



Math + Games = < Engagement

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Abstract

The goal of this study is to present findings that games integrated into math helps students to become more engaged in the learning and helps students to better understand what is being taught. If teachers are able to find ways to include game activities into math instruction, then students may respond in a more positive and effective way. Every student learns differently and therefore there are different learning styles that include visual, auditory, verbal, and kinesthetic. Games integrated into math may help teachers to serve all these different learning styles.

Introduction

If teachers are able to integrate games into math instruction, then students may respond in a more positive and effective way. There are many students who find math difficult at various levels. Why is this? This question can be answered in many ways. One simple answer is because students don't understand the math. Sometimes students are so focused on trying to memorize the math, that they miss out on trying to understand it. Moreover, students find math difficult because they simply cannot relate to it. Now the question becomes, how can teachers make the math relatable in a way that students can understand it? Teachers must consider the different learning styles of each student and so finding strategies that will serve all types of learning styles is the key. What better way to serve all those learning styles than through different game activities in math that has the ability to make it fun and engaging.

There are all sorts of games that can serve each of the students learning styles and since math is a subject that many students struggle in, math games can help students relate to things that they are familiar with such as images of cars or animals, depending on their grade level. These are ways that students can visually see how the images they are familiar with relates to math. Hands on game activities and game-based learning both provide students with learning opportunities to explore different math concepts that can also relate to real life experiences. For example, having a game activity with play money serves different learning styles. Students are able to physically count and touch the money, identify how money looks, observe the activity that goes on with money (how it is used), and working with other students will help the learning process become more engaging and effective. Using such activities will allow students to better understand the concept of money counting, which will help them in their savings or spending in real life.

Hypothesis

If teachers are able to integrate games into math instruction, then students may respond in a more positive and effective way.

Research Design

This research project was based on the following questions:

- How does math games integrated into math lessons help student engagement?
- How does math games serve the different learning styles?
- How does math games influence effective student learning?

These questions help to formulate my hypothesis, If teachers are able to integrate games into math instruction, then students may respond in a more positive and effective way.

Online research and in person observations were used in collecting data and information to support this research project.

Results

Through online research, studies have found that student engagement have increased across all grade levels as game activities (hands-on and online) have been included into math lessons. It is found that games motivate students to participate in the learning process because they can connect with it in a way that they can understand and because it is fun.



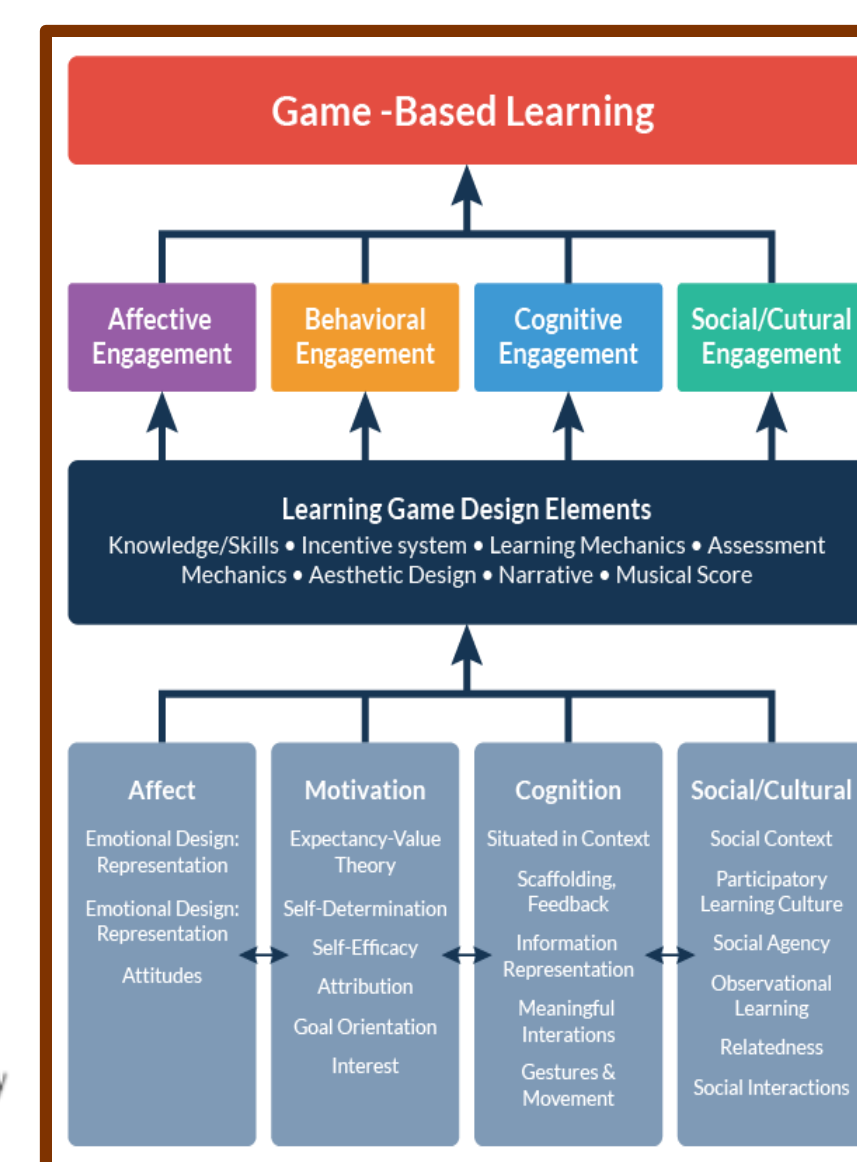
In Fall 2013, the Joan Ganz Cooney Center, on behalf of the Games and Learning Publishing Council, surveyed 694 K-8 teachers from across the United States on whether and how they are using digital games with their students. Part of the survey included how effective games have been in improving student learning.

