The Application of Video Games in Childhood Learning Styles

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

In 2019, pro players, content creators, and steamers all competed in the Fortnite World Cup with a prize pool of $30 million. Eventual Winner Bugha won $3 million by simply being the best in the world at a video game. There is no doubt that more than ever, video games have a hold on the youth of America in such a way that many kid's friends are only made through video games. Instead of society putting video games in a negative light, it could be an advantage to capitalize on how impactful video games are and implement them in an institution that all kids attend every day, school. In this paper I will outline the benefits and shortcomings that accompany video games. A simple review of literature and how it applies to these topics is sufficient enough to draw conclusions based on how video games can be used in a classroom setting or if there is no place for video games outside of the home. I will also address the skills that students can learn from video games that will benefit or harm inside the classroom, outside the classroom, and beyond graduation. I will not attempt to create new teaching styles that center around video games, but rather adapt the most effective styles of teaching to involve video games when appropriate. Although not a key topic of this piece, it would be an injustice to not address the issue of school funding and how this can apply to the implementation of video games in K-12 curriculum. This paper's aim is not to solve the issue of school funding for underprivileged schools, but rather to simply address the potential impact it would have if video games are deemed suitable for classroom environments. A simple introduction to an ethical discussion of how the implementation of video games should be prioritized will also be provided, as there are more pressing issues around how schools in America can be improved upon. An argument will be presented that will draw on the review of literature and how the conclusions for that argument connect to what is discussed in future sections.

Benefits and Detriments

Video games have been around for over 50 years, which means that it is very likely that the enjoyment that comes along with them is something that has been experienced over multiple generations. The harms and benefits of video games is something that has been argued by parents and children for just as long. Things like social skills, obesity, violence, and desensitization are topics that are quite important in this argument today.

Obesity and overweightness have been negatively associated with video games since the idea of an overweight teen drinking and eating junk food while playing video games all day became the vision that people thought of when discussing games. This idea has been reinforced by many different forms of media. For example, the South Park episode "Make Love, Not Warcraft" depicted an image of an overweight, unemployed adult that does nothing but play video games all day. This episode aired in 2006 which stressed just how long this stereotype has been around. Markey and collaborators showed that screen time has a minimal effect on weight in children. Programs have found that decreasing a child's screen time by 43 percent over the course of a year can cause them to lose on average, one pound. This is of course not a bad thing, but if a child would simply only drink water instead of soda and juice, they would lose around 15 pounds over the same time period (Markey et al., 2020). Although the issue with obesity and overweightness doesn't appear to of relevance to the application of video games in school, it is important to realize that the implementation of such games in a school's curriculum could allow the student to build the habit of playing them outside of school. Since video games don't have a negative effect on obesity, the possibility of a potential habit being built should not reinforce the typical stereotype. This is not to say that there aren't cases where the video games usage does not contribute to children being overweight, but this shouldn't deter video games usage as whole.

The stereotypical image of gamers being extremely antisocial and lonesome is also unrealistic. Markey and collaborators have also shown that the majority of gamers play games with friends or other people leading them to build and manage social relationships just like people do outside of video games. Gamers also cooperate and converse with other gamers in the real world just as often as people who do not participate in gaming. Not only does simply playing video games help to build and manage social relationships, but any game, regardless of its content, that offers any sort of conflict allows gamers to hone their skills of dealing with conflict, cooperating with people, and feeling the emotion that comes with the result of solving said conflict or not. Video games also offer anonymity to players who do have trouble making friends and relationships outside of gaming; allowing them to experience what it is like to manage social relationships even if it is behind a screen (Markey et al., 2020).

Gamers have often shown signs of desensitization when it comes to gruesome or violent events taking place in video games. They have been shown to react less emotionally when these events take place inside the game they are interacting with. However, the distinction between these reactions taking place in a video game and the real world needs to be made. Even though gamers tend to be less emotional and show less empathy to violent events happening in a video game, they show the same reaction as non-gamers when these events take place in the real world (Markey et al., 2020).

