



## Abstract

Mathematics does not always have to be "boring" through lectures and worksheets, but it can be fun depending on the way a teacher decides to deliver the information. Each student learns in different ways, and learner variability needs to be accounted for in lesson planning. There is also a lot that can be done to reinforce mathematical concepts. For many students, math is not an easy subject. Because of this, educators should plan to teach all children where they are at. Teachers should not be teaching to the middle, followed by an afterthought of differentiation for students in the margins. Mathematics needs to be engaging, accessible, and meaningful.

## Introduction

Mathematics is more than just teaching students numbers and formulas. It is a vital concept for students to understand patterns and problem solving. It's important for students to be engaged with mathematics because mathematics is used on a daily basis. Teachers should teach students that math can be learned in many different ways, not just one specific method. It's important that all students are able to access mathematics because no learner is at the exact same level as the other. Students need to be taught at the level that they are at to ensure that they truly understand the material and concepts. It's important that mathematics is meaningful to students because it is used in our everyday lives. By making mathematics meaningful, students will be able to understand it better. It is important for students to understand mathematics because they will learn skills from mathematics that can be used across other subjects and applied to their everyday lives.

# Mathematics + Student Engagement

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## Research Question

How can we deliver math instruction in an engaging way?

## Hypothesis

If math is taught in an engaging way, then students will have an easier time learning mathematics because each student has a different learning style.

## Research Focus

In order to retrieve the knowledge needed to support our hypothesis, research was conducted through the National Council of Teachers of Mathematics and through other organizations. The articles that supported the hypothesis discussed key points related to the hypothesis and other related research.

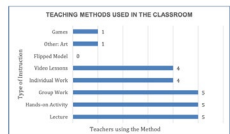


Figure 1. Teaching methods used in the middle school math classroom.

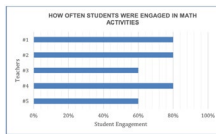


Figure 2. How often students were engaged in math.

## Results

Attached below are two charts from "THE MIDDLE SCHOOL MATH TEACHER AS A FACILITATOR" (p. 6-7) from Laurie James and Alexander Apo's research. These were the results from the surveys conducted among the teachers. Figure 1 depicts the various instructional methods used by the math teachers. In the survey, all teachers said that they used group work, hands-on activities, and lectures as their primary teaching methods. They then elaborated by stating that most of their lessons included a form technology to enhance the students' learning. There was even one teacher that integrated art and music into her math lessons. Another teacher used math games to reinforce math concepts. Four of the five teachers used video lessons and individual activities to allow for students to build conceptual understanding. Figure 1 identified eight teaching methods and how many of the teachers used a type of instruction.

To add on to Figure 1, Figure 2 shows results of surveys done on how well the teachers felt their students retained the knowledge taught based on class engagement. Three teachers thought their students were engaged 80% of the time while the other two believed students were only engaged 60% of the time. Based on data collected by these teachers, Figure 2 shows how often these teachers observed student engagement in their math class.

## Discussion

Based on the different resources that were researched on student engagement, majority of the students agreed that game-based learning had targeted their learning styles, while also keeping them engaged. Surveys were administered to upper elementary math teachers identifying their instructional approaches. Based on the survey results, teachers said it was difficult to reach all students through one instructional method.

Students were more engaged in game-based activities that supported their specific learning styles. Teachers also claimed that creating multiple different activities to target a students' learning style was extremely difficult. Through game-based learning, it is able to target multiple different learning styles, while keeping students engaged in the mathematical practice.

This study was tested on a limited number of participants. With that, in future research, a larger number of participants should be present to determine if student engagement correlated with students who find math interesting as a subject and if students felt they could master math concepts if taught in their preferred learning style.

## Conclusions

Integrating games into math lessons will help students have an easier time learning mathematics. Through games, students can learn through their specific learning style. Games help students to stay engaged and target their learning style.

## References

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