EURASIAN JOURNAL OF TECHNOLOGY AND INNOVATION
Innovative Academy Research Support Center
Open access journal www.in-academy.uz

DEVELOPING STUDENTS' COGNITIVE COMPETENCE THROUGH TEACHING ELEMENTARY MATHEMATICS

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ARTICLE INFO
Received: 25th May 2023
Accepted: 30th May 2023
Online: 31th May 2023
KEY WORDS
Cogn itive competency, innovation, ability, motivation, creativity, critical thinking, problem solving.

ABSTRACT
In this article, the content was explained on teaching elementary mathematics using digital technologies to develop students' cognitive competence, and the effectiveness level of the results obtained through experimental testing was determined.

Elementary mathematics is a critical topic in developing students' cognitive competencies. It is essential for students to learn logical skills such as analyzing, solving, organizing, and representing mathematical concepts to overcome challenging problems.

Elementary mathematics relies on rules and models that students must understand to learn mathematical literature and the appropriate methods for analyzing it.

To develop students' cognitive competencies in teaching mathematics, educators need to utilize various methods to help them benefit more from mathematics. For instance, teachers should assist students in analyzing, solving, and creating charts and tables, discussing and evaluating them, reading and writing mathematical literature, and practicing other essential math skills.

In teaching mathematics, educators should encourage students to practice and help them with real-world applications. For example, students need to work on several analytical tasks, get assistance, and check their answers.

In teaching mathematics, educators should demonstrate proper problem-solving methods and encourage students to find their solutions. This will help them become more engaged with mathematics and increase their motivation to find their answers.

In teaching mathematics, teachers need to create practical exercises and problems to help students find solutions and practice mathematical operations, which can aid them in utilizing math in real-life situations. Yes, of course! Do you want to know more about developing cognitive competence in students during the process of teaching elementary mathematics?

Teaching mathematics plays a significant role in developing cognitive competence. Learning mathematics helps students to develop logical and physical concepts needed for understanding, analyzing, arguing, and solving problems. This, in turn, helps students develop competencies such as identifying themselves, analyzing, problem-solving, solving significant problems, creative thinking, and developing problem-solving and creativity skills.

To ensure the development of cognitive competence during the teaching of mathematics, teachers must employ strategies aimed at teaching mathematical concepts and ideas to students. For example, working with students to solve problems, analyze them, and argue about them can help develop their logical and physical concepts. This includes developing skills such as identifying oneself, developing anti-stress capabilities for the future, developing students' analytical and argumentative skills, and engaging in cooperation and collaboration with other students, including discussing their own thoughts and opinions.

During the teaching of mathematics, teachers can help develop students' cognitive competence by organizing the learning of mathematical concepts, developing problem-solving skills, and teaching them how to solve problems logically. Learning mathematics helps students develop their competencies in logical and physical thinking, which can also aid them in other fields.

Mathematical exercises are considered the main part of mathematics classes for students. These exercises are designed to apply theoretical knowledge gained in math classes, to test and consolidate students' understanding. Practical exercises are considered the main tool for the cognitive development of students, as through these exercises, students can practice solving math problems independently.

Providing students with mathematical practical exercises enables them to consolidate and analyze their knowledge, solve problems, apply theoretical knowledge in practice, and improve their skills. These exercises allow students to move one step further in their understanding of the subject. Therefore, it is essential for teachers to create practical exercises based on the students' activity and interest.

When designing mathematical practical exercises, teachers should pay attention to the following characteristics:

Exercises should match the students' level of preparation.

Exercises should be of an appropriate level of complexity and length, taking into account the students' experience and skills.

Exercises should be divided based on the students' experience and skills.

Exercises should be created in a way that makes it convenient for students to test and improve their knowledge.

Exercises can be presented in the form of illustrations, interactive systems, or study programs.

Exercises should allow students to apply their experience in practice, solve problems, and analyze logical processes.

Overall, providing students with practical exercises is an effective way to consolidate theoretical knowledge and improve their mathematical skills.