Violence itself is also something that gamers do not seem to struggle with. Seeing violence in video games has the opposite effect. The rates of violent crime after the release of any sort of violent media, video games or horror movie, drop in the days after said release. The reasoning behind this fact being that video games keep people, specifically males, occupied and away from the people that would be considered their victims (Markey et al., 2020).

Madhumathi and others tested the effect that video games have on a child's spatial skills. Spatial skills are simply the ability to create, memorize, or transform visual images. The study utilized a specialized type of video game to target the audience's spatial skills. The set of games included mental rotations of images, building blocks, matching shapes, and puzzles. The study found that this type of game is to be strongly recommended to children of the ages of 6-10 and can offer an improvement of their spatial skills (Madhumathi et al., 2022).

Since I have shown that video games don't affect children and young adults in stereotypically negative ways, I want to shift focus to a study in which video games have been proven to boost young people's "brain power." Bavelier and Green tried to determine if the human brain could, in response to new experiences, grow new brain cells. This is now known as neuroplasticity. In setting up and performing the experiment on himself, Green realized that he was producing almost perfect scores that were well above what the expected average was to be. Green, an 18-year-old undergraduate student, also ran the test on some of his closest friends, all who were around the same age that Green was, and all received near perfect scores. Once the experiment was performed on Bavelier, the test scores returned to around the expected average. They quickly found out the difference was that Green and his friends had been logging a significant number of hours playing a video game while Bavelier had not. Once they switched their focus to investigating how video games affect certain cognitive skills, they quickly found that video games have significant effect. Some of the cognitive skills they found that video games boosted are as follows:

> "During our research, we and other teams have found that video-game play boosts a variety of cognitive skills. Individuals who regularly play action games demonstrate improved ability to focus on visual details, useful for reading fine print in a legal

> document or on a prescription bottle. They also display heightened sensitivity to visual contrast, important when driving in thick fog. Action gamers also mentally rotate objects more accurately—and so are able to judge how an oddly shaped couch might best fit in an overpacked moving van. The multitasking required to switch back and forth between reading a menu and holding a conversation with a dinner partner also comes more easily" (Bavelier & Green, 2016).

One can see that video games are able to affect all people in different ways. It is important to notice that not only do video games have an effect on young children by honing and improving their skills in the classroom, but also life skills that can make them more useful to society. As this paper targets not only young children in elementary schools but also young adults and teenagers in middle and high school, this effect cannot be understated. Many graduating seniors do not attend secondary education and enter straight into the workforce. The skills that they can learn while in school like the ones stated above make them more marketable and provide better opportunities for their future. This could all be attained by allowing students to participate in an activity that some already enjoy doing.

It is clear that even the harshest criticisms behind video games have little merit and may even propose the opposite effect than the one stereotypically expected. Children of all ages would not be subject to the concepts that many people use to discredit the use of video games. Video games in school setting could not only be used to improve the students' performance in the classroom, but it is very possible that those students gain skills that are applicable outside the classroom and to life after graduation. The application of said video games will be discussed next.

Applications in Schools

Implementation will look different in elementary schools than high schools, and also amongst students and faculty. It goes without saying that the students will be the ones playing and participating in video games, however they may be applied, but teachers should also be familiar with how to correctly distribute said games. For example, if the game is web-based, the teacher should know how to efficiently run as the administrator of an online lobby or server that the students join. This could require extra training and meetings that teachers go through if video games are implemented into their schools' curriculum. The impact that the addition of video games to the curriculum would have on both the teachers and administration is based almost solely on the behavior of the students. A study by Rihtarić targeted the effect that video games had on students that were playing them outside of school. The study looked into the differences between harmonious passion for video games and obsessive passion for video games and how that impacted school engagement. Rihtarić defines harmonious passion as the ability for an individual to control the activity and put it aside if something else needs to be accomplished. Rihartić found that harmonious passion for things leads to stronger positive and weaker negative outcomes, while obsessive passion for things leads to weaker positive and stronger negative outcomes. Rihartić hypothesized that harmonious passion for video games would correspond with a student being able to control the urge to play video games, leaving more time for school work and overall lead to only a stronger school engagement for students (Rihtarić et al., 2022). So, if schools can find a way to implement video games into the curriculum in a way that promotes a harmonious passion for playing them, then administration and teachers would be able to get more engagement in the classroom and less behavioral issues out of students.

