

Effects of game-based learning on improvement of cognitive skills in elementary aged children

Abstract

The purpose of this study is to look at the impact of educational games upon children and how it affects their information retention and cognitive skills such as long-term memory as opposed to traditional lecture methods. The researcher devised two lessons that were equivalent (one through a game-method, one through the traditional learning method. There were two groups of students with two participants in each group. The groups proceeded to take a quiz immediately after the lessons were given and then again one week later. It was hypothesized that there would be a higher improvement of information retention when kids were given the game-based approach. There were no significant findings.

Introduction

A variety of researchers have studied the effects of game-based learning on information retention and improvement of cognitive skills. Their efforts provided good cases exemplifying the design of learning games (Ke et al. 2015). The recent meta-analysis on the effectiveness of digital games for learning indicated that digital games, compared with non-game instruction conditions, have a moderate to strong effect on cognitive learning outcomes (Clark et al. 2014). A common skepticism on game-based learning is that students can get distracted with the entertainment of the game and get frustrated with the learning part. The challenge is to integrate learning into core game elements while not violating or corrupting what is enjoyable about games (Garris et al. 2002).

Game play is essentially a process of learning, in which players interact with the game to learn the rules and play strategies, then adapt and improve play skills to make progress in the game (Lindley and Semnersten, 2008). The effectiveness of game play impacts on ability and skill acquisition can help both students and teachers look for alternative ways to retain information and increase scores on school assignments. The goal of this research was to learn more about the effects of game-based learning and compare plan of actions that can aid in more successful testing strategies with students or individuals with learning disabilities.

Method

Three participants were recruited from the Langston Centre in Johnson City, Tennessee and aged from eight years old to nine years old. The Langston Centre is a cultural facility that promotes multicultural awareness and workforce development through arts, education and leadership activities. To test whether game-based learning or lecture-based learning was more effective, I presented both methods to each participant. The first group received a 15-minute lecture on Dia De Los Muertos, a Mexican Catholic holiday. Shortly afterwards, the first group received a brief presentation on simple Spanish terms, then I distributed a BINGO game to test the participants' understanding of the words. For the second group, a 15-minute lecture on simple Spanish terms and then shortly after I gave a short presentation on Dia de los muertos and distributed a game to test the participants' knowledge on the topic.

After each group received both learning methods, they were immediately given a 10 item assessment to test their knowledge of the presented content. One week after the study was conducted, the same questionnaire was handed out with a different order of questions.

Results

Following the study, results were recorded and analyzed. Group 1 consisted of one 8 year old male and female. There were no significant differences between the game based and lecture based learning. Please see Table 1 for means and standard deviations of both groups. I had planned to attempt to find different factors such as age and gender that contribute to information retention in game-based versus lecture based learning. However, because of the Covid-19 pandemic, participation was limited and results were small.

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Game Based Recall Score (immediate)	73.3333	3	46.18802	26.66667
Game Based Delayed Score (1 week delay)	80.0000	3	20.00000	11.5474
Lecture_Based_Immediate	93.3333	3	11.54701	6.66667
Lecture_Based_Delayed	93.3333	3	11.54701	6.66667
Game_Based_Total	76.6667	3	32.14550	18.58921
Lecture_Based_Total	93.3333	3	5.77350	3.33333

Table 1

3. How do you say "MOON" in spanish?



BINGO game given

Examples of questions given

- How do you say "MOON" in spanish?
- How do you say "MOON" in spanish?
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- How do you say "MOON" in spanish?
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There were two fundamental goals in this study: (a) to demonstrate that game-based learning was the more effective approach to teaching in elementary aged children and (b) to analyze the significance of the difference in lecture based learning versus game based learning. The male participant in group 2 had Attention Deficit Hyperactivity Disorder (ADHD). Therefore, the questionnaire was read out loud to this participant in order for him to thoroughly concentrate. Because of this, the results may have been compromised and further research can be conducted to investigate the effects of kids with ADHD and game-based versus traditional learning. Another factor that could have affected my study was the fact that this participant also had minor background knowledge in Spanish language. Further research can be conducted to limit participation for individuals who have no background knowledge in Spanish. Future research could also include how game-based learning and lecture based learning affects students in elementary versus other grades such as middle school or high school.

Discussion

Selected References

Garris, R., Ahlers, R., & Dinkell, J. E. (2002). Games, motivation, and learning: A research and practice model. *Simulation and Gaming, 33*(4), 441.

Jabbar, A., & Felicia, P. (2015, December). Gamplay Engagement and Learning in Game-Based Learning: A Systematic Review. *America Educational Research Association, 85*(4), 740-779. Retrieved from https://www.jstor.org/stable/24753028?seq=1#metadata-info_tab_contents