Effects of Video Games on Students: An Analysis

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Abstract

This paper is an analysis of 25 different sources on the history of video games and their application in schools and education as a tool to help students learn. Many studies are analyzed, covering video games and their effect on aggression in their players, their ability to influence the cognitive functions of those that play them, and how much video games affect the academic performance of students who play them. While many studies are analyzed, there is conflicting data between some of the sources on the various topics that were mentioned. Some sources finding statistically significant data to support some of the ideas or theories, while other studies could not find significant enough data to provide support. With the sources being divided in their conclusions, and with only a small percentage of all the available studies analyzed, I can not draw any conclusions of my own as to if video games are a useful tool for educators or if they pose to do more harm to the education of the students.

Introduction

Before discussing how video games can be beneficial to students and the studies that looked at the effects that video games have on their players, it is important to understand some of the history of video games that lead up to what is known today. Throughout the past few decades video games have become a common household occurrence, however it was not always this way. Video games arguably started in two different years, with what could be considered the first game being created in 1958, with gameplay and graphics similar to the game “Pong” that was

released in 1972. Depending on how it is looked at, video games started with either of these two games. Over the course of the 1970's mainframe computers became more commonplace, with arcade cabinets popping up allowing people to walk up and play for a while. The 1980's marked the beginnings of home consoles, thus allowing video games to be more easily accessible to the average consumer. In the 1990's 3D graphics began to take off, allowing more realistic games to be made. The video game *Mortal Kombat* was released in 1992, this video games is a violent fighting game in which characters are killed in brutal ways. In fact, it was so brutal that it was one of the leading reasons for the formation of the ESRB, Electronic Software Rating Board, in 1994. The ESRB was created for the purpose of rating media such as movies and video games, giving them the content warning stickers that can be seen on modern video game or movie cases. Finally, from the early 2000's to the present, there has been an escalation of realism in video games, for example, *Mortal Kombat* from 1992 is drastically less realistic than the most recent in the series *Mortal Kombat 11*. This escalation in realism has lead to a lot of concerns for games such as these and how they affect the minds of their players. Never the less, millions of people all around the world, from the elderly to very young children, can all relax, and in some cases even learn using this technology. Video games, ever since their creation, have been used for recreative purposes, with stress relief and entertainment being positives of their use. Their use for educational purposes has been looked at for almost as long as video games have been around, with countless studies being performed to determine their effects on people and any potential applications for teaching the next generation of students. Throughout most of the research that has been gathered for this report, the results of the studies very mixed in if video games were beneficial or harmful, with many reports conflicting with one another, some saying that video games used for educational purposes were beneficial for student learning, while just as many

showed negative to neutral results for video games in schools. Another big topic that came up throughout the articles and documents reviewed was studies on the levels of aggression that video games caused in their players. With most of the studies that said that there was a high level of connection between video games and increased aggression were from the same researcher, having done multiple studies over the past few decades. This is compared to the multiple studies, done by multiple different researchers, that concluded the opposite of those studies, that video games do not make a person more aggressive or that any heightened levels of aggression were generally dissipated within a few minutes of the end of playing. There were also multiple sources that discussed how video games could benefit those who play them, not just through a new way to learn but to also improve their mental abilities. Some of these reports concluded that playing video games have improved the reaction time of their players and improved their ability to focus. However, there are still many conflicting reports about just how much of a benefit video games could be to the educational programs in schools and with all of the conflicting reports from multiple different sources, it is hard to draw any definite conclusions. That being mentioned, with many in this new generation growing up with access to video games more regularly that ever before, it poses a great opportunity to determine if video games could have an impact in further improving the educations of students in a way that is educational, fun, but also relatable to the interests of the new generation of learners.

Literature Review

Literature Introduction

Many studies have been done throughout the decades ever since the inception of video games on their effects on the human mind. Many studies focused on attempting to find the negative effects of video games such as heightened levels of aggression with certain games while

not mentioning any perceived benefits of the time spend playing the games. The studies and the meta analyses covered in this analysis have over 1.8 million student participants from across many different regions of the world. Other reports that are analyzed do not have an experimental data however they discuss the history of video games and how video games were considered for educational purposes. First, there was a few studies that were led by one individual that seemed to appear across many other sources that supported the idea of video games making their players more aggressive. Second, there were many studies that looked at the effect of video games in classrooms and how they impacted the performance of students. Third, there is how video games have been able to improve the cognitive abilities and visual attention. Finally, there were a few of the sources that talked about how video games were considered for use in educational purposes.

