Brazilian Journal of Education, Technology and Society (BRAJETS)
http://dx.doi.org/10.14571/brajets.v17.nse4.2024

INVESTIGATING INCREASING THE LEVEL OF LEARNING AND MAKING STUDENTS INTERESTED IN MATHEMATICS

INVESTIGANDO O AUMENTO DO NÍVEL DE APRENDIZAGEM E O DESPERTAR DE INTERESSE DOS ESTUDANTES POR MATEMÁTICA

INVESTIGAR CÓMO AUMENTAR EL NIVEL DE APRENDIZAJE Y DESPERTAR EL INTERÉS DE LOS ESTUDIANTES POR LAS MATEMÁTICAS

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Abstract. The research in question is the lack of interest, inattention, and passivity of students in carrying out mathematics activities and the unsatisfactory results of the tests. The purpose of this research was to increase the level of interest of students in mathematics and create motivation and interest in mathematics. The article is a method analysis type and to collect the contents of this research, school experiences and also a review of previous research were used. It is no secret to any of the mathematics activists in the field of education that many students are not interested in mathematics and have problems learning it. In this regard, this research has presented methods for creating motivation in learning mathematics based on the experiences of different schools. By conducting this research, I first identified the causes of students' lack of interest in mathematics and then, by benefiting from the points of view of teachers and parents, books and magazines, experiences, and innovative ways, increased students' interest in mathematics. For this purpose, by using various and modern teaching methods such as brainstorming, games and mathematics, making teaching aids, as well as implementing projects such as "I Can Do It" projects, "Idea from You" and "A Day in the Hands of Children" and using descriptive evaluation to solve group problems, student participation in the class was increased, and by creating a happy and friendly environment, the feeling of fatigue and monotony in the classroom was eliminated and the desired learning situation was provided. The results showed that accurately identifying the cause of lack of interest in mathematics and providing a combination of the above solutions made students interested in learning mathematical concepts. In the end, it was concluded that using various teaching methods, appropriate to the purpose of each lesson, providing functional activities to students according to individual differences, students' needs and interests and appropriate encouragement, strengthening visual and auditory memory, and cultivating learners' accuracy and attention in the form of purposeful games, has been very effective in increasing students' interest in mathematics and performing their functional activities.

Keywords: Mathematics, Education, Learning, Teaching Method.

Resumo. A pesquisa em questão aborda a falta de interesse, desatenção e passividade dos estudantes na realização de atividades de matemática, bem como os resultados insatisfatórios nos testes. O objetivo desta pesquisa foi aumentar o nível de interesse dos estudantes pela matemática e criar motivação e entusiasmo pela disciplina. O artigo é do tipo análise de métodos e utilizou experiências escolares, além de uma revisão de pesquisas anteriores, para coletar os dados desta investigação. Não é segredo

para os profissionais de matemática na área da educação que muitos estudantes não têm interesse pela disciplina e enfrentam dificuldades em aprendê-la. Nesse sentido, esta pesquisa apresentou métodos para criar motivação no aprendizado de matemática com base em experiências de diferentes escolas. Durante a condução desta pesquisa, foram primeiramente identificadas as causas da falta de interesse dos estudantes pela matemática. Em seguida, com base nas perspectivas de professores e pais, livros e revistas, experiências e métodos inovadores, foi possível aumentar o interesse dos estudantes pela matemática. Para esse propósito, foram utilizados métodos de ensino diversos e modernos, como brainstorming, jogos matemáticos, criação de materiais didáticos, além da implementação de projetos como "Eu Posso Fazer", "Ideia de Você" e "Um Dia nas Mãos das Crianças". Também foi utilizada a avaliação descritiva para resolver problemas em grupo, aumentando a participação dos estudantes na sala de aula. Criando um ambiente alegre e amigável, o sentimento de cansaço e monotonia foi eliminado, proporcionando uma situação de aprendizado ideal. Os resultados mostraram que identificar com precisão as causas da falta de interesse pela matemática e oferecer uma combinação das soluções mencionadas tornaram os estudantes mais interessados em aprender conceitos matemáticos. Concluiu-se que o uso de métodos de ensino variados, adequados aos objetivos de cada aula, a oferta de atividades funcionais adaptadas às diferenças individuais, às necessidades e aos interesses dos estudantes, além de incentivos apropriados, o fortalecimento da memória visual e auditiva e o desenvolvimento da atenção e precisão dos aprendizes por meio de jogos com propósito definido, foram muito eficazes para aumentar o interesse dos estudantes pela matemática e melhorar seu desempenho em atividades práticas.

