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The Effects of Online Games on Student's Academic Performance

Sharliana Che Ani, Norul Huda Mohd Ghazali, Mohd. Sofi Ali, Kwang Yong Shin, Mageswari Subramaniam, Noorul Akmal Shafii

UNITAR International University, Malaysia
Email: sharliana@unitar.my

Abstract
This study aimed to investigate the effects of online games on students' academic performance. The study employed a descriptive qualitative in-depth interview conducted with 30 students, aged 10-17, from private and public schools in Kuala Lumpur. Interviews were conducted face-to-face as well as through phone or video calls interviews where physical accessibility is restricted. The interview consists of mostly semi-structured questions focusing on "the negative effects of online games on their academic performance", "the positive impacts of online games on their academic performance", "the positive impacts of online games on learning" and "the appealing features of online games" and followed probing questions. The researcher also followed all ethical regulations in ensuring that all participants' details were kept private and that the participants were well informed about the interview procedures beforehand. The findings disclosed that most students playing online games for long hours at night and going to bed late had a significant impact on their performance in school. There were obvious implications of the effects of online games on the academic performance of most of the students whereby their subjects' grades were deteriorating. The class, lack of revision, and unattended homework due to the divergence of focus to online games. Students state that online learning games used in the classroom can motivate them to learn better, improve languages and make fast decisions. Based on the findings of the study, the negative effects didn't reach the addiction level with the moderate effect taking place now might worsen as time goes by unless remedial action is taken immediately. The researchers recommended that to maintain the good academic performance of students, parents should also play an important role by setting limits on how often and how long their child is allowed to play online games. Parents are also encouraged to form a bridge of communication between them and their children, so that there will be a mutual understanding between them as well as to ease conflicts.
Keywords: Online Games, Student, Academic Performance, Learning

Introduction
In this decade, using technology in our daily lives isn't something new. With the development of technologies, things became more advanced, and people's lives became easier and simpler.

Reflecting to the 1940s, many video games were developed and gained popularity irrespective of their ages. By the time between 1960 and the 1990s, the history of video games made a huge turn, and games started to boom and developed to promote online involvement. Today, almost every home has access to the internet.

The internet has become the biggest medium of technology that connects us to every corner of the world. And with the accessibility of the internet, online gaming became extremely popular, especially among teenagers. It is said to be one of the most popular trends among teenagers because it is used as a leisure activity, stress-reliever, and relaxation. There is no area of technology that has become as prominent as online gaming. It was also because online gaming can be played at any point and time of the day. The addiction had made teenagers immersed in the games so much so that they isolate themselves from social communication and physical activities, just an attempt to reach a higher level in a game. Some even went to the extreme of spending on purchasing games-related items to keep themselves at the highest level in the game. Addictions started to alarm many societies about the outcomes and detrimental effects it might have on children and teenagers.

Purpose of The Study
Problem Statement
While concern about online gaming has grown dramatically in recent years, gaming is not something new. The development of technology had made vast changes to people's lives. The changes may serve benefits or disadvantages to people's lives. The invention of online gaming has become one of the main addiction or leisure activities among teenagers and people of other ages.

Education is one of the important elements in building society. It contributes to someone's future success as well as improves personal satisfaction, knowledge, skills and growth. With the advancement of technology, online games became a necessity among students and teenagers. The education system had no choice but to also make constant changes to reach the generations today, effectively.

It is apparent that when minimal attention is given to study due to other addictions, it will be obvious that academic performance will decline. The increasing prevalence of online games among children and adolescents has made many researchers determine to investigate the effects of these games on the players. Parents also started to raise their concerns in recent years about the effects of online games that could be the factor in the declining academic performance of their children.

During the Covid-19 pandemic, the rise in online gaming and the absence of face-to-face education in schools have again raised parents' concerns about the effects of online games on students' academic performances. During this period, children were forced to stay at home and online gaming is the only refuge for recreation during their stay at home (Elsayed, 2021). Students are also abiding by online classes which leads to significant disruption to the student as well as a loss of interest in studying. There is no doubt that the Covid-19 pandemic had seriously affected the children's lifestyles. According to research done by Elsayed (2021), the impact of the Covid-19 pandemic on the increasing risks of children's addiction to electronic games indicates a high level which came to 80.47%.