Developing students' cognitive competence through teaching elementary mathematics is a crucial aspect of their overall educational growth. Mathematics provides a unique

opportunity to enhance students' cognitive abilities, such as critical thinking, problem-solving, logical reasoning, and analytical skills. Here are some strategies and approaches that can be employed to foster cognitive competence in students while teaching elementary mathematics:

Active Learning: Encourage active participation and engagement of students during math lessons. Use hands-on activities, manipulatives, and real-world examples to make learning more concrete and relatable. This approach promotes cognitive development by enabling students to explore mathematical concepts through direct experience.

Problem-solving Approach: Emphasize problem-solving as an integral part of mathematics learning. Present students with open-ended questions and challenging problems that require them to apply their cognitive skills to find solutions. Encourage multiple problem-solving strategies and provide opportunities for students to explain their thinking processes.

Critical Thinking Skills: Foster critical thinking skills by asking students to analyze, evaluate, and interpret mathematical information. Encourage them to question assumptions, make connections between different concepts, and identify patterns and relationships. Provide opportunities for collaborative discussions and debates to enhance their reasoning abilities.

Metacognition: Promote metacognitive awareness by encouraging students to reflect on their thinking processes and strategies. Teach them to monitor their own learning, set goals, and evaluate their progress. This metacognitive approach enhances students' ability to regulate their cognitive processes and develop a deeper understanding of mathematical concepts.

Scaffolding: Provide appropriate support and scaffolding to students as they learn new mathematical concepts. Gradually release responsibility, allowing them to take on more challenging tasks independently. This approach helps students build confidence, develop problem-solving skills, and strengthen their cognitive abilities.

Technology Integration: Utilize educational technology tools and software to enhance students' cognitive competence in mathematics. Interactive games, simulations, and online resources can provide opportunities for hands-on exploration, problem-solving, and critical thinking. These tools can also offer immediate feedback and adaptive learning experiences tailored to students' individual needs.

Differentiated Instruction: Recognize and accommodate the diverse learning needs and cognitive abilities of students. Differentiate instruction by providing varying levels of challenge, using differentiated materials, and offering additional support or enrichment opportunities. This approach ensures that all students can engage meaningfully and develop their cognitive competence at their own pace.

Authentic Assessments: Use authentic assessments that require students to apply their cognitive skills in real-life contexts. Performance-based assessments, portfolios, projects, and open-ended tasks allow students to demonstrate their understanding and problem-solving abilities. These assessments provide a holistic view of students' cognitive competence beyond traditional tests and quizzes.

Cultivating a Growth Mindset: Foster a growth mindset in students by emphasizing effort, perseverance, and the belief in the ability to improve. Encourage students to embrace challenges, learn from mistakes, and see obstacles as opportunities for growth. This mindset cultivates a positive attitude towards learning and supports the development of cognitive competence.

By implementing these strategies, teachers can create a math learning environment that promotes the development of students' cognitive competence. By nurturing their critical thinking, problem-solving, and analytical skills, students can become confident and capable mathematicians while also enhancing their cognitive abilities across various domains.

Developing students' cognitive competence through teaching elementary mathematics is an important responsibility. Mathematics provides unique opportunities to enhance students' critical thinking, problem-solving, logical reasoning, and analytical skills, as well as their ability to make theoretical decisions and organize projects. The following strategies and methods can be utilized in the process of teaching elementary mathematics to enhance students' cognitive competence:

Active Learning: Encourage students to actively participate and engage in mathematics lessons by providing hands-on activities, resources, and real-world examples. This approach allows students to learn mathematics concepts through direct experience and experimentation.

Problem-Solving Approach: Allocate a significant portion of mathematics instruction to problem-solving. Present students with open-ended questions and challenging problems that require them to utilize their cognitive abilities to solve. Provide opportunities for students to explore different problem-solving strategies and encourage them to explain their thinking processes. Development of Critical Thinking Skills: Foster the development of students' ability to analyze, evaluate, and articulate mathematical concepts. Encourage them to make connections between related concepts, identify patterns, and recognize relationships. Create opportunities for collaborative debates and discussions to strengthen their reasoning and argumentation skills.

Metacognition: Teach students metacognitive knowledge and strategies to monitor and regulate their thinking and learning processes. Help them develop skills such as self-monitoring, goal-setting, and self-assessment. This metacognitive approach supports students in organizing their cognitive processes and developing their problem-solving skills.