Palavras-chave: Matemática, Educação, Aprendizagem, Método de Ensino.

Resumen. El estudio se centra en la falta de interés, la falta de atención y la pasividad de los estudiantes a la hora de realizar actividades matemáticas y los resultados insatisfactorios de las pruebas. El objetivo de esta investigación fue aumentar el nivel de interés de los estudiantes por las matemáticas y crear motivación e interés por las matemáticas. El artículo es de tipo análisis de métodos y para recoger el contenido de esta investigación se utilizaron experiencias escolares y también una revisión de investigaciones anteriores. No es ningún secreto para ninguno de los activistas de las matemáticas en el ámbito de la educación que muchos estudiantes no están interesados en las matemáticas y tienen problemas para aprenderlas. En este sentido, esta investigación ha presentado métodos para crear motivación en el aprendizaje de las matemáticas basados en las experiencias de diferentes escuelas. Al realizar esta investigación, primero identifiqué las causas de la falta de interés de los estudiantes por las matemáticas y luego, beneficiándome de los puntos de vista de los profesores y los padres, libros y revistas, experiencias y formas innovadoras, aumenté el interés de los estudiantes por las matemáticas. Para ello, mediante el uso de diversos y modernos métodos de enseñanza como la lluvia de ideas, los juegos y las matemáticas, la elaboración de ayudas didácticas, así como la implementación de proyectos como los proyectos "Yo puedo hacerlo", "Una idea tuya" y "Un día en manos de los niños" y el uso de la evaluación descriptiva para resolver problemas en grupo, se aumentó la participación de los estudiantes en la clase y, al crear un ambiente alegre y amistoso, se eliminó la sensación de fatiga y monotonía en el aula y se proporcionó la situación de aprendizaje deseada. Los resultados mostraron que la identificación precisa de la causa de la falta de interés en las matemáticas y la provisión de una combinación de las soluciones anteriores hicieron que los estudiantes se interesaran en aprender conceptos matemáticos. Al final, se concluyó que el uso de diversos métodos de enseñanza, apropiados para el propósito de cada lección, brindando actividades funcionales a los estudiantes de acuerdo con las diferencias individuales, las necesidades e intereses de los estudiantes y el estímulo apropiado, fortaleciendo la memoria visual y auditiva y cultivando la precisión y la atención de los estudiantes en forma de juegos con propósito, ha sido muy eficaz para aumentar el interés de los estudiantes en las matemáticas y realizar sus actividades funcionales.

Palabras-clave: Matemáticas, Educación, Aprendizaje, Método de enseñanza.

1. INTRODUCTION

Mathematics is undoubtedly one of the main subjects that students at all levels of education need to know and understand. Many students, for various reasons, such as teacher's teaching method, parent’s pressure, low practices, Consecutive failures in learning and de-

creased self-confidence, and difficulty in learning math, cause afraid and anxiety and show resistance that they sometimes cannot perform even the simplest mathematical operations.

While today, given the dominance of mathematics over new sciences and technology, there is a greater requirement to learn math. Therefore, what teachers need to know is to simplify concepts, emphasize the basic foundations of mathematics, and provide various exercises and examples. Most importantly, it is to create motivation. The best motivation that plays a general role, especially in learning and interest in mathematics, is to explain the historical roots and the history of mathematics in the development of mathematics. In short, it can be said that mathematical concepts are one of the most effective and efficient teaching materials.

As Richard Courant says in this regard: "Mathematics is one of the highest emanations of human thought, reflecting the will of man and indicating the course of reason and argument, and also expressing the level of human interest in perfection and beauty." The fundamental role of mathematics in advancing other sciences and arts is also accepted by everyone, so that not achieving educational goals in the field of mathematics will lead to weakness, inability, and failure to achieve goals related to the progress of other sciences and arts.