Thus, on the other hand, it is worth noting that online gaming may impact positively on student learning and academic performance. Dedicating too much time and attention to playing games may decrease the learning time and homework completion tasks. However, strictly forbidding students from playing online games may prevent them from keeping

themselves abreast with the latest technology as well as the benefits online gaming might offer.

Literature Review
Theoretical Framework
There were several theoretical models that explain the linkages between learning variables and students' educational outcomes. Walberg's (1981) theory of educational productivity was empirically tested as one of the very few theories of academic achievement (McGrew, n.d). Walberg's theory of academic achievement explores the factors that affect the academic performance of a student. In his theory, he identified the 9 most influential domains of variables that influence educational outcomes. They include student ability/prior achievement, motivation, age/developmental level, the quantity of instruction, quality of instruction, classroom climate, home environment, peer group, and exposure to media, which includes online gaming (McGrew, n.d). According to Walberg's theory, factors and variables are clues to why students aren't reaching their full potential (Kuterbach, 2013). Therefore, based on the theory, the effects of online games do imply on students' academic performance. However, with the evolution of technology, will online games only affect students negatively?
Model
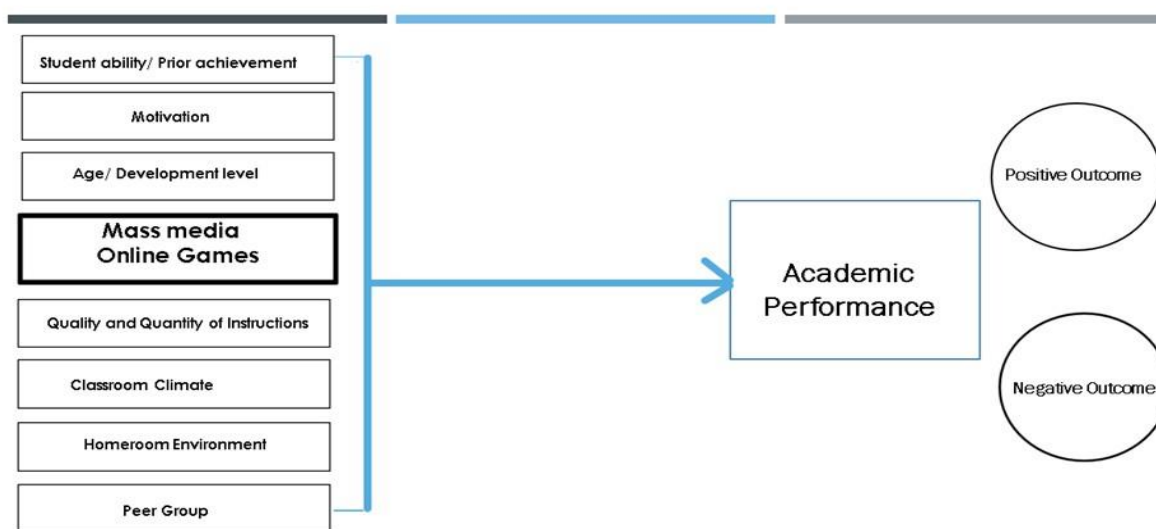
WALBERG'S THEORY OF ACADEMIC ACHIEVEMENTS

Negative Effects of playing online games
It is undeniable that playing online games can provide some pleasure that is incomparable. Some people claimed that playing online games is just a pastime, stress-reliever, relaxation, and fun. However, many have raised their concerns as it was taken more seriously as an addiction that is thought to contribute negatively to mental health and increases aggression among children.
Research was conducted in the United States where, on average, participants in the study played for around 20 hours a week. Students who were addicted to online games tended to perform lower than their non-addicted peers in school (James, 2022). Countries like China

have quickly reacted to the negative influence online games can have on students. China has set rules banning children from spending more than 90 minutes a day gaming and children are only able to play online games up until 10 pm (James, 2022)

The negative effects of online games are obvious. In terms of education, a decline in academic performance is one of the most apparent negative effects of online games. Besides that, due to addiction, online gaming may also cause a lack of sleep, homework unattended, and a loss of interest in school activities such as social clubs and sports as well as social communication. It was noted that social isolation has caused a child loses social skills in dealing with other, be unable to speak and express themselves and eventually cause a separation from reality and live in imagination that is confined around himself (Elsayed, 2021).