Video Games and Aggression: Supporting the Theories

One of the names that appeared in more than a few of the sources as references and in more that a few of the sources that are being analyzed, was C.A. Anderson, who seems to be one of the major contributors to the research in the past few decades. Most of Dr. Anderson's contributions and studies have indicated that he has found that playing video games cause an increased level of aggression in the participants studied. In multiple analyses and studies done by Dr. Anderson, he reported that there was a connection between video games and heightened aggression levels. He reported after analyzing many other reports and studies that video games and participant aggression levels were extremely connected. Specifically, an analysis of multiple studies, including other meta-analyses titled, "Video Games and Aggressive Thoughts, Feelings, and Behavior in the Laboratory and in Life". Most of the samples were from college students in the age range of 18-21. It was found that aggression was raised in those who played video games

for an extended period of time and over an long duration. A second study done by Dr. Anderson that is also reported in the same paper, a meta-analysis that covered over 35 different reports and 54 independent samples of participants. After Dr. Anderson and his associates analyzed findings from 35 different studies, it was found that video games have a large impact on students and their levels of aggression. In a second paper by Dr. Anderson, titled, "An update on the effects of playing violent video games", a group 227 of students in college were given a questionnaire about how often they played video games and how violent those games are. They questioned how often these students played in middle and high school as well. The results indicated that exposure to violent video games had a strong correlation with aggressive behaviors. In a final study posted by Dr. Anderson titled "Effects of Violent Video Games on Aggressive Behavior, Aggressive Cognition, Aggressive Affect, Physiological Arousal, and Prosocial Behavior: A Meta-Analytic Review of the Scientific Literature", six different meta analyses were done for six different categories: best partials data, culture, sex, age, moderators specific to experiments, moderators specific to nonexperimental studies. Using the results from multiple different groups of research they compiled the results an found that violent video game exposure was associated with increased aggression. Throughout Dr. Anderson's studies, most of the video games that were tested, were either considered violent video games, or involved some forms of aggression on screen. Therefore, it may be logically concluded that part of the reason that this result was found, was that the sample tested was biased to this result. Potentially, if other styles of video games had been tested, the conclusion may have been different. Had more educational video games been tested, or more video games that did not display acts of violence or aggression, then it may be very possible that the results would be different.

Video Games and Aggression: No Connection Found

Conversely to Dr. Anderson and his studies, another topic that was shared across multiple sources was that violent video games did not cause aggression in their players or that any aggression that was present dissipated very quickly after playing ceased. In an article by Harris, R (n.d), titled "How Long Do the Short-Term Violent Video Game Effects Last?", 91 students that participated in the study. They tested the students level of aggression before they played video games, immediately after playing video games, and multiple times after playing video games. The results that showed that after 4 minutes, aggressive feelings were found to have dissipated for the participants. Heart rate in the participants were found to have calmed down after about 9 minutes. The results of this study support the idea that violent video games do not cause any lasting increase of aggression in the players of video games. In another study by Kühn, S., Kugler, D. T., Schmalen, K., Weichenberger, M., Witt, C., & Gallinat, J. in 2019 titled "Does playing violent video games cause aggression? A longitudinal intervention study", 90 participants were part of the study, ranging from college students to members of the local community. After separating the participants into random groups and assigning a game for them to play, the researchers collected the data to determine if violent video games were causing heightened aggression. The results showed that there were no negative effects of violent video games on the participants. In a third study by Sestir, M. A., & Bartholow, B. D. in 2010, titled "Violent and nonviolent video games produce opposing effects on aggressive and prosocial outcomes", across three different experiments, the researchers were trying to determine if the violent video game effect existed or if there was faulty comparisons to blame. The researchers had over 500 different participants for these experiments. The results showed that while playing violent games did raise the overall levels of aggression of the players, the results showed that any effects were short lived. The results also concluded that comparing violent video games to

nonviolent video games was skewing the results as nonviolent games reduced the amount of aggressive behavior participants showed. Therefore, they concluded that comparing to the control group of no video game play time. In another article by Tear, M. J., & Nielsen, M. in 2013, titled "Failure to Demonstrate That Playing Violent Video Games Diminishes Prosocial Behavior", involved three different experiments from this article. Two of the experiments involved 64 students playing video games and measuring how their social ability is affected by the video games. The first experiment involved measuring their social behavior after playing video games. The results showed there were no major change in the students' social behavior. The second experiment was the pen-drop experiment. The results showed that there was no major change of social behavior. The third experiment involved 32 students using the pen-drop test. The results were similar to the previous two experiments. That there was no major change in any of the students' social behavior. All of these studies lending themselves to the thought that video games do not cause any increase in aggression in their players. That violent video games do not cause players to become any more aggressive than those who do not play video games at all.