[jgcc_leveluplearning_final \(1\).pdf](#)

Table 2

	Game (n=70)	Non-Game (n=83)	Effect Size (d)	Effect Size (d) for adj. means
Pretest (max=61)	32.0 (11.0)*	26.0 (9.7)	0.58	-
Posttest (max=61)	38.6 (9.6)*^	30.1 (10.5)	0.84	0.65
Delayed posttest (max=61)	40.6 (9.3)*^	31.9 (11.2)	0.84	0.59
Pretest-to-posttest gain scores	6.9 (6.9)*^	4.1 (6.1)	0.43	0.68
Pretest-to-delayed posttest gain scores	8.6 (7.5)*^	5.9 (7.1)	0.37	0.59
Lesson enjoyment (1-5)	2.0 (1.0)*	3.0 (1.1)	0.95	-
Ease of interface (1-5)	2.1 (.69)*	2.5 (.76)	0.55	-
Feelings of math efficacy (1-5)	2.1 (1.0)*	2.8 (1.0)	0.80	-
Intervention time (minutes)	89.7 (28.5)	82.1 (25.4)	0.28	-
Intervention errors	175.0 (111.4)	273.4 (209.2)*	0.57	-

Asterisks (*) indicate scores that are significantly greater for non-adjusted means. Carrot tops (^) indicate scores that are significantly greater for adjusted means (i.e., with the pretest score used as a covariate).



Student Engagement



Discussion

In an National Council of Teachers of Mathematics article titled Why Play Math Games? Rutherford explains that games are an important tool for learning in elementary school mathematic classrooms. She talks about how games:

- Encourage strategic mathematical thinking as students find different strategies for problem solving and deepens their understanding of numbers.
- Supports student development of computational fluency.
- Opens opportunities for students to practice and develop familiarity with number systems.
- Supports a school-to-home connection.
- Motivate students
- Increase confidence with educational content and relieve math anxiety.

Conclusions

Although there are different studies that have found an increase in student engagement and learning with the inclusion of math games, further studies need to be made to strengthen the results of this research project. Teachers have claimed that students are more engaged in the learning when there is an inclusion of a math game activity or game-based learning. Some of the game-based learning includes prodigy, cool math games, and IXL. Hands-on math games have become a positive way to help students with critical thinking and problem-solving skills. Some teachers have recorded the improvements of student engagement and learning because students are able to connect and understand the concepts and steps rather than having it taught to them directly from the book. Students can become self-directed learners in the process. In classroom observations also show how engaged students are with math games. They enjoy it because it's interactive, fun, and relatable in a way they can understand. This supports my hypothesis that if teachers can integrate games into math instruction, then students may respond in a more positive and effective way.

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