Researchers also found out that the use of touch screens can reduce lesser hours of nighttime sleep or delay bedtime hours (Cheung et al., 2017). This causes daytime drowsiness and restrains students from focusing on what the teacher is teaching in class

Impact of Online Games on Learning

Despite the obvious negative effects of online games, there are arguments about the positive effects of online gaming on student performance. When online games became a trend, researchers started to venture into education, with innovative and refined ideas embedded in the design of game-based learning. Besides that, the design of online games had also ensured different learning experiences are being engaged on an affective, behavioral, cognitive, and sociocultural level (Homer, et. al., 2015).

According to Homer, et. al (2015), online games can develop 21st-century skills whereby they can help to improve the student's socio-emotional skills such as collaborating as a team and being involved in problem-solving and communication.

According to a study by the UK's National Literacy Trust, students who play online games every day scored higher than the average students in reading and writing (Picton et al., 2020). It is also believed that kids who play online games do better in Maths and science and one of the arguments for why these improved scores exist is the fact that online games such as solving puzzles require higher-order thinking skills to achieve higher scoring points, thus allowing a person to quickly solve problems, be able to think critically, and make good decisions.

According to research done by Sauce et al (2022), American kids, between 9 and 10 who spent an above-average time playing online games increased their intelligence scores by 2.5 I. Q points above the average after two years.

Even schools in recent years have incorporated online games such as Quizizz, Kahoot, Pictionary, Spelling Bee, and many more in their classroom teaching.

In 2020, the President's Council of Advisors on Science and Technology found the importance of enforcing STEM as they realized many students are switching out of science, technology, engineering, and math programmes due to the difficulty of a course called calculus. In conjunction with this, The University of Oklahoma has developed a calculus game to help students to master the subject. It was evident that the use of purposefully designed learning games had increased the success of students in calculus (Thomas, 2021).

Online games Appealing Features

Due to the Covid-19 challenge, most educational systems have been obliged to develop new teaching and learning methods. Most teachers have moved into incorporating online games to make their classes more interesting. Moreover, the consistent innovations of online games

had always provided new and catchy features that would appeal to students' interest and attention to learning. The lack of attractive design will impede students from using the online educational games (Whittion, 2011; Soylucicek, 2012)

One of the most appealing features of online games is the visual aesthetic design. A good design features lead the reader to access it with confidence. It should provide readers with a clear and hassle-free mindset. Good design features include the fonts used, the colour scheme used, and the use of simple language. According to Sharma & Alam (2022), games often have a fantasy element that engages students in a learning activity just like a storyline. Besides that, other features of online games that appeal to students are that it provides challenges, whereby they get to be involved in competition with other students either from their same classroom or it could be from other students from abroad or another school. This motivates them to learn better.

Definition of Key Terms

This study contains certain key concepts that were used frequently. Although they are briefly introduced in the earlier part of this study, the definition of terms will allow readers to understand and make sense of what is presented in the subsequent sections or chapters.

Participant - The term "participant" is used to mean and used interchangeably with the word "student."

Online games - Online games refer to games that are played over some digital devices such as smartphones, tablets, iPad, and computers with some form of internet network. Online games can range from simple text-based games to games incorporating complex graphics and virtual.

Internet – The Internet is an electronic communications network that connects computer networks all over the world and facilitates worldwide communication.

Academic performance - Academic performance is the measurement of student achievement across various academic subjects. Student achievement in academic performance can be measured using both formative and summative assessments whereby it could include classroom performances, classroom participation, projects, assignments, or examinations.

Learning – According to the Oxford dictionary, learning means "the acquisition of knowledge or skills through study, experience, or being taught." Learning is a process whereby experiences and knowledge lead to results of change for the betterment or expansion of already known facts.