Most students recognize mathematics as one of their most difficult subjects (which is actually the case). They also unconsciously consider the mathematics teacher to be a bad-mannered, harsh, and harsh teacher. Given these conditions, if the mathematics teacher also wants to treat the classroom as harsh and harsh as traditional teaching methods and take away the possibility of activity and freedom from students, the students will be unable to learn the lesson. They may appear to learn the lesson, but this learning will not be profound and will cause problems in the future.

According to the findings of numerous studies (Egara & Mosimege, 2024; Abd Rosyid et al., 2023), the factors affecting the formation of students' academic goal orientation can be considered to include the following: past experiences, history of failures and successes, student attitude, parents' goals and beliefs, teacher's beliefs and class structure, sense of belonging, social responsibility, relational and situational goals, and self-esteem and self-concept (Kearney, 2011; Otoo et al., 2018).

The inquiry teaching method has been introduced in the teaching literature under titles such as exploratory education and research education. The American Association for the Advancement of Science defines inquiry as curious behaviors based on human efforts and struggles to explain phenomena logically. In other words, this association calls the correct and reasoned response to human curiosity exploration (Arthur et al., 2014). The inquiry teaching method, which was developed by Da Ponte et al., (2007) to teach the process of searching and explaining phenomena, is based on the analysis of the methods used by creative researchers.

After determining the elements related to the inquiry processes, Koparan et al., (2023) put those elements into a framework that was called the inquiry teaching method. The inquiry method is a discovery approach that is based on effort and hard work. That is, the teacher does not respond directly, but rather a two-way effort leads to reaching the truth. Rooney (2012) conducted a study to investigate the effect of experimental science education based on the inquiry approach on the creativity and motivation of third-year female students in middle school.

The results of the data analysis showed that the inquiry approach is effective on the creativity and motivation of students. Putra et al. (2018) studied the effect of active teaching methods on social problem-solving skills and compared the effect of the problem-solving teaching method and the inquiry teaching method on students' social problem-solving skills in social science lessons. The results of their study indicate the positive effect of the inquiry method. Roche et al., (2023) in their study titled, "Comparing the effectiveness of two exploratory and descriptive teaching methods on students' academic achievement in the subject of viscosity," showed that the exploratory method had a positive effect on academic achievement.

Considering these factors, in order to be successful in teaching and learning, the teacher must create an active, enjoyable, and diverse class for students. In this case, students will not feel tired in the class and will participate in the teaching and learning process with interest and motivation, and their mentality towards the lesson and the math teacher will be adjusted to some extent. It can be said that the math teacher should pay more attention to the individual characteristics of the students than other teachers, and design activities that are appropriate to the physical, environmental, and academic conditions of the students (Khasawneh et al., 2023).

In some classes, it may be necessary to teach one subject to a group of students and another subject to another group, which depends on the academic background of the students. Before starting the lesson, the teacher must establish an emotional and friendly relationship with the students. As a suggestion, a complete research can be done on the skills of establishing an emotional and friendly relationship between the teacher and the student. Therefore, considering the weakness and disinterest of the students in the math lesson, the necessity of conducting this research is clear. For this reason, this study aimed to investigate the effect of a teaching method with an approach to creating students' interest in mathematics and to examine the amount of learning growth resulting from it. Research model is presented in figure 1.