One of the best ways that students in an elementary school setting learn is through hands-on activities and by a teaching style called chunking. Chunking is a process in which an educator

breaks up a particular lesson that is being delivered into smaller chunks to check for progress of understanding as the lesson goes along. Lane and others outlined how to properly do this in an elementary school setting since this has been proven to be one of the most effective ways that elementary level students learn. Chunking led to less negative interruptions by students such as talking over the teacher. This also led to less hand-raising by students to ask questions. This is simply due to the effectiveness of taking breaks and allowing the students to check their progress to see if they actually understand the material, rather than giving the lesson in its entirety and testing the students after the fact. Students showed more of a tendency to understand the material that was being delivered when the chunking method was used (Lane et al., 2007). It is important to note that video games already easily implement the chunking teaching style no matter what type of game one uses. For example, may story based action-adventure games such as God of War and the Assassins Creed franchise rely on this to help the player progress through the game in an effective manner. These games provide a brief, in-game tutorial for certain abilities and inputs, and allow the player to use and unlock them as they progress. These games do not simply dump every ability and input onto the player and expect them to figure it out. With that being said, stopping to periodically test students on their understanding of the material that they are learning in a fun and inviting way may seem more enjoyable to the students as they do not feel like they are constantly being tested.

High school students do not require the same positive affirmations that elementary school students do in order to effectively learn. Nabulsi and collaborators found that high school students learn better and take in the material in a more effective way when an adaptive-response system is used rather than a traditional one. This response system is typically used in a homework setting. An adaptive-response system is one where the questions are tailored to the

mastery of the specific student. For example, a traditional-response style would be one where the teacher assigns the same X number of questions for each student. In an adaptive-response system, the same X number of questions will be assigned, but if the student has shown a sufficient level of mastery on Y number of the questions, then the student will only need to complete the remaining X-Y number of questions to receive full credit for the assignment. This allows the student to focus on and receive a more targeted assignment based on what they don't know, rather than what they do know being repeatedly assigned. This adaptive-based system can be modified based on what the teacher would like to achieve in the classroom. For example, the teacher could assign that X number of questions be assigned for a given assignment. If a student has shown mastery on previous subjects that are within those X number of questions, then the student would still have to complete an X number of questions, but the content within those questions would be tailored to what they don't know. This would allow the student to get more attention and experience working on topics that they have trouble understanding. This system was implemented with a group of high school general chemistry students. Students spent the entire semester with one type of homework system and their final grades were tabulated. The results are shown in the figure below.

Final grade	ALEKS ($n = 242$)	Sapling ($n = 261$)
A	24.8%	23.4%
B	37.2%	29.5%
C	24.4%	30.3%
D	11.2%	12.3%
F	2.5%	4.6%

Note. Table depicting final grades for adaptive-response systems and traditional response systems (Nabulsi et al., 2021, 36)

ALEKS is the name of the adaptive-response system, Sapling is the name of the traditional-response system, and n is the number of students who were enrolled in the respective system. There aren't any major discrepancies at the extreme ends of the spectrum as the kids who got A's and F's would have more than likely performed the same way regardless of the system they were in. However, there is a notable difference between the students who received B's and C's in each system. There is clearly evidence that that students performed on average, better in the ALEKS system than in the Sapling system (Nabulsi et al., 2021). Systems like this could also be applied to a video game level. It is imperative to note that high school kids do not need the same level of access to video games that elementary students do, but a small amount of exposure to a fun activity can be seen to get high school students more involved in their work.

