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DEVELOPING CRITICAL APPROACH THROUGH ANALYZING INCORRECT DECISIONS IN PERFORMING OPERATIONS ON FRACTIONS

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Abstract
This article discusses the possibilities of developing critical thinking skills based on the analysis of errors and incorrect decisions made by elementary school students when performing operations on fractions. A critical approach is explained as a process that activates the student's thinking activity, aimed not only at identifying an error, but also at its in-depth analysis, understanding its causes, and solving the problem. It is proven that students can develop mathematical thinking skills, find independent solutions to problem situations, and come up with alternative ideas based on practical examples, analytical tasks, and reflective questions.

Keywords: fractions, critical thinking, wrong decision, analysis, error, mathematical thinking.

Today, the development of critical thinking skills in students in general secondary education is one of the most pressing issues. Especially in mathematics - in particular, in such topics as performing operations on fractions - students often make mistakes. By working on these mistakes, analyzing and correcting them, students learn to think critically, evaluate and justify their decisions.

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Critical thinking and its application to mathematics. Critical thinking is the ability to analyze existing knowledge, draw logical conclusions, identify errors, and make informed decisions. This skill increases the student's mathematical literacy, that is, the level of a deep, logical and systematic approach to the problem.

Typical errors when performing operations on fractions. Below are some of the most common errors made by elementary school students:

Issue	Wrong solution	Error reason
$\frac{1}{2}+\frac{1}{3}$	$\frac{2}{5}$	Add the numerator and denominator separately
$\frac{3}{4}-\frac{1}{4}$	$\frac{2}{0}$	When subtracting the numerator, also subtract the denominator
$\frac{2}{5}\cdot\frac{3}{7}$	$\frac{6}{12}$	The denominator was calculated incorrectly.
Mixed numbers: $1\frac{1}{2}+2\frac{2}{3}$	$3\frac{3}{5}$	Mixed numbers added incorrectly

Methodology for developing critical thinking based on error analysis. The teacher can develop critical thinking in the following stages:

Analyzing incorrect solutions: For example, the student is given incorrect solutions and asked questions such as “Why is this solution incorrect?”, “Where did the mistake occur?”

Providing alternative solutions: “What if this problem were different?”, “Can it be solved in another way?”

Coming to a conclusion and substantiating: The student justifies his opinion: “I think this is a mistake because...”

Reflection: At the end of each lesson, students are asked questions such as “What mistakes did we see today?”, “What should we be careful of?”

Sample practical assignments

Task 1. Is the following solution correct? Analyze and justify your opinion:

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$$\frac{3}{5}+\frac{2}{7}=\frac{5}{12}$$

Task 2. Find the error and write the correct solution:

$$1\frac{1}{4}+2\frac{1}{2}=3\frac{2}{6}$$

Task 3. Give at least two solutions to the following problem and justify which one is more convenient:

$$\frac{5}{6}-\frac{1}{3}$$

Expected results. Students trained on the basis of a critical approach will develop the following skills:

- Logically justify their own opinion;
- Identify and correct errors;
- Offer alternative solutions in problem situations;
- Self-control and evaluation.

In conclusion, analyzing students' errors in the process of performing operations on fractions is an effective tool not only for consolidating knowledge, but also for developing deep critical thinking. By working on an incorrect decision, the student strengthens his thinking, which creates the basis for a deeper mastery of subsequent mathematical topics.

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