Utilize Technology: Incorporate educational technology tools and programs to facilitate learning mathematics. Interactive games, simulations, and online resources provide opportunities for students to learn mathematical concepts, solve problems, and engage in critical thinking. These tools offer individualized learning experiences that cater to students' needs and foster their cognitive development.

Differentiated Instruction: Recognize and accommodate the diverse learning needs of students when teaching mathematics. Provide additional support or enrichment opportunities based on the varying levels of difficulty, differentiated materials, and supplementary resources. This approach ensures that all students have access to meaningful and challenging mathematical experiences.

Analytical and Presentation-Based Teaching: Analyze mathematical information and promote inquiry-based learning. Teach students to analyze mathematical thought processes, make conjectures, and present logical arguments. The primary goal of such teaching is to develop students' abilities in critical thinking, problem-solving, and logical decision-making.

Assessment for Growth: Use authentic assessments, portfolios, projects, and open-ended problems to assess students' cognitive abilities in real-life contexts. This type of assessment encourages students to demonstrate their understanding and problem-solving skills. It provides students with opportunities to reflect on their learning processes and promotes further cognitive growth.

Nurturing Growth Mindset: Foster a growth mindset in students, emphasizing the importance of effort, perseverance, and the belief that abilities can be developed through dedication and practice. Encourage students to embrace challenges, view mistakes as learning opportunities, and value the process of growth and development. By implementing these strategies and methods, teachers can effectively promote the cognitive competence of students in elementary mathematics education.

Metacognition: To develop metacognitive knowledge in students, encourage them to reflect on their thinking processes and strategies. Teach them to monitor their learning, set goals, and learn to evaluate their own progress. This metacognitive approach helps students to organize and support their cognitive processes: providing appropriate support and assistance to students in learning new mathematical concepts. Assign challenging problem-solving tasks that require students to apply their unique thinking and problem-solving strategies, fostering the development of their cognitive abilities.

Utilizing Technology: Enhance students' cognitive abilities by incorporating educational technology tools and programs in mathematics instruction. Interactive games, simulations, and online resources provide opportunities for learning mathematical concepts, problem-solving, and critical thinking. These tools offer personalized learning experiences that cater to individual students' needs and promote their cognitive development.

Differentiated Instruction: Recognize and address the varying learning needs and cognitive abilities of students through differentiated instructional strategies and materials. Challenge students with more difficult problem-solving tasks, utilize differentiated materials, and provide additional support or extension opportunities. This approach ensures that all students have access to meaningful and challenging mathematical experiences.

Authentic Assessments: Evaluate students' cognitive abilities in real-life contexts through authentic assessments. Use performance-based assessments, portfolios, projects, and open-ended problems to assess students' understanding and problem-solving skills. These assessments provide opportunities for students to demonstrate their cognitive abilities and reflect on their learning processes, fostering further cognitive growth. Nurturing: Emphasize nurturing in the teaching process to promote students' cognitive development. This includes increasing motivation, setting goals for self-evaluation and recognition, and emphasizing the important aspects of effective learning and support.

Facilitating Thoughtful Discourse: Promote student-to-student interaction and discussions to enhance their cognitive abilities. Engage students in debates and discussions

that require them to express their ideas, engage in detailed explanations, and organize their thoughts.

By implementing these strategies and methods, teachers can effectively enhance students' cognitive competence in elementary mathematics education.

Differentiated Instruction: Recognize and understand the learning needs among students and the importance of tailoring instruction to meet those needs. Through differentiated instruction, you can offer students varying levels of difficulty, differentiated materials, and additional support or extension opportunities. This approach ensures effective learning opportunities for all students.

Analytical and Presentational Teaching: Emphasize the analysis of mathematical information and stimulating students' curiosity. Teach students to analyze mathematical thinking and reasoning processes. The main goal of this type of instruction is to develop students' analytical and presentational thinking, problem-solving skills, and logical decision-making.

Nurturing Growth Mindset: Engage students in growth mindset conversations and encourage them to embrace their individual differences. Growth mindset conversations support students in self-assessment and self-improvement, allowing them to internalize feedback and suggestions given during the learning process.

By implementing these strategies and methods, teachers can effectively enhance students' cognitive competence in elementary mathematics education.

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