems, the solution of which is determined by the methods described.

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