Game features - It is any descriptive aspect of a game's design, art, audio, or technical capabilities.

Research Methodology

Research Design

This research follows the descriptive qualitative study which seeks to describe a phenomenon on the effects of online games on students' academic performance and how it impacts their learning. This research design also enables the researcher to obtain information that represents the reality of the situation in order to provide an accurate explanation of the findings.

Research Sample

This research follows an in-depth interview with 30 students from private and local government schools in Kuala Lumpur, aged between 10 – 17. The private and local government schools that were used in the research sample comprise:

Hibiscus International School, No. 2, Jalan Udang Harimau 3 Kepong Business Park, TamanSri Segambut, 51200 Kuala Lumpur

Sayfol International School, 261, Jln Ampang, Taman U Thant, 50450 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur

Sekolah Kebangsaan Kepong Baru, Jalan Api - Api 4, Taman Kepong, 52100 Kuala Lumpur,
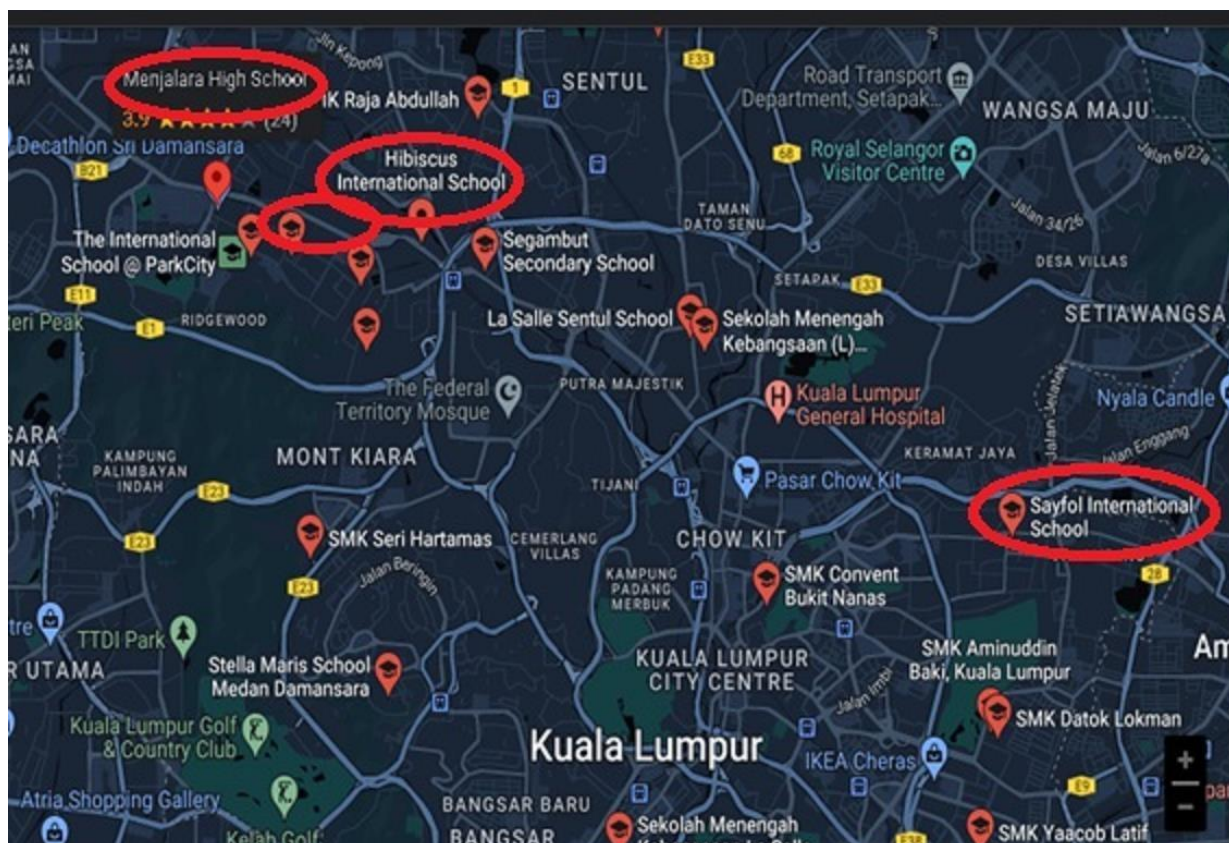
Wilayah Persekutuan Kuala Lumpur