Video Games and Students: Effects on School Performance

In term of the other sources that studied the effects of video games in the classroom and how students' performance was affected over an extended time period, most sources reported little to no impact on student performance. Studies performed that came to this conclusion include one conducted by Algan, Y., & Fortin, N. M., titled "Computer Gaming and Test Scores: Cross-Country Gender Differences Among Teenagers", who tested over 1.8 million students, researchers compared the data of students' academic performance with that of how often they played video games. The researchers then compared that average to the average of those that

responded to not have played video games after school. They found that boys averaged 4 to 6 points better while girls averaged 4 to 6 points worse than their non-video game counterparts. A second study that spanned over 22 different countries and tested over 192,000 students, titled "Video-Games Do Not Negatively Impact Adolescent Academic Performance in Science, Mathematics or Reading", conducted by Drummond, A., & Sauer, J. D, concluded that video games had no overall performance change in the students that were tested. This conclusion was reached after they found that video games did have some negative effects for students in one area, they had positive effects for students in another. The overall change in the performance of students was minimal, therefore the conclusion was reached that video games do not affect performance in school. In another study done by RMIT. (n.d.)., titled "Online gaming can boost school scores: Video games sharpen math, science and reading skills among 15-year-olds, but social media reduces test results," 12,000 Australian 15-year-olds were tested in math, reading, and science while collecting data on their online activities. When the data was analyzed, it showed that those students who played games almost every day scored 15 points average higher in math and 17 points higher in science. The results from these studies show that playing video games can impact school performance, however the level of impact, if any, is completely unique to each individual, for some it may help, others hurt, and for some no impact at all.

Video Games and Education: A Useful Tool

Another topic that sources had throughout them was the history of video games and electronics and how video games help teach students and help encourage learning in their own unique way. In an article written by Saunders, B., & Roodt, S. (n.d.)., titled "DIGITAL GAME-BASED LEARNING FOR THE NET GENERATION: PERCEPTIONS OF UNIVERSITY STUDENTS", in which This article discusses the research done over the last 40 years in many

studies and meta-studies. It was found that video games have encouraged learning through: Rules, Goals and objectives, Outcomes and feedback, Conflict, competition, challenge and opposition, Interaction, Representation. The article stated that these six elements engage players and provide an environment for the players to learn and be creative. In a second article by Moline, T. (n.d.)., titled "Implications for Teacher-Librarians and For Researchers", an experiment was conducted with 8 children ages 12- 18. The experiment involved the children explaining the game as they were playing. They found that they students were able to solve problems very quickly when compared to others of similar age and that the children also tended to do well in school. The article also covers potential uses of video games in school. In an article titled "Video Gaming, Education and Digital Learning Technologies: Relevance and Opportunities", written by Kirriemuir, J. (2002)., regarding video games and their use academically mentioned how many colleges and institutions began to offer courses related to gaming and game development has increased over the years. The development of college courses included game design, programming, and music. Video games also helped develop skill programs in college to increase the skills of incoming employees from college. This was all to further improve the companies' potential future employees, but this in turn improved the potential opportunities for students. In another article titled "History, theory and research concerning integrated learning systems", written by Hativa, N. (n.d.)., 22 school districts were studied due to their instructional system using integrated computer networks. Positive results in scores were only shown when compared to other classes that did not use integrated computer systems. Negative results were shown when classes had to compensate for the lack of computer equipment. This article showed that there was a positive effect for the ability of the students studied to learn information with the assistance of technology in the classroom. In an untitled

article by Harushimana, I., Professor, A., & Harushimana, D. I. (n.d.)., In this study, researchers had 12 male students perform a writing task who showed a high level of interest in video games. From the students writing tasks they determined that 9 of the 12 based their writing task on their favorite video games. It was determined that video games could be used to influence those who play them. Potential educational uses were discussed in which video games could be used to teach its players important lessons. In another article talking about the use of video games in use for classroom for teaching titled "A "Pac-Man" Theory of Motivation: Tactical Implications for Classroom Instruction", written by Bowman, R. F. (1982)., while it is from 1982, it discusses that many where thinking that videogames could be used for educational purposes. This article suggested using intrinsic rewards, like videogames, to make students more likely to participate in school. This would help further motivate the students to perform in school.

