# A Systematic Review on Online Gaming Addiction and Student's Behaviour in Gaming: The Case of PlayerUnknown's Battlegrounds (PUBG)

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## Abstract

*Online gaming addiction issues are very popular among students until now. Previous study shows that previous researchers are more focusing on the online gaming addiction. Less research was conducted in the effect of the addiction on the students' behaviour. However, as for present study, the researcher will be focusing on online gaming addiction and students' behaviour in Malaysia. Previous research shows data about 1.4% addicted to online gaming and experiencing negative behaviour issues. Moreover, online gaming also led to a negative behaviour because of the extreme elements in the game. Therefore, the target of the present study is to do a systematic review on online gaming addiction and student's behaviour in gaming the case of PUBG. The present study will employ a Qualitative method. PRISMA systematic review will be conducted in reviewing previous journals starting from the year of 2016 until 2020. Findings show that the addiction of PUBG among the students in Malaysia results in a negative behaviour amongst them. This data can justify why behaviour issues among students in Malaysia keep on rising. A collective of systematic review assists in identifying the trends on online gaming addictions and students' behaviour in gaming.*

*Keywords: PRISMA Systematic Review, Online Gaming, Addiction, PUBG*

# Tinjauan Sistematik PRISMA mengenai Ketagihan Permainan Dalam Talian dan Kelakuan Pelajar dalam Permainan: Kes PUBG

## Abstrak

*Isu ketagihan permainan dalam talian sangat popular di kalangan pelajar sehingga kini. Kajian terdahulu menunjukkan bahawa pengkaji terdahulu lebih menumpukan pada ketagihan permainan dalam talian. Kurang kajian dilakukan mengenai kesan ketagihan terhadap tingkah laku pelajar. Walau bagaimanapun, seperti kajian semasa, penyelidik akan memberi tumpuan kepada ketagihan permainan dalam talian dan tingkah laku pelajar di Malaysia. Penyelidikan sebelumnya menunjukkan data tentang 1.4% ketagihan dalam permainan dalam talian dan mengalami masalah tingkah laku negatif. Lebih-lebih lagi, permainan dalam talian juga menimbulkan tingkah laku negatif kerana unsur-unsur yang melampau dalam permainan. Oleh itu, sasaran kajian ini adalah untuk melakukan tinjauan sistematik mengenai ketagihan permainan dalam talian dan tingkah laku pelajar dalam permainan kes PUBG. Kajian ini akan menggunakan kaedah Kualitatif. Tinjauan sistematik PRISMA akan dilakukan dalam meninjau jurnal sebelumnya yang bermula dari tahun 2016 hingga 2020. Dapatan menunjukkan bahawa ketagihan PUBG di kalangan pelajar di Malaysia mengakibatkan tingkah laku negatif di antara mereka. Data ini dapat membenarkan mengapa masalah tingkah laku di kalangan pelajar di Malaysia terus meningkat. Kolektif tinjauan sistematik membantu dalam mengenal pasti trend ketagihan permainan dalam talian dan tingkah laku pelajar dalam permainan.*

**Kata kunci**: Kajian Sistematik PRISMA, Permainan Dalam Talian, Ketagihan, PUBG

## 1. INTRODUCTION

Online gaming is one of the most popular platforms that serve entertainment to the users and can influences the quality of the users' life (Agag, Khashan and Gayaar, 2019). This online gaming is very popular not only in developed country but also in developing country such as China, Malaysia, Philippines, Brazil, and India. According to WePC (2021), the use of online gaming can be classified worldwide with 2.2 billion online gamers. Next, there are many types of online gaming and each of the live streaming online games give a different experience to the users. For instance, Player Unknown's Battlegrounds (PUBG), Fortnite Battle Royale, Apex Legends, League of Legends (LOL), Minecraft, Counter-Strike: Global Offensive and HearthStone. However, among all of the online gaming, the most popular online gaming platform is PlayerUnknown's Battlegrounds or also known as (PUBG) with more than 50 million online players in 2021 (FULLSYNC, 2021). As have been mentioned earlier, Player Unknown's Battleground or (PUBG) is a multiplayer battle royale live streaming online game and the players can decide whether they want to play it on PC's or mobile phones such as Android or IOS and XBOX (Chris, 2021). This game has been developed by Bluehole which is a subsidiary of South Korean video game company and was launched in 2018 (Chris, 2021). PUBG has been designed by a designer known as Brendan Greene and this online game is based on a Japanese film known as Battle Royale (Chris, 2021). All of the players can decide whether to play as solo, duo or group. After that, all of the players will fight and the last person that stands will be the winner of the game (Chris, 2021).