Sekolah Menengah Kebangsaan Menjalara, Jalan 2/62b, Taman Manjalara, 52100 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur

Research Instruments

The instrument that was used in this research is in-depth interviews conducted face-to-face as well as through phone or video-calls interviews where physical accessibility is restricted. The interview consists of mostly semi-structured questions focusing on "the negative effects of online games on their academic performance", "the positive impacts of online games on learning" and "the appealing features of online games", followed by probing questions such as "How do you manage your studies?", "Do you feel that the time you spend on your studies has changed since you spent so many hours playing games?", "Which online games used in the classroom are most appealing to you?"

Procedure for Data Collection

The interviews were held at the convenience of the participants. The interviews were conducted by research team members who are well trained in qualitative methods. It will be conducted in either, English, Malay or Mandarin depending on the participant's preferences. The interview session will take 20 – 45 minutes. The participants will be notified beforehand and clearly briefed on the interview procedures whereby all their personal details and responses will be kept private and anonymous. The interview will be audio-recorded and later transcribed, cross-checked against the recording, and coded in English.

Procedure for Data Analysis

The thematic analysis approach will be used to determine themes and subthemes. NVivo V.12 Plus software will be used to organize and facilitate the coding process for analysis. The codes analyzed will be merged into comparable categories. And finally, the same categories will be grouped into subthemes and themes through analysis from the word cloud.

Results

Research Question

A total of 30 in-depth interviews were carried out among students from local government schools and private schools in Kuala Lumpur. Through the data collected, three broad themes emerged from the thematic analysis: Negative effects of online games on academic performance, positive impacts of online games on learning, and online games appealing features. Several subthemes were identified within each major theme. The themes and subthemes are summarized in Table 1.

Table 1
The effects of online games on students' academic performances

Themes	Subthemes
Negative effects of online games on academic performance	Changes in daily routine Focus Subjects' Grades
Positive impacts of online games on learning	Think Learn Reduce stress
Online games appealing features	Visual Clear Communicate

Theme 1: Negative effects of online games on academic performance. Changes in daily routine

The study found out that students were too involved in online games that they displace valuable time that they should spend on educational activities such as completing their homework or doing revisions for playing online games. Some participants said:

"Game is part of my daily routine." (P23)

"More importance was given to games rather than school. They completely replace my routines; everything is planned around games. The time I spend on studies has shrunk to none due to online games." (P17)

"I delay homework, projects and studying. I replace doing useful things with playing games." (P25)

"Wake up late due to late-night gaming. Most subjects failed." (P15) Some students responded that playing online games had made them lazier.
"I forgot to do homework and delay so much work." (P1) "I procrastinate in completing school homework." (P18) "I became lazier." (P24)

Focus
Probably one of the most obvious reasons for declining academic performance is the lack of focus in class. The results showed that many students who played games late at night or for long hours at night tend not to get enough sleep. With the lack of focus in class, cognitive response and participation in class might not be effective and in the long term, this can cause a decline in academic performance.
"My brain is usually drained, so I'm tired, cannot focus and participate in class so much." (P19)
"I cannot focus on class and studies." (P29)
"I sleep late due to playing games until late at night, wake up late, feel sleepy in class, and lost focus while the teacher is teaching in class." (P13)

Subjects' Grades
There are also students that found a decline in their academic results due to involvement in playing online games. Some results may decline drastically whilst for some students, it declined gradually.
"Yes, they are on a gradual decline." (P17)
"It did affect my scores, but I am starting to take studies seriously." (P28) "Due to gaming, my History grades got lower." (P1)
"Bad effects on academic performance. Maths and English subject grades from B to E." (P12)

