

EDUCATIONAL ACTIVITY AS A FACTOR IN SOLVING MATHEMATICAL PROBLEMS OF ELEMENTARY SCHOOL STUDENTS THROUGH THE THEORY OF COGNITIVE EDUCATION

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Abstract:

The article is devoted to the study of interrelationships in improving the ability to solve mathematical problems by organizing the educational activities of elementary school students using the theory of cognitive education. Questionnaires were conducted with 45 4th-grade students to check their educational activities through the observation method. In order to assess mathematical problem-solving skills, problem descriptions were used to conduct the research. The test results showed a significant correlation between academic performance and mathematical problem-solving skills. With the help of cognitive learning theory, learning activities were tested and correlational results were determined in solving mathematical problems. Based on the results of the analysis, we can conclude that it has a significant effect on the educational activity and ability to solve mathematical problems of the fourth-grade elementary school students of Boyovut district, Sirdarya region.

Introduction

Education is a basic need that can never be separated from human life, and it gives children the opportunity to learn through learning activities that support the creation and achievement of educational goals. In order to properly conduct a pilot test on the introduction of the national curriculum (hereinafter - the Program) based on the requirements of the republican scientific-methodical center for the development of education under the Ministry of Pre-school and School Education, general secondary development of the state educational standard of education, basic and variable curricula and programs; Based on the order of the Ministry of Pre-school and School Education, by selecting authors and compilers and creating uniform layouts of textbooks and teaching manuals [1], students and teachers play an important role in creating an active and interesting learning environment in the course of educational activities. For example, students' educational activities such as completing textbook assignments, working together between teachers and students, doing practical work and answering questions can be carried out during class sessions. This draft Decree is an updated historical document of normative legal documents adopted in the field over the past years. At the same time, the current state of the national education system is a necessary condition for modernizing it based on the requirements of the times, educating young people to be highly educated, physically and spiritually healthy people, increasing the authority of leaders and pedagogues of educational institutions, and their effective functioning. requires the implementation of consistent measures to create conditions.

Research Objectives

Determining the relationship between academic performance and mathematical problem solving skills in elementary school.



Methodology

The foundations of social cognitive theory were published in 1931 by Edwin B. Holt and Harold Chapman Brown, and were covered in a radical empiricist approach, beginning with *Animal Handling and the Learning Process* [2]. In 1941, Neal E. Miller and John Dollard presented their book revising Holt's theory of social learning and imitation [3]. They argue that learning is facilitated by four factors: management, role models, responses, and incentives. The manager, that is, the teacher, is a social motivator and plays the role of a role model in the learning process, as a result of which the learner's behavior develops depending on the role model.

According to the research of Albert Bandura, until then the widely studied topics of behaviorism had certain differences. Inspired by the work of Miller and Dollard,[7] he and his students and colleagues conducted a study in 1961 and 1963 known as the "Grandfather Doll" experiment and determined when and why children show aggressive behavior[10][11].

Academics have grouped learning theories into three categories based on their field of application: behavioral, social learning theory (SLT), and social cognitive learning theory (SCLT). Albert Bandura is a leading research psychologist whose social cognitive theory has influenced many fields of study, including social policy, health, education, and psychotherapy. Social learning and social cognitive learning are based on observation[13].

Because mathematics is not just about facts and figures, but also involves the development of students' social and emotional skills, using social cognitive learning theory (SCLT) in mathematics learning makes the learning process active and dynamic. This is consistent with Darling-Hammond et al.[4]'s views on the importance of creating an environment that supports students' cognitive and emotional development.

Instructional strategies designed to increase student interest, increase confidence in mathematics, and help students see the importance of mathematics in their daily lives can help improve mathematics achievement. In addition, the role of teachers who can provide appropriate support and motivation has a significant impact on students' engagement in learning mathematics. Thus, the relationship between social, emotional, and motivational aspects and mathematical problem-solving skills can help create a more effective and sustainable learning environment in schools and improve students' mathematics achievement.

Methods

In the implementation of this study, data collection was carried out using an observational method to understand the relationship between learning activities and students' mathematical problem solving skills. This study was conducted in primary IV class of general education school No. 47, Boyovut district, Syrdarya region. The experimental work was carried out with the help of 45 students, who were selected through the sampling method in the 2023/2024 academic year.

