# Gaming in Education

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## Abstract

Utilizing game-based learning in education is a topic widely discussed throughout the educational field. This paper reviews the benefits of utilizing game-based learning in regards to education. The paper then goes on to describe digital and non-digital based games. Although digital game integration has proven to improve student learning, digital gaming is not fully integrated by educational professionals. Some educators prefer non-digital game based learning. However, through personal experiences and intensive study in regards to educational digital games, I have determined that this technology integration is essential to provide a meaningful education that is differentiated to meet the needs of all students. This paper seeks to answer the question: Why should educators integrate game-based learning into their classroom instruction? It is hoped that this paper will inform and persuade practitioners as to why it is essential that game-based learning be utilized in every classroom.


*Keywords:* Digital, Games, Learning, Technology, Education

# Digital Games in Education

Digital-based games for education have the potential to make kindergarten through twelfth grade classrooms more engaging and conducive to student learning. However, the question is, what has been the real experiences among teachers who have used digital-based games in the classroom? After viewing the works of An, Cao, Castellar, Takeuchi, Vaala, and more I have discovered benefits and disadvantages to utilizing digital-based games in the classroom.

After reading the work of Yun-Jo An and Li Cao I learned that their research findings primarily stated the benefits of utilizing digital game-based learning in the classroom. First, game design experience had a positive influence on the participant's attitudes and self-efficacy. Additionally, digital games help students develop higher-order thinking skills. Lastly, this article stated that digital game-based learning helps learners develop 21st century skills while making learning fun and engaging (An & Cao, 2017).

Afterwards, I reviewed work by Castellar. I learned that Castellar and her colleges explored whether traditional methods and game training differ in terms of the cognitive processes. The mathematics game was modified and its contents extracted to allow precise comparison between the gaming and paper exercises condition. This means that each single math exercise, type of question (e.g., multiple choice), quantity and order was perfectly matched in the game training and the traditional training conditions. Gains in arithmetical performance, and self-reported measures of enjoyment were also investigated. The authors found some evidence suggesting that arithmetic performance enhancement induced by game play and paper exercises

differ not only in terms of enjoyment but also of working memory capacity improvements. Overall, the digital gaming was proven to impact student achievement more so than the paper exercise.

Next, I read a study by Takeuchi and Vaala. This study surveyed nearly seven hundred kindergarten through eighth-grade teachers on how they're using digital games in the classroom. Seventy-four percent of kindergarten through eighth-grade teachers report using digital games for instruction. What I found most interesting from this study was teachers who use games more often report greater improvement in their students' core and supplemental skills. Most teachers reported using short-form games that students could finish within a single class period. While lack of time is a likely explanation, teachers may also find shorter-form games to be easier to map to curriculum standards. Lastly, seventy-one percent of digital game-using teachers report that games have been effective in improving their students' mathematics learning.

In contrast to the works by An, Cao, Castellar, Takeuchi, and Vaala explaining the benefits of utilizing digitally-based games for education, I also found works that disputed their greater effectiveness in relation to non-digitally-based games. The works of Naik, Kaufman, Flanagan, and Belman support the utilization of game-based learning. However they suggest it by non-digitally-based.

Nitin Naik work evaluated the use of digital and non-digital game-based learning. It explored the use of both formats in regards to education. Naik's research was based on game-based learning in relation to mathematics. Naik stated that Game-based learning (GBL) is commonly deployed in education. GBL can be broadly classified into two main categories: digital game-based learning (DGBL) and traditional or non-digital game-based learning

(NDGBL). DGBL is more popular and covers all types of computer and video game-based learning. Although NDGBL is less popular, it is long-established as a pedagogical practice and has a proven track record. As stated in the article, non-digital games pose fewer problems than is the case with DGBL, which make them potentially useful in education (Naik, 2014). When utilizing DGBL educators can encounter problems. Such problems include a lack of devices, difficult in-game controls, and learner focus.

The last article I studied, by Kaufman, Flanagan, and Belman, was a randomized experiment. In this study a sample of students (ages 11-17) played a cooperative game presented in either a non-digital format (board game) or digital format (mobile app). The study indicated that players of the non-digital version of the game exhibited significantly higher post-game systems thinking performance, whereas players of a nearly identical digital version did not did not demonstrate strong thinking performance. This discrepancy was accounted for by key differences in playing the two formats. Specifically, players of the digital game exhibited a more rapid play pace and shorter turn length, meaning that they discussed strategies and consequences less frequently and with less depth.

After viewing works that support and discourage the utilization of digitally-based games I understand the challenges and rewards associated with the topic. However, I personally encourage the utilization of digitally-based games. I use them frequently within my own classroom. I particularly find EveryDay Mathematics (EDM) app-based games to be beneficial to student's comprehension of mathematical skills.

Throughout my research I was able to come to a singular conclusion. Despite the dispute of format, digitally-based or non-digitally-based educational games, all research concluded that

game-based learning was beneficial to student learning. Game-based learning promotes student engagement, problem-solving, and critical thinking. Therefore, it is essential that educators utilize game-based learning within their classrooms.

# References

An, Y. J., & Cao, L. (2017). The effects of game design experience on teachers' attitudes and perceptions regarding the use of digital games in the classroom. *TechTrends, 61*(2), 162-170.

Castellar, E. N., All, A., De Marez, L., & Van Looy, J. (2015). Cognitive abilities, digital games and arithmetic performance enhancement: A study comparing the effects of a math game and paper exercises. *Computers & Education, 85*, 123-133.

Kaufman, G. F., Flanagan, M., & Belman, J. (2016). Playing the System: Comparing the Efficacy and Impact of Digital and Non-Digital Versions of a Collaborative Strategy Game. In *DiGRA/FDG*.

Naik, N. (2014, October). A comparative evaluation of game-based learning: Digital or non-digital games?. In *European Conference on Games Based Learning* (Vol. 2, p. 437). Academic Conferences International Limited.

Takeuchi, L. M., & Vaala, S. (2014). Level up Learning: A National Survey on Teaching with Digital Games. In *Joan Ganz Cooney Center at Sesame Workshop*. Joan Ganz Cooney Center at Sesame Workshop. 1900 Broadway, New York, NY 10023.