As for the age group that plays the online games, a survey by Rakuten Insight in March, 2020, shows that most of the players are from the age of 16 to 24 years old (Statista, 2021). Nevertheless, another survey from AARP in 2019 states that the range of age that plays online games has increased to 50 and above. The previous researcher also states in the portal that there are slight differences between the young and old generation players and the differences are mostly in terms of the time that they spent on playing the live streaming online game (AARP, 2019). As for the old generation players, they tend to spend their time on playing games at least once a month or 5 hours per week compared to the young generation, they tend to spend about 8.21 hours a week (Limelight Networks, 2021).

Next, in terms of gender, online gaming is not only popular among male but also among females (newzoo, 2017). This can be seen from a statistical portal which is newzoo, 2017, reported that about 52% male and 48% female spent their time playing games daily. Based on the statistics, it is proven that PUBG is widely used by everyone and will keep on increasing more in the future (newzoo, 2017). Nevertheless, the main concern here is that, without the users noticing it, the more they spend their time playing online games, eventually they become addicted with it (newzoo, 2017). According to Raghvendra, Daideepya, Vivek and Alok (2020), PUBG has been criticized because of the negative effect that it can give to the users where it can lead the players to become addicted with it and eventually it will lead to excessive time spent of the online games. In addition, in PUBG also there are a lot of violence elements in it that can influence the gamers in a short or long term especially in terms of the players' behaviours (Raghvendra et.al, 2020).

According to Simone, Dimitrij, Katharina and Jurgen. (2019), players that are always being exposed to violence online games are more likely to reveal aggressive behaviour or will lack empathy. Meaning by aggressive is that the players may have the intent to harm other people (Simone et.al, 2019). A fast action needs to be taken regarding the issues because if the players keep on doing the same routine which by playing PUBG for a long time, it may cost the players life (Simone et.al, 2019). Therefore, in this study the researcher aims to study the issues regarding online gaming addiction and students' behaviour when playing games in the case of PUBG. Research regarding this issue can help everyone, especially PUBG players to be aware about the consequences that they may face if they do not control the time, they play online games. Asides from that, this research also will help the policy makers in Malaysia to observe the students' activities when they are playing the games online. This kind of information will be beneficial to the policy makers as they can be more aware about the current issues that happen especially among the students and they also can make an improvement in order to cope with the issues.

## LITERATURE REVIEW

*The Negative Effect of PUBG on Behaviour*

PUBG has many negative impacts on the players, especially on their behaviour. Previous research study states that there is a significant relationship between the player's behaviour and online video games

such as PUBG (Muhannad, Abdullah and Rehab, 2019). Moreover, many previous research has been conducted and the results show that PUBG also can develop a certain behaviour in the players and the behaviour can either be good or bad (Muhannad et.al, 2019). Playing online games that have a violence element such as shooting and killing can make the players behaviour change to aggressive (Muhannad et.al, 2019). This statement is based on the previous findings and the researcher mentions that the more realism the game, the more easily the players can be influenced with the violence scenes in the games (Muhannad et.al, 2019). This finding managed to get numerous supports from other studies (Andre, 2020). Moreover, players that play games that have a virtual character in it will always choose a character that has the same characteristic that the players have in the real world (Muhannad et.al, 2019).