School Funding

Although not the key topic of this paper, another topic that needs to be addressed is the issue of school funding. The implementation of video games into school curriculum would cost money. There already exists a discrepancy between privileged and underprivileged schools in America, and it is important to not allow the implementation of video games does not become yet another thing that separates the quality of education that kids that attend these different kind of schools get. The majority of students that attend underprivileged schools in America are minorities while the majority of students that attend privileged schools are predominantly white. With the amount of controversy surrounding the racial divide in this nation, the betterment of childhood education should not be one of the things that contributes to it (Schmidt et al., 2011; Ostrander, 2015).

Video games should not be seen as a replacement for the more traditional things in the classroom. They should serve as a fun alternative. For example, there is still a place in the

classroom for traditional lectures, homework, and group activities. However, the addition of video games should only make the classroom more diverse, giving students as many learning opportunities as they can possibly have access to. Since many schools across America already use technology in some way, no new or a limited amount of money should need to be spent in order to offer the alternative learning opportunities that video games provide. Therefore, it follows that if video games are proven to be a bonus in the classroom at certain times and grade levels, it should not be an overwhelming problem for those in underprivileged schools.

There are a lot of ethical issues in the world surrounding money, and it would be a disservice if the ethical issues of school funding were not addressed with regards to video games. The biggest question to ask is if schools have the ability to purchase the necessary materials to implement video games into the curriculum, should they? It goes without saying that there are clearly more pressing matters to take care of if a school has extra, unallocated funding. For example, I think it is uncontroversial to say that a school with extra funding should prioritize offering free lunch for all students instead of trying to bring video games into the classroom. In fact, there lies many things that should take priority over the implementation of video games in the classroom such as free school supplies for underprivileged students or bonuses for teachers that go above and beyond to offer a brighter future for all students. As I stated previously, the issue behind school funding and the implementation of video games into school curriculum is not the primary focus of this paper, but it is an important topic of conversation when deciding if and how video games could be implemented.

Argument and Conclusion

The implementation of video games in childhood education is something that can be argued as having a huge role in the future of American schools. Weighing the effects of the items

discussed in the previous sections, I argues that video games not only have a place in K-12 schools, but possess what could be the biggest part of the future of K-12 curriculum. It is shown in the above section that the negative stereotypes surrounding video games are not only false, but in some cases have the reverse effect. Things like obesity, violence, desensitization, and the inability to create and maintain social relationships are not negatively affected by video games outside of schools. If one can use video games in an effective way inside of school to help boost the amount that students learn, then it is obvious that these effects still won't take place.

Since so much research has already been done on which teaching styles work best for particular ages of students, it would not make sense to rewrite these techniques to add video games into the curriculum. After all if it ain't broke don't fix it. However, video games can be created to try and mimic the most effective teaching styles and allow the student to learn using a different media. Teaching styles like chunking and adaptive-response systems for things like in class lectures and homeworks could very easily be implemented using video games as the method for delivering the learning material. Not only can video games be used to mimic current teaching styles, but with the addition of them to the schools' curriculum, new learning styles that haven't been thought of and researched can be created that could prove to be more effective than the aforementioned ones. There can also be a portion of the school day that gets put aside for students to play video games that allow them to simply take a break from learning and simply have fun. It was previously mentioned that just the playing of a video game can help with student's cognitive functions, so it could be important to not only make a child a better student, but also a better learner. Although it is important to realize the issue that surrounds school funding with the change in curriculum, it was shown in the previous section that this effect may not be as great as one might have expected.

It is imperative that schools across America and the world must adapt as new technology and research becomes available to better improve our schools. Just as the invention of the blackboard revolutionized the way material was delivered in the classroom, the implementation of video games into K-12 curriculum could be the next best thing. Assuming funding is not an issue, schools across America should do what they can to start assimilating video games into their schools curriculum. There is little doubt that these actions could negatively impact students and the way they learn if utilized in the correct manner. This paper by no means in suggesting that video games be offered as a replacement to traditional teaching and learning styles, but rather as a tool to aid in childhood learning. With all this being said, the effect that video games could have on schools across America have little downside compared to the potential upside that they provide. Video games offer a new way and style of learning and should be implemented by local policy makers in states across America.

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