Theme 2: Positive impacts of online games on learning. Think
It was said that online games do affect students' cognitive development. According to Fuad and Helminsyah (2017), children who play online games tend to have better memory, problem-solving skills, better synchronization, and high critical-thinking skills. Based on the results, many participants acknowledged the positive impacts of online games on learning. They said:
"Better memory." (P18)
"Make fast decisions." (P20)
"It stimulates my mind and ideas." (P12)

Learn
From the results obtained, many participants claimed that they have learned a lot of new things and improved their language from playing online games. They expressed a very positive outcome of online games on learning. The participants mentioned:
"My native language is Kazakh; I play online games in English. It improves my English language." (P16)
"Learn something interesting, new vocabulary and review meaning." (P1)
"Makes studies fun and interesting. It also helps me to learn how to answer questions well and motivates me to learn." (P12)

Reduce Stress
Based on the findings, some participants responded that they feel good when they accomplish a challenge. Others also responded that online games are fun and enjoyable and that it is the best way to relieve stress. They also mentioned that they think and learn better when they are not under stress. One of the participants said:
"Relieve stress from the success of winning a game. My mood gets better and then could grasp what the teacher teaches better." (P27)
"The success of winning a game and being at the top." (P27) "It is really fun and relieves all the stress that I have." (P26)
Theme 3: Online game appealing features. Visual
Most participants responded to the visual aspects of online games. Most of them indicated that the designs, colors, and characters used to create an appealing effect. A few participants even mentioned the online games that they admire in terms of their use of creative visuals such as home design, sandbox elements (Roblox), and big maps.
"Nice designs." (P19)
"Colorful characters and nice image." (P12)

Clear
There were also many participants who claimed that there are clear instructions and that they can repeat the instructions if needed. They said:
"Easy to play". (P19)
"Have answers to check to know what is wrong and correct." (P3)

Communicate
Most students responded that they could socialize with their friends and other people of different cultures.
"Basically, I love to chat with people, different people. My school friends and people from other places. And for team games, it is fun to collaborate with other people." (P25)
"I can make friends and improve my language." (P29) "I can make friends, know other cultures." (P26)

Conclusion
This study revealed students' perceptions of online games. Students find that online games are indeed a good platform for relieving stress and having fun. It is said to be easily accessible and a good source of entertainment. On average, students face the screen for about three hours per day playing online games with friends. The study also shows that students themselves admit that playing online games does affect their academic performance. Not only does it affect their academic performance, but it has also affected their health and eyesight. Their daily routine has been in a way that it works only around playing online games which leads them to neglect socializing with their family members and other physical exercises for online games. Through the study, most students realized that there is a need to start adjusting the proper allocation of time between playing games and studying and to reduce the number of hours on online gaming.
Besides that, this study also enables the researcher to gain insights into parents' views of their children playing online games. Some parents think that playing games is a nuisance. And on another extreme, some parents were unaware of their children playing online games for long

hours, and some parents don't mind their children playing online games given the trust that they will allocate their time properly.

Through the findings, the study revealed that online games not only affect students negatively, but they could serve some positive impacts on learning. Based on research done by Schmidt and Vandewater (2008), it is stated that the content appears to be crucial, which literally means the amount of information gets transmitted from mass media (online games). It all depends on how it is being used. If it is used correctly, then it would produce positive outcomes. But if it is being used incorrectly, then negative results can be expected. Based on the findings, it shows that not all students who played online games had results that turned out to be declining and some find that online games did help them in developing verbal skills and visual- spatial skills which leads to academic success in problem-solving, critical thinking, and creativity. It is worth noting that teaching students 21st-century skills such as problem-solving.and critical thinking are the utmost important elements in the education industry of this century.

The findings also revealed that a mind which is free of stress does impact the student's learning process. According to Thomas (2021), on average, students can only absorb 60% of what was being taught in class. An extended learning time will not provide beneficial outcomes as a tired mind will only give marginal effects. Implying online games can help to keep students more engaged and more motivated to learn. Students will also construct the knowledge obtained and develop skills and strategies. Besides that, games that are immersive and require strategic thinking to win require the player to memorize a lot of details. Therefore, regular training with this type of game can help improve memory.