Other researchers have argued on the issues and they argue that the reasons for choosing characters that have the same characteristic with them is because the players want the character in the games to reflect the same personality as the players have in the real world (Muhannad et.al, 2019).  For example, if the players' characters in the online games is violence, there is a high tendency for the players to be violence in the real world too (Muhannad et.al, 2019).  Based on several studies, players that play live streaming online games will have a high tendency on portraying the same behaviour that they see in the online games in the real world (Muhannad et.al, 2019). Another study argued about these issues in medical aspects and the reasons why the players portrayed the same behaviour as in the game in the real world is because the neurons in the players body started to deal with the effect the same way either in the games or in the real world (Muhannad et.al, 2019). In addition, the effect of PUBG does give the players a positive effect. However, it also can give a negative impact on the players' especially on the players' behaviour as it can lead to aggression, violence, stress and anxiety (Muhannad et.al, 2019).

*The Positive Effect of PUBG on Behaviour*

Most of the previous researchers are focusing more on the negative part of PUBG towards the players' behaviour and less studies on the positive effect (noplag, 2017). Some of the previous researchers argue about it and they state that in order for the researcher to have a better understanding about the impact of PUBG on the students, a balanced point of view is compulsory (noplag, 2017). The researcher should focus not only on the negative part but also on the positive sides

(noplag, 2017). In addition, the positive effect of PUBG towards the players can be found in several domains such as social, emotional, motivational and cognitive (noplag, 2017). For instance, in terms of the social, the players will have a good leadership skill and behaviour of wanting to help other people either for a short or a long term (noplag, 2017). The players can gain many benefits from playing the game either as a duo, group or as single players (noplag, 2017). According to Wang, Taylor and Sun (2018), playing violence online games such as PUBG, especially in a group, can increase their cooperation and bond with each other.

Additionally, anyone that has been exposed to online games, especially violence games such as PUBG can influence the players to grow up as a digital native (Wang et.al.2018). According to Martina (2017) digital native are actually referring to people that were born in the era of digital. Previous study also argues that this PUBG also can improve the player's problem-solving skills (Martina, 2017). Another study by Vaishnavi (2018), shows that the more the players play strategy games like PUBG, the more improved the players problem solving skills for the next year. Moreover, this problem-solving skill will only be gained by players that play strategic online games (Vaishnavi, 2018). Research for fast- paced games also has been conducted but the results are not as what the researcher predicted (Vaishnavi, 2018). Asides from problem solving skills, the players also are predicted to have a good academic performance (Vaishnavi, 2018).

*Factors that Lead to PUBG Addiction*

Based on previous research studies, the researcher has revealed several factors that can lead the players to become addicted to PUBG such as time spent on online games, elements in the games, the accessibility of the online games, poor relationship with the family, loneliness and low self- esteem.

*Time Spent on PUBG*

This factor is one of the main reasons that contribute to the addiction of PUBG among the players (Lee and Kim, 2016). According to Lee and Kim (2016), players that always spend their time on PUBG will have a high tendency of being trapped in the game's world. The researcher also states that the time or the duration that the players spend on playing PUBG will be the cause that led to game

addictions (Lee and Kim, 2016). Because of the addiction to PUBG, the younger generation tends to stay up until late at night just to play the games (Lee and Kim, 2016).

*Elements in PUBG*

Appealing elements and game structures have become the reasons why the players could not stop playing PUBG (Lee and Kim, 2016). The battle, shooting, and killing elements are one of the main reasons that make the players become more addicted with PUBG. According to Lee and Kim (2016), the element in the online game is the thing that keeps on encouraging the players to play for a longer time and eventually will lead to addiction. Furthermore, the players become addicted with it because PUBG gives the players freedom, rewards, vivid recreation and group identity (Lee and Kim, 2016). The researcher also states that the enjoyment that the players receive while playing the multiplayer game also can make the players develop an addictive behaviour (Lee and Kim, 2016). This is because in multiplayer online games it allows the players to compete with other players compared to solo player games (Lee and Kim, 2016).

*Accessible*

According to Raunak (2020), easy access to the game is one of the reasons that make the players addicted to it. During the first launch of PUBG, this game can only be played on computers and it managed to attract people to play the game (Raunak, 2020). However, after the games company released the game on mobile phones, the number of the players increased drastically to 60 million players just within one week in the South East Asian region (Raunak, 2020). The author also states that by launching the game in mobile phones has given many advantages to PUBG Corporation as the players can access the game anywhere and everywhere the players want (Raunak, 2020). Moreover, based on a research report made by State of Online Gaming 2019, the statistic shows that the player spent about 1.59 hours playing online games at the computer per week (Limelight Networks, 2021). Meanwhile, players that play online games on mobile phones tend to spend about 2.01 hours per week. Therefore, based on the statistics, it has been proven that the easier for the players to access the online games the more addicted they will be with the online games (Limelight Networks, 2021).