Video Games and Cognitive Ability: Improvements

One topic found in the sources was how the video games have been able to affect those who play them. In an experiment performed by Ma W., at the University of Electronic Science and Technology of China, reported in the article titled "One Hour of Video Gaming Can Increase the Brain's Ability to Focus", 29 male students, measured if playing video games improved visual selective attention. They divided the participants into two groups, experts with at least two years of experience with the game, and non-expert with less that half a year experience. They measure all participants visual selective attention before and after playing for an hour. The results showed that both groups improved visual selective attention. The non-experts also showed brain activity similar to that of the experts. Showing an improved level of focus in their participants. In a second study also done at the University of Electronic Science and Technology of China, by M. Dykstra, titled "Video games improve the visual attention of expert players",

with 28 college volunteers, found that people who played video games were less prone to missing visual information while processing a separate piece of information. They had participants input a letter in response to the prompt on the screen with a timer of a 200-500ms between each. The study found that those who played video games did not miss as many prompts. This once more shows how video games can help improve the mental capacities of those who play. In a third study done in 2012, reported in an article titled “Cultivation Effects of Video Games: A Longer-Term Experimental Test of First- and Second-Order Effects” by Gabriel Chong, Y. M., Scott Teng, K. Z., Amy Siew, S. C., & Skoric, M. M., This article was an experiment with 135 participants to determine if playing games influence the way their players think. The results showed that those who played games in which they crashed a car, they tended to estimate the percentage of car crashes were much higher than they were. This shows that not only can video games improve the mental abilities of those who play video games, but how video games can have an influence in how it causes its players to perceive information. In a study done by Universite de Geneve. (n.d.)., titled “Action games expand the brain’s cognitive abilities, study suggests”, a sample of 8,970 individuals between 6 and 40, both gamers and non-gamers, took a number of tests to evaluate their cognitive abilities. It was found that gamers had a better cognition rating by one-half of a standard deviation compared to non-gamers. In a second study conducted by the same researchers with a new sample of 2883 participants, found that individuals playing games increased their cognition by one-third of a standard deviation from those who did not play. This study overall concluded that video games helped improve the overall cognitive abilities of those that play them. This data supports the thought further using video games as an educational tool for teachers as not only could it help students learn in a fun

way, but allow them to better focus on the material and possibly have better retention of the information as their brains would be more active during this time frame according to the data.

Video Games and Education: Effective Material Presentation

The final theme that appeared throughout multiple sources was how video games have been used in the classroom and how they can help student more effectively learn the material. A book written by H. J. Brown. "Videogames and Education", delved into this, explaining how some researchers in the field have successfully taught students history using video games such as Civilization 3 and Oregon Trail. Brown also mentions how there are projects in development by companies to help create purely educational video games for the classroom. One project, Revolution, is a role-playing game that would allow students to assume the role of colonials in 1775, letting them live out the daily life of a colonial and feel the repercussions of their choices throughout the game. This is a major step forward as it allows the students to not only learn about history and what life was like back then, but it would allow new perspectives on history. The same could be said about most other topics of education, math, science, language, and so forth. In another article written by Balasubramanian, N., & Wilson, B. G., titled "Games and Simulations", educational strengths for using video games outside of school were discussed. The article discussed how students developed behaviors and motivations by playing video games. Students who played games were more intellectually engaged and made significant learning gains after playing games. In a third article titled "The Impact of Media and Technology in Schools" by Reeves, T. C., & D, P., written in 1998, discussed how video games and other media could have a major impact in the classroom. They wrote that television was found to be useful for learning when the programs were designed for the purpose of teaching. This in turn could also be applied to other technologies, thus turning them into educational tools, future use of

cutting edge technology such as 3d printers, augmented reality, holograms and many more technologies may be able to assist in the education of future learners in a much more effective method that the current standard.