Besides that, bringing students to socialize with people of different customs and cultures can bring students together and build strong relationships or collaboration in schoolwork. The bond between students having fun together may foster social and emotional learning whereby they learn to take turns and share.

Students have also described a few interesting online games that were used in their classroom learning. It appeared that the visual aesthetic designs such as the colors and characters used as well as its competitive platforms complement the attractive features of online games. It is apparent that most students preferred "Kahoot". Apart from this game, there were also other games mentioned such as crossword, Pictionary, Quizizz, Wordwall, scrabble, charades, puzzle, diverting, booklets, and monopoly. Students have claimed that these games were fun and triggered them to think more deliberately.

While the negative effects didn't reach the addiction level with the number of hours of screen time, there were still negative effects that need to be addressed. There might be a possibility that the moderate effect taking place now might worsen as time goes by unless remedial action is taken immediately. The researchers recommended that to maintain the good academic performance of students, parents should also play an important role by setting limits on how often and how long their child is allowed to play online games. Parents are also encouraged to form a bridge of communication between them and their children so that there will be a mutual understanding between them as well as to ease conflicts.

Limitations of Research

Studying, like any other, has certain constraints and limitations. First, the scope of the study is limited to students only in the general population and does not consider parents, teachers and other communities. Thus, this study will not be able to analyze it from the view of other groups. Furthermore, the samples were done in both private and local government schools.

As most private schools incorporate technology in their lessons, such as the use of smartboards, iPad, and other electronic devices, there might be gaps between different cultures and curricula practiced by students at both different schools.

Recommendations for Further Research
Several areas for future research arose during the study. The study was done in the city of Kuala Lumpur whereby the internet is easily accessible. What would be the effects or perception of online games in other urban areas where the internet is not as developed as in the city centre? Would exposure to online games affect students differently?

Another area that is good to investigate is the impact of online games on intelligence. Intelligence is one of the psychological traits that involves many cognitive processes such as memory, spatial manipulation, reasoning, understanding, logic, creativity, and attention. Would online games arouse students' ability to learn effectively, think rationally and be able to adapt very quickly to different situations? It would be great to study the relationship between online games and intelligence. A high percentage of intelligence would guarantee better academic achievement and hence, online games will move apace and develop further for the betterment of learning.

Research is meant for contribution. Please add a paragraph after conclusion, which details the theoretical and contextual contribution of this research. How is it significant to the existing knowledge and how it plays its role in context?
It is important to emphasize the theoretical and contextual contributions of this research after the study on the effects of online games on students' academic performance has come to a conclusion. The complex relationship between online games and academic performance is clarified in this study, which adds to the body of knowledge by examining both the positive and negative effects.

This study's application of Walberg's theory of educational productivity—which identifies important domains of variables that influence educational outcomes—represents its theoretical contribution. The study offers insightful information into how elements like student aptitude, motivation, and exposure to online gaming can affect educational outcomes by looking at the effects of online games on academic performance within this framework. This advances knowledge of the complex nature of academic performance and the influence that online games have on it.

In a broader sense, this study adds to the ongoing debate about the impact of technology on education. As online gaming becomes more popular among students, it is critical to research its effects on academic performance. This study contributes to the development of evidence-based strategies and policies that can support students' learning and well-being in the digital age by investigating the positive and negative aspects of online games.

Furthermore, this study takes into account the unique context of the Covid-19 pandemic, which has disrupted traditional education systems and increased reliance on online platforms. The study provides timely insights into the challenges and opportunities that arise from the integration of online gaming and remote learning by examining the effects of online games during this period. This contextual contribution is especially important in guiding educators, parents, and policymakers through the changing landscape of education during times of crisis. Overall, this study provides a thorough examination of the effects of online games on students' academic performance, emphasizing the theoretical and contextual implications of these findings. This study adds to existing knowledge by recognizing the complexities of this

issue and providing evidence-based insights, and it serves as a foundation for future research and interventions aimed at promoting positive educational outcomes in the digital era.

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