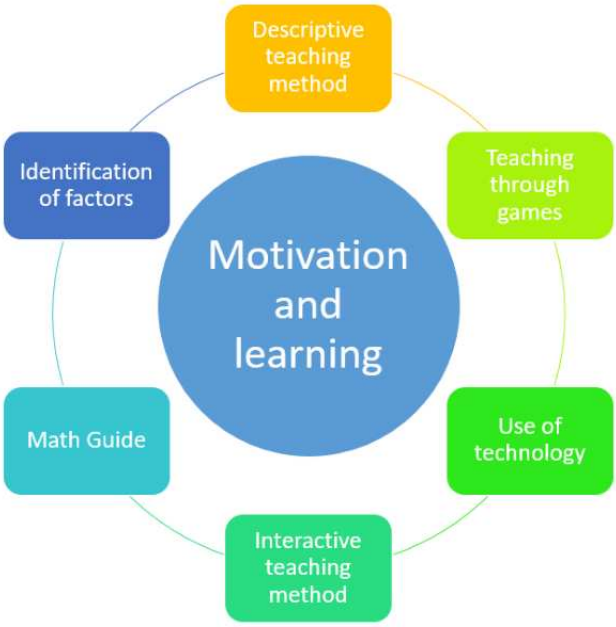

Figure 1. Research model for the learning and motivation in math class

2. METHOD

The present study aims to investigate the factors affecting students' lack of motivation in mathematics lessons in a descriptive and content analysis manner. According to the research method, the statistical population of the study includes schools in Uzbekistan and all documents, evidence, and resources related to the subject under study.

After collecting the desired data through the math test and the aforementioned questionnaires, the factors of lack of motivation and learning in mathematics lessons were identified, and then, based on these factors, strategies for creating motivation and increasing learning ability were presented based on the experiences of various schools in Uzbekistan.

The questions in the questionnaire section related to teachers' opinions are as follows:

1. In your opinion, what methods can we use to have a lively and cheerful math class?
2. What methods do you suggest to be aware of the status of your child's math lesson?
3. How can teaching aids be made attractive to first grade students?
4. In your opinion, how can students' negative attitude towards learning math be eliminated?

A sample of colleagues' responses to the questionnaire was as follows:

- Making teaching aids by students,
- Using group and collaborative methods in teaching some math concepts.
- Using the brainstorming method in the descriptive teaching method

3. RESULTS

The basic goal of any educational system is to provide individuals with the necessary skills to enable them to play an effective role in society as useful members. Given the characteristics of today's society, mathematics plays a significant role in providing these skills because mathematics deals with observation, calculation, analysis, inference, analogy, proof, and prediction, and as a communication system, it helps us to gain a precise and correct understanding of information, patterns, and reasoning (Alam & Mohanty, 2023).

Mathematics is more important than the application of basic arithmetic skills. It is also the most important means for developing high-level cognitive skills and logical thinking of students. Mathematics is of particular importance in the curriculum and education of societies. The struggle to find the appropriate method of teaching mathematics continues, because students are at an undesirable level in this area, memorizing mathematics and memorizing materials and concepts, followed by forgetting, involves the least amount of conceptual learning.

The most important causes of students' decline in mathematics:

- Insufficient skills of teachers in this subject in methods and techniques and appropriate teaching and training methods and methods that are appropriate and appropriate to the needs and expertise of this field.
- Defects in the teachers' work evaluation system.
- Neglect and lack of time for students' classroom practice and their work. Uniformity in teaching mathematics and the use of old and traditional methods in the lesson by

many teachers and lack of motivation to use new methods and methods of teaching mathematics.

- Students' lack of familiarity with the importance of mathematics and the unknown scope and goals of mathematics at this level.
- Problems in the evaluation criteria of mathematics from students' knowledge.
- Neglect of students' interests, motivations, and intellectual ability when teaching mathematics and even making it appear difficult in the students' attitude.
- The presence of learning disorders in some students
- Weakness in basic mathematics
- Illiteracy and low literacy of some parents in not completing their children's math homework and exercises.

In this regard, and considering the reasons raised for students' academic decline in math, the most important factors that affect students' academic progress, especially in math, can be stated as follows:

3.1. Foster a growth mindset in students.

The first step in helping students learn math is to help them believe that they can do better. Many students have a very negative fixed mindset. They believe that math is fun and they can't get better. It's natural that they will never get interested in math with this defeatist attitude. It might be a good idea to teach students the power and deep meaning of the word "yet."

They may not be able to solve a new math problem yet, but if they keep trying, repeating, and practicing, they will eventually succeed. Celebrate your students when they finally succeed. Remind your students that a few weeks ago they couldn't solve that math problem, but now they can. Understanding their own progress and growth will help them have a more positive attitude toward math.

3.2. Students' interest in mathematics with the structure of the mathematics guide

It is natural that instructions and teaching concepts in an overly direct manner can be tiring for both the teacher and the students. In addition, trying to help all students during independent practice is difficult and exhausting for the teacher. On the other hand, in each classroom you have two groups of students. Those who have completely mastered the concepts and do the exercises for you to check their work, and students who are at a weaker level and need your help to do their exercises.