Research Findings

Research Findings Introduction

The sources that have been analyzed have many major themes are shared across them, from the effect that video games have on those that play them to how they have been thought about for their potential use in the classroom as an educational tool for assisting students in better learning new materials. However, what most backs up the claims of some of these sources is the data that they have collected, how some of these sources that support the claims of violent video games causing increased levels of aggression in their players, how some of these same sources refute those claims, how many of the sources show the beneficial effects of video games on their players including students in school, and how some sources showed no major impact on student academic performance.

Research Findings: Supports Aggression

Dependent measure	k	N	r_+	95% C.I.	Homogeneity test	Estimate of random-effects variance (95% C.I.)
Aggressive behavior	33	3,033	.19	(.15, .22)	$\chi^2(32) = 23.25, p > .05$	0.042 (0.029, 0.068)
Prosocial behavior	8	676	−.16	(−.22, −.09)	$\chi^2(7) = 1.30, p > .05$	0.013 (0.006, 0.048)
Aggressive cognition	20	1,495	.27	(.22, .31)	$\chi^2(19) = 29.15, p > .05$	0.087 (0.054, 0.164)
Aggressive affect	17	1,151	.18	(.12, .24)	$\chi^2(16) = 15.11, p > .05$	0.070 (0.039, 0.161)
Physiological arousal	7	395	.22	(.12, .32)	$\chi^2(6) = 2.32, p > .05$	0.028 (0.012, 0.115)

The figure above is data collected by Dr. Anderson and his associates that in their study and reported in his article “Effects of Violent Video Games on Aggressive Behavior, Aggressive Cognition, Aggressive Affect, Physiological Arousal, and Prosocial Behavior: A Meta-Analytic Review of the Scientific Literature”, published in 2001. From the data above, which shows how

many of the participants of their study were showing aggressive behavior, Dr. Anderson and his colleagues concluded that the data was significant enough to determine that violent video games caused that overall levels of aggression in the people to increase and caused them to become more violent. This data and more data from others of Dr. Anderson's studies support the claim that violent video games cause their players to become more violent overall. However, there are other sources that would contradict that data with studies of their own.

Research Findings: No Change in Aggression

Table 1 Mean and standard deviation (in brackets) split according to group and time point for the dependent variables

From: Does playing violent video games cause aggression? A longitudinal intervention study

Dependent variables	GTA			Sims			Controls		
	Baseline	Posttest 1	Posttest 2	Baseline	Posttest 1	Posttest 2	Baseline	Posttest 1	Posttest 2
Questionnaires assessing aggression and associated constructs									
BP physical aggression	1.99 (0.76)	2.03 (0.89)	1.95 (0.82)	1.55 (0.47)	1.66 (0.62)	1.50 (0.38)	1.94 (0.92)	1.87 (0.93)	2.08 (1.26)
BP verbal aggression	3.78 (0.80)	3.61 (0.92)	3.61 (0.77)	3.62 (1.04)	3.63 (0.83)	3.56 (0.69)	3.66 (1.18)	3.82 (1.14)	3.86 (1.15)
BP anger	2.85 (1.08)	2.63 (0.98)	2.61 (1.21)	2.42 (0.77)	2.39 (0.92)	2.22 (0.77)	2.64 (1.34)	2.49 (1.16)	2.72 (1.32)
BP hostility	1.89 (0.66)	2.01 (0.98)	2.13 (0.83)	1.76 (0.68)	1.89 (0.74)	1.73 (0.69)	2.09 (1.20)	2.11 (1.23)	2.37 (1.32)

The data on the table above, collected by Kühn, S., Kugler, D. T., Schmalen, K., Weichenberger, M., Witt, C., & Gallinat, J. in their article, "Does playing violent video games cause aggression? A longitudinal intervention study", in 2019, was collected in a study done to determine if playing violent video games would cause any higher levels of aggression than playing a nonviolent video game or not playing video games at all and taking the test. From all of the data collected the researchers determined that violent video games did not cause the players to become any more aggressive than those who played video games that were considered to be nonviolent in nature. The data also determined there was no significant change in the behavior of the participants when compared to even the control group, who did not play any

video games. This data is not the only source analyzed that came to this conclusion, that violent video games do not make players more violent overall. There are other sources that also support the claim that violent video games do not make players more aggressive. Other sources showed how video games helped improve the student's abilities to learn the material presented to them and how the use of video games engaged the students to make more significant improvements in learning.