Discussion and Results

Learning can be achieved through supportive learning activities. Education can produce skilled graduates with diverse abilities. One of the skills one can have is problem solving. Formation of students' motivations for learning in primary education requires the teacher to create the following conditions: create problem situations, activate students' creative attitude to reading; formation of a student's reflexive attitude to learning; to provide students with the necessary means of solving



problems, taking into account the fact that students have gained new knowledge and evaluating them; organization of educational activities in cooperation, forms of educational cooperation [14]. Problem solving is designed to enable students to adapt and solve problems in their own lives. S. L. Rubinstein called the situation in which a contradiction arose during the teaching process a problematic situation. If the student encounters contradictions in the process of learning (learning), his interest in learning increases, that is, motivation appears. For example, in the study of the floating of bodies, "Why does iron sink when thrown into water, and an iron ship floats in water?" The question is problematic (because there are contradictions in this question). This question encourages and even forces the student to compare and interpret, analyze, that is, it leads to understanding of the normality of bodies floating in liquid [6]. In problem-based education, the teacher creates problem situations by means of the following methods: - the teacher shows the conflict to the students and encourages them to find a way to solve it; - confronts them with contradictions in the activity; - expresses different views on the same topic; - invites students to look at events from different perspectives in the audience; encourages students to compare, generalize, draw conclusions from the situation, compare their evidence; - puts specific questions in front of students and calls them to generalize, justify, clarify, think logically; - gives problematic theoretical and practical assignments; - suggests problematic issues[8].

Problem solving skills are skills that students must have in the learning process. According to Gagne, problem solving is the highest and most complex type of learning compared to other types of learning, so especially in mathematics, problem solving skills are very important because problem solving skills are general, the purpose of learning mathematics, basic skills in learning mathematics, problem solving includes methods, procedures and strategies that are the main and central processes of the mathematics curriculum[9].

Solving problems, answering logical questions, solving problems, finding puzzles gives a person a special mood and increases self-confidence. Logical thinking should be formed from childhood, because as President Sh. M. Mirziyoyev said, "Mathematics is the basis of all concrete sciences. A child who knows this subject well will grow up to be smart, broad-minded, and work successfully in any field." Learning to solve mathematical problems increases the child's interest in mathematics.

Textual problems form the basis of the content of the elementary school mathematics course, and the methods of mental activity used in the process of solving them: analysis, synthesis, comparison, analogy, generalization, abstraction, and concretization develop students' logical thinking skills. Therefore, based on the requirements of the State Educational Standard, the types of textual problems in the primary education mathematics curriculum in general secondary schools have been expanded, and logical and combinatorial problems have been included in them.

Students start familiarizing themselves with simple text problems from the first grade. As they move from grade to grade, they gradually master the concepts of relational issues such as "greater than ...", "smaller than ...", "... times more, ... times less". A new stage of solving textual problems begins with the introduction of the physical formula of plane motion $S = v * t$. Various problems can be solved using this formula: directly and inversely proportional, "trade", "whole divided into equal parts", "work", "surface of a right quadrilateral", etc. related issues [13].

Assessing the quality of education in Uzbekistan, according to the 2022 PISA (Programme for International Student Assessment), the average score for mathematics was 364, compared to the



average score set by the OECD (Organization for Economic Cooperation and Development) of 489 and we can see that the result is significantly lower than the average score.

According to the results of the observations of students of the 4th grade of the school No. 47, Boyovut district, Syrdarya region, it is especially noteworthy that the teacher does not implement new technologies and innovations of teaching in the educational process or educational activities. Teachers are still conducting lessons based on traditional methods that bore students and do not give students freedom in their learning activities.

Through teacher-directed education, students were observed talking, sleepiness, distraction, even playing with paper when the teacher gave an assignment, lack of enthusiasm and lack of diligence. In the course of the lesson, not all students are able to do the activities independently, for example, the dominance of students who copy tasks from their friends and the lack of students who rarely discuss, ask questions, argue about problems or issues we can witness directly.

The importance of activities in education is researched by Ekawati in Datok Modern Islamic Boarding High School, who emphasizes the importance of educational activities due to changes in students' behavior[5].

Conclusions and Suggestions

Based on the results of the research on the effect of educational activities on the ability to solve mathematical problems in elementary school classes, the educational activities and mathematical problem-solving abilities of students in the 47th elementary school of Boyovut district it can be concluded that there is a significant relationship between. The results of observational analysis show that when students' academic performance is in a very high category, students' problem-solving abilities also rise to a higher level. The relationship between academic performance and problem-solving skills is obtained with positive values or direct proportionality, it shows that the more active students are in learning, the higher their problem solving skills.

Throughout the study, the importance of the strength of the belief in self-confidence is emphasized. Self-confidence means belief in a person's ability to perform a task or successfully achieve a goal. Children with high levels of self-confidence in their math skills are more likely to continue to problem solve, seek challenges, and engage in challenging learning while learning mathematics. In addition, this study reconstructs the learning relationship with social cognitive theory, emphasizing the role of social interactions and cooperative learning in mathematics learning. Research shows that children learn about others by observing collaborative activities, discussions, and interactions with peers and teachers. Working with others allows children to share ideas, solve problems together, and deepen their understanding of mathematical concepts.

The results of this study can be used as an evaluation material for all parties involved in the education sector to improve the quality of the educational process. Teachers can pay attention to written and oral activities in teaching mathematics and increase students' learning activity in mathematics and thereby expand methodological activities.



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