Given these differences, it is better for you to change the structure of your teaching and try the Guided Math method. A short training class can familiarize all your students with this concept and its working method. After that, your students can continue their teaching activities in accordance with this concept in their educational centers such as schools, universities, etc., and you will check them and supervise their work not in a large classroom, but in small study groups.

Guided Math helps you to have different approaches to meet the needs of your students. With this method, you first teach the concepts to students on an individual level. After a group lesson and understanding and learning the concepts, they can repeat and practice the concepts taught together in small groups.

In the Guided Math method, to get students interested in math, they are first grouped according to their math level. In this method, you break down the math concepts and teach the students according to the quality level of each group. So each group can do different activities and exercises while teaching other teams. This method allows you to work with students in smaller groups.

You can meet their needs and make learning math fun. Guided Math allows teachers to make a difference to meet the needs of their students and allows students to do a variety of activities in the classroom to teach and learn math. Students also compete with each other for encouragement and instruction, which can increase students' interest in math.

3.3. Get your students moving, thinking, and collaborating.

Although students' interest in mathematics has decreased, one way to make them interested in mathematics is through games and group activities. To do this, you, as a math teacher, can first divide the entire class into several equal groups. In doing this, make sure that all students from strong to weak levels are in each group so that the groups have the same levels in terms of learning and mathematical knowledge.

Then, create a game with mathematical problems and present it in the class so that students work as a group to reach the answer to the question and win a prize. Simple prizes such as pencils, pens, notebooks, erasers, etc. are a good choice for such games. It is also better to emphasize teamwork and obtaining the answer as a group during the game so that students learn to reach the answer by working together.

3.4. Students' interest in mathematics through playing games

Another way to help students with math and get them interested in math is to play games. This method is even more effective in elementary school than private math tutoring. There are many fun games that are in the field of math that can help your students learn math better. Just by searching online, you can find a lot of free math board games. One of the games that can affect the speed of solving math problems and that you can do in the classroom is solving math puzzles.

Of course, pay attention to the age group of your students. For example, you can define a puzzle that is appropriate for solving an unknown equation and ask students to find the unknown numbers in the puzzle. This will make students feel smart and, on the other hand, understand the function of mathematics in everyday life.

3.5. Use technology to engage students.

Technology is a great motivator for many students. There are many interesting websites for practicing math skills and solving math problems. Home practice, reviewing skills, online math games, etc. You will definitely find something that every student in the class will like. In today's teaching, it is better to use new and modern methods to make students interested in school and lessons.

Of course, the amount of technology and cyberspace used should be determined for students so that their minds do not stray from the main topic and goal. Having study groups in cyberspace can also be another way to engage students with technology. The key to getting students interested in math is to build self-confidence in them and help children see success.

4. CONCLUSION

In conclusion, we can say that in almost all classes we witness a lack of interest and motivation or low motivation of a number of students towards mathematics, but this problem can be solved by taking some activities by the teacher and other colleagues, as well as parents and most importantly, the students themselves. Therefore, solving this problem requires a collective activity that is not far from reach. In this study, a model designed to create students' interest in mathematics was implemented in the form of an experimental design for students in mathematics.

The results showed that using the teaching method and identifying the factors of lack of motivation in mathematics and transforming this class into a research-oriented context causes students to achieve higher individual efficiency in mathematics compared to regular classes and, while making more effort in scientific and research activities, attach more importance to mathematics and have greater satisfaction with this lesson.

In the exploratory approach, the problem becomes motivating and, in addition to leading to the growth of creativity, it also increases the interest of learners in the lesson. Among the problems encountered in conducting this research are the following:

- The occurrence of artificial behavior by students during our observations (direct observations by the researcher and photos not taken of students during their activities, etc.)
- Researcher bias in some stages of the research (such as correcting pencil-paper tests, etc.)
- Lack of a statistical population of the desired size (small number of students)
- Involvement of other factors and their impact on the results of the research (such as student fatigue, family issues and problems, etc.)

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