Research Findings: Improvement of Student Performance

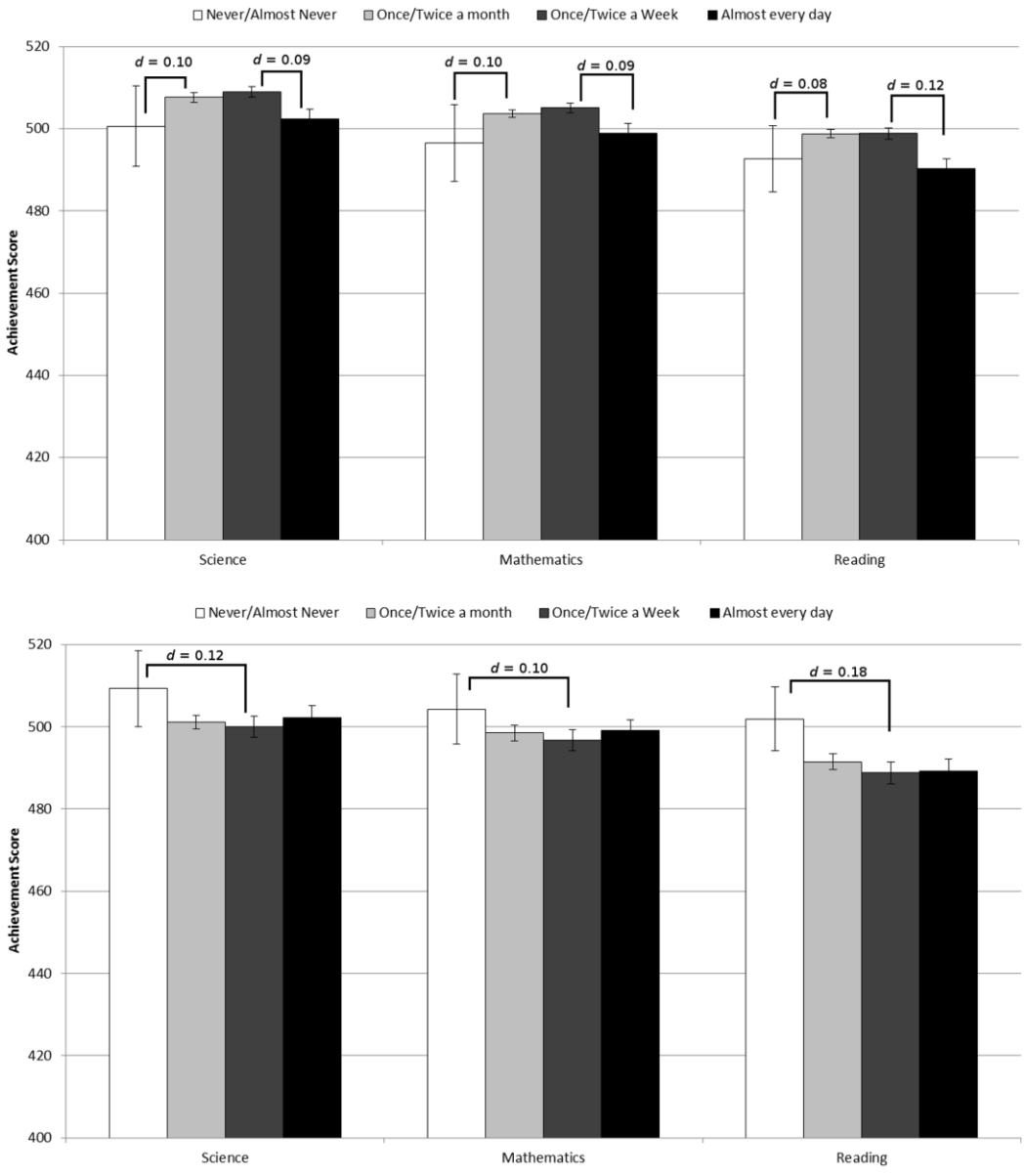
Group	N	Pretest Mean (%)	Pretest SD (%)	Post-test Mean (%)	Post-test SD (%)	t-value	p-value
Entire Class	40	46.9	18.2	77.9	19.4	8.341	<.0001
Caucasian M.	18	51.8	19.9	80.7	16.2	6.113	<.0001
Minorities	22	42.9	16.2	75.5	21.7	5.824	<.0001
Girls	11	41.8	11.6	81.1	12.1	8.418	<.0001

Fig. 1. Summary of two-tailed, paired sample t-tests after playing the Nobel games