*Poor Family Relationship*

Based on Wong and Lam (2016), some of the players use online games as a tool or a way for them to cope with their family problems. Based on previous research, the respondent in the research mentions that when they play the games, it will make them feel better (Wong and Lam, 2016). In addition, playing games also will make them forget about their problems (Wong and Lam, 2016).

*Loneliness*

According to Saklofske et.al, (1986), loneliness can be defined as unpleasant feelings that may be experienced by everyone. Moreover, people that are lonely usually will prefer to spend most of their time on online games because interaction in online games is easier compared to the real world (Wang, Jia and Hai, 2019). Wang et.al (2019), also mentions that loneliness, depression, anxiety or isolation are associated with game addiction. Marie, Alessandro, Cecilia and Gianluca (2019), states that players use online games as a platform to escape from unpleasant feelings and stress.

*Low Self- Esteem*

Juliane, Beate, Kai and Boris (2019), low self- esteem has been identified as one of the reasons that make the players addicted to online games especially among males. Based on previous research study, the respondents in the research state that the players with low self -esteem or problem players tend to describe themselves as a failure because they always get poor results in their academics (Juliane et.al, 2019). However, when they play online games, it makes the respondents feel appreciated by their peers and clever as they keep on getting praise for their skills (Juliane et.al, 2019). In other words, by playing online games it will boost the players' self-worth compared to when they talk about study and school (Juliane et.al, 2019). This kind of players usually will think that they are expert in playing games, which tested their motor skills, quick response and intellectual competence (Wong and Lam, 2016).

## METHODOLOGY

*Screening and Selection Process*

PRISMA or also known as Preferred Reporting Items for Systematic Review and Meta-Analysis is a qualitative method. This method is an evidence based minimum set of items for reporting in systematic reviews and meta-

analysis [NH1] (UNC Health Library, 2021). The reason for using this method is because researchers aim to know whether this study is still popular or not using the keywords. If the number of articles published is higher for the keywords starting from the year 2016 until 2020 for each database, therefore, it can be concluded that the issue is still relevant and still not being resolved. In order to collect the data, the researcher has used several keywords and the following are the search terms: (Online gaming OR behaviour AND Malaysia), (online gaming AND behaviour AND Malaysia), (online gaming addiction OR behaviour AND Malaysia), (online gaming addiction and behaviour AND Malaysia), (PUBG OR behaviour AND Malaysia) and (PUBG AND behaviour AND Malaysia).

PRISMA or the search terms were entered in several online databases such as Google Scholars, Science Direct, ProQuest, EBSCO, Wiley Online Library, Oxford Academic, Emerald Insight, SCOPUS, IEEE Xplore and Web of Science. All of the search journals are published from 2016 – 2020. Exclusion criteria will be journals that do not have the keywords that the researcher searches, journal that is not in English language, journal that is not in the selected online database and journal that is published below 2016. Meanwhile, as for the inclusion criteria the researcher will be focusing on journals that comes from the year of 2016 – 2020, publish in online database that have been selected, journal that in English language and contain all the keywords that required in the research.

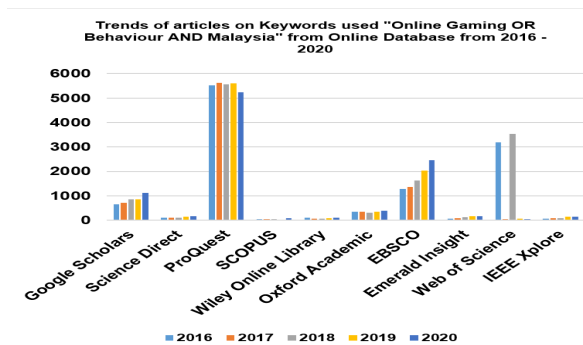## FