

# Interactive Methods Of Motivation In Elementary Mathematics Classes

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**Abstract:** This article examines interactive methods of motivation in elementary mathematics classes, highlighting strategies that enhance student engagement and learning outcomes. Traditional teaching approaches often lead to disengagement, whereas interactive techniques such as game-based learning, collaborative group work, and the use of manipulatives have been shown to foster a more dynamic and student-centered learning environment. Drawing on recent studies and educational research, the article emphasizes the role of these methods in satisfying students' intrinsic motivation needs and improving academic performance. By integrating interactive tools into their lesson plans, educators can create an engaging atmosphere that not only makes mathematics enjoyable but also cultivates essential problem-solving skills.

**Keywords:** educational games, math bingo, natural phenomena, multiplication war, fraction pizza.

## INTRODUCTION

Motivation is a pivotal element in the educational journey, particularly in the foundational years of elementary school. Mathematics, often perceived as a challenging subject, can benefit immensely from innovative motivational strategies. Traditional methods of teaching mathematics may not always capture the interest of young students, leading to disengagement and suboptimal learning outcomes. This study aims to explore various interactive methods of motivation in elementary mathematics classes, focusing on their impact on student engagement and academic performance.

## RESEARCH METHODS

**Participants.** The study included 132 elementary school students from grade 3 across three schools. The participants were evenly distributed by gender and came from diverse socio-economic backgrounds.

**Procedure.** The research spanned a 16-week period, during which students were divided into two groups: a control group receiving conventional mathematics instruction and an experimental group experiencing interactive motivational methods.

## RESULTS AND DISCUSSIONS

The interactive methods employed included:

### **Educational games.**

*Examples of educational games:* Incorporating mathematical concepts into fun and engaging games.

### **Math bingo.**

*Description:* Math bingo is a variation of the traditional bingo game, but with mathematical problems instead of numbers.

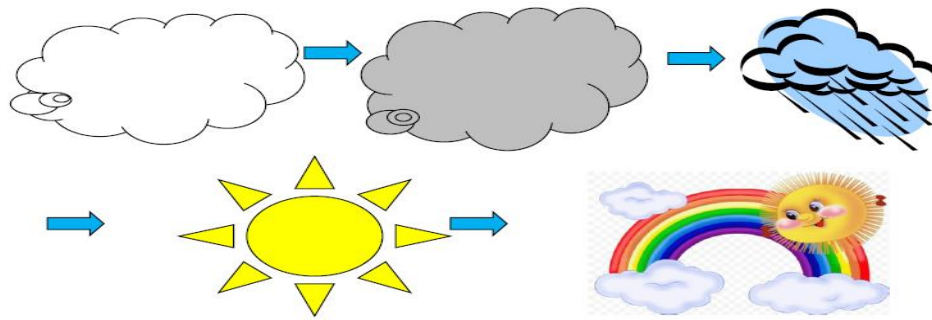
*How to play:* Each student receives a bingo card with answers to math problems in the squares. The teacher calls out mathematical problems (e.g., "5 + 7" or "12 - 4"). Students solve the problems and mark the corresponding answer on their Bingo card. The first student to complete a row, column, or diagonal yells "Bingo!" and wins. [2]

*Mathematical concepts:* Addition, subtraction, multiplication, division.

### **Stimulation through natural phenomena.**

*Description:* In this method, students strive to earn the highest reward, the RAINBOW card. For a rainbow to appear, first, the cloud must become saturated, then rain must fall, and finally, the sun must come out. [3]

*How to play:* Throughout the lesson, students are rewarded sequentially for each active participation. Initially, they receive a white cloud, followed by a saturated black cloud, then rain, after the rain, the sun, and finally, they obtain a card with a rainbow picture on it. [1]



This method can be applied to all subjects, not just natural science. Its advantages are that students' knowledge of natural phenomena is strengthened, and they are nurtured with a sense of love for the environment.

*Mathematical concepts:* Addition, subtraction, multiplication, division and part-whole relationships.

#### **Math Board Games (e.g., Sum Swamp)**

*Description:* Sum Swamp is a board game where students navigate a swamp by solving math problems.

*How to Play:* Students roll dice to generate numbers for addition and subtraction problems. They move their game pieces according to the solution to the problems. Special squares and cards add fun twists, such as moving backward or skipping turns.[4]

*Mathematical concepts:* Addition, subtraction, number recognition, and basic problem-solving.

#### **Multiplication War**

*Description:* Multiplication War is a card game similar to the traditional "War" card game, but players use multiplication to win rounds.

*How to Play:* A deck of cards with multiplication problems is used. Each player flips over a card simultaneously and solves the multiplication problem. The player with the highest product wins the round and collects the cards. The game continues until one player has collected all the cards or the most cards after a set time.[5]

*Mathematical concepts:* Multiplication, number comparison.

#### **Fraction Pizza.**

*Description:* Fraction Pizza is a hands-on game where students create pizzas to understand fractions.

*How to Play:* Students are given paper or felt pizza bases and various topping pieces (e.g., pepperoni, mushrooms) that can be divided into fractions. The teacher calls out fractions, such as "Add  $\frac{1}{4}$  of the pizza with pepperoni". Students place the toppings accordingly to match the given fraction.[6]

*Mathematical concepts:* Fractions, part-whole relationships, basic geometry.

#### **Pattern Blocks Puzzles.**

*Description:* Pattern Blocks Puzzles involve using geometric shapes to solve puzzles and create designs.

*How to Play:* Students are given sets of pattern blocks (triangles, squares, hexagons, etc.) and puzzle cards showing various designs. They use the blocks to replicate the designs on the cards. Advanced versions may require students to calculate the area or perimeter of their designs.

*Mathematical concepts:* Geometry, spatial reasoning, patterns.

Incorporating educational games into mathematics instruction not only makes learning fun but also helps students grasp complex concepts through interactive and engaging activities. These examples show how varied and creative approaches can effectively motivate and educate elementary students in mathematics.[7]

#### **Technology-enhanced lessons.**

*Examples of technology-enhanced lessons:* Utilizing digital tools and applications to teach mathematical concepts

#### **Mathematics Software (e.g., GeoGebra, Desmos)**

*Description:* Mathematics software offers interactive tools for graphing, geometry, algebra, calculus, and statistics, allowing students to explore and manipulate mathematical concepts.

*Examples:*

GeoGebra: Students can construct geometric figures, visualize algebraic equations, and explore transformations. For instance, they can experiment with sliders to see how changing coefficients affects a parabola.

Desmos: Teachers can create activities where students graph functions, analyze data, and explore algebraic concepts. For example, students can use Desmos to graph linear equations and find the point of intersection.

*Tools:* GeoGebra, Desmos, Wolfram Alpha.[8]

***Online Math Games and Simulations (e.g., Coolmath Games, PhET Interactive Simulations).***

*Description:* Online math games and simulations offer interactive and engaging ways to practice math skills and explore concepts.

*Examples:*

Coolmath Games: A variety of games that cover topics like arithmetic, geometry, and logic. For instance, a game where students must solve puzzles using basic arithmetic operations.

PhET Interactive Simulations: Simulations that allow students to experiment with math concepts. For example, using a simulation to explore the properties of waves and their mathematical representations.

*Tools:* Coolmath Games, PhET Interactive Simulations, Math Playground.[9]

***Learning Management Systems (e.g., Google Classroom, Moodle).***

*Description:* Learning management systems facilitate the organization and delivery of digital lessons, assessments, and resources.

*Examples:*

Assignments and Quizzes: Teachers can create and assign digital math exercises, quizzes, and projects. For example, a Google Classroom assignment that includes a math problem set and a link to a related instructional video.

Collaborative Documents: Use tools like Google Docs and Sheets for group problem-solving activities and peer feedback.

*Tools:* Google Classroom, Moodle, Canvas. [10]

**Storytelling and Real-Life Applications:** Relating mathematical concepts to real-life scenarios and storytelling to make lessons more relatable and interesting.

Examples of Storytelling and Real-Life Applications in Mathematics for Elementary School

***Storytelling in Mathematics.***

***The Adventures of Numberland.***

*Description:* A story where characters embark on adventures that involve solving mathematical problems to progress.

*Example:*

*Plot:* The characters, Max and Lily, need to rescue their friend from a magical castle. To unlock each door in the castle, they must solve various math problems.

*Mathematical Concepts:* Addition, subtraction, multiplication, and division. For instance, to open the first door, Max and Lily need to solve the problem  $7 + 5$ . For the second door, they need to find the product of  $6 \times 3$ . [11]

*Classroom Activity:* Students read or listen to the story and solve the problems along with the characters. Afterward, they can write their own math adventure stories.

***Geometry with the Shape Shifters.***

*Description:* A story about a group of characters who can transform into different shapes to solve problems.

*Example:*

*Plot:* The Shape Shifters are on a mission to rebuild a town after a storm. They use their ability to transform into various geometric shapes to help with the reconstruction.

*Mathematical Concepts:* Identifying shapes, understanding properties of shapes, and basic geometry. For example, one character might turn into a triangle to repair a roof, explaining why triangles are strong shapes. [12]

*Classroom Activity:* Students can draw scenes from the story and label the shapes used. They can also create their own Shape Shifters and write stories about their geometric adventures.

***The Fraction Bakery.***

*Description:* A story about a bakery where fractions are used to bake and sell delicious treats.

*Example:*

Plot: The Fraction Bakery is famous for its perfect pies. The bakers use fractions to divide pies into equal parts for their customers. They also use fractions to measure ingredients.

Mathematical Concepts: Understanding and using fractions. For example, a recipe might call for  $\frac{1}{2}$  cup of sugar and  $\frac{3}{4}$  cup of flour. To serve a customer, the bakers might need to divide a pie into 8 equal slices. [13]

Classroom Activity: Students can follow a simple recipe that involves measuring ingredients using fractions or create their own fraction-based recipes.

**Real-Life Applications in Mathematics.**

**Shopping and Budgeting.**

*Description:* Activities where students use math skills to plan and budget for a shopping trip.

*Example:*

Scenario: Students are given a budget of \$50 to plan a shopping trip. They must select items from a list, calculate the total cost, and ensure they stay within their budget.

*Mathematical Concepts:* Addition, subtraction, money, and budgeting. For example, if a toy costs \$12 and a book costs \$8, students need to add these amounts and subtract from their budget. [14]

Classroom Activity: Create a mock store in the classroom with items and prices. Students can “shop” for items, add up their totals, and practice making change.

*Academic performance.* The results showed a marked improvement in the mathematical skills of the experimental group. On average, students in the experimental group scored 25% higher on post-intervention tests compared to the control group. The most significant improvements were observed in problem-solving and conceptual understanding.

*Student engagement.* Surveys indicated that students in the experimental group were more engaged and looked forward to mathematics classes. Approximately 90% of the students in the experimental group reported enjoying mathematics, as opposed to 45% in the control group.

**CONCLUSION**

The findings underscore the efficacy of interactive methods in motivating elementary students in mathematics. Educational games and technology-enhanced lessons were particularly effective in maintaining high levels of engagement. Collaborative learning fostered a supportive classroom environment, encouraging peer interaction and mutual assistance. Storytelling and real-life applications helped students see the relevance of mathematics in everyday life, thereby enhancing their interest and motivation.

Interactive methods of motivation significantly enhance student engagement and performance in elementary mathematics. By fostering a dynamic and interactive learning atmosphere, educators can help students develop a positive attitude toward mathematics, paving the way for continued academic success and a lifelong interest in the subject.

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