The table above comes from the study, "Games and Simulations", by Balasubramanian, N., & Wilson, B. G., there was no experiment conducted, but an analysis was performed. The analysis that they performed suggested that the students who played video games tended to be able to retain information better and made more significant gains in their learning when compared to those who did not play video games. The researchers also determined that the students that played video games had developed behaviors and motivations after playing the video games. It was determined that these behaviors and motivations caused the students to perform better in their academics when compared to their peers. This analysis lends support to the claim that video games can be beneficial to students in their education, by allowing the teachers to present the materials to the students in a way that is both fun and interesting and gives the students a way to have a better understanding of the material presented to them. As

mentioned in the book “Videogames and Education”, written by Harry J. Brown, there have been cases of history teachers using the games like Oregon Trail or Civilization 3 to help teach their students about different topics and civilizations throughout history. This is not the only case of something like this happening as there is an educational video game in development, called Revolution, puts the students in a simulation of the life of a colonial settler on the verge of the Revolutionary War. These applications allow the students to get a better understanding of the topics presented by allowing them to interact with the material and learn by experiencing it instead of just being told. This add to the theory that video games can be used as an additional education tool by teachers to better present the materials in a way that is more beneficial to the students.

Research Findings: No Significant Student Performance



The data graph above is from the study conducted by Drummond, A., & Sauer, J. D. in 2014, titled “Video-Games Do Not Negatively Impact Adolescent Academic Performance in Science, Mathematics or Reading”, the data was collected by testing both male and female students in the categories of science, mathematics, and reading. Students were asked before the test started how often they played video games and the overall data collected showed that for male students who played video games, they tended to do better in the categories of math and

science than those who did not play video games. However, for female students the opposite effect was found to be the case, that for female students, those who played video games tended to do worse in the categories of math and science. The researchers then concluded that the overall difference when all the data was considered, video games did not have any conclusive impact one way or the other and that no definite conclusion on if video games were negatively or positively affecting the students. This data and experiment lend to the thought that video games could be used as a learning tool in certain situations, as not every student learns the material as effectively in the same way, some students are more visual learners, some are more tactile learners, some are better with verbal learning.

Conclusion

In all, video games, like most other pieces of technology, can be used for educational purposes, it is all in how they are implemented. They can engage the brains of students in a way that most lectures simply cannot. Not only does this allow some students to better grasp the material being taught to them through the game, but it also turns the process of learning into a more interactive and fun experience for many students. Allowing the option for teachers to present some of their materials in a way that helps their students to better comprehend new topics or allows them to better visualize certain topics, such as historical events by allowing the students to learn by experiencing the events. However, the level of helpfulness to each student's education would be completely on an individual level, as not all students can effectively learn the same way. Thus, it is not the case that video games could completely replace the traditional methods that teachers use to teach their pupils, but as a supplementary tool for their lectures and presented materials would be a potential benefit of adding video games into the educational system. Video games could be used in the classroom for educational purposes, though there

would still need to be more experiments done to truly know if video games are beneficial to student learning compared to purely standard methods of education. This in turn, means that more research needs to be done on how video games can be used in an educational setting and how the use of video games as an educational tool compares to more standard methods of education. As mentioned earlier, students learn in different ways, with some students learning better with visual stimulus, others learning with tactile learning, and others learning better with lectures. While all of these are very valid learning methods, video games would most likely work best with those who learn best through visual stimuli and tactile learning. As video games not only give a visual on the screen it is played on and allows the players, in this case students, to interact with the objects in the game and learn through doing. While the data analyzed from the sources collected lends itself more toward the idea that video games are a beneficial tool to use in certain cases to improve student's performance in some categories of learning, the data analyzed is just a small portion of all the data that has been gathered on this topic. To draw definitive answer from a small subset of data, would be unreasonable as a small amount of data does not tell the entire story that all the data collected over the past few decades can tell. However, to analyze all of the data that is available is not practical for this research report, as there is simply not enough time to properly analyze every study done over the past few decades. Furthermore, with many studies conflicting with each other with their findings, it is difficult to draw any definite answers from all data available, as to whether video games are a beneficial tool for educating students or if it should remain separate from the educational environment. With the current data being mixed on whether video games are beneficial or detrimental to furthering the educations of students, I cannot draw any final verdict on the topic. Though I am hopeful that there will be more research done that will be able to give a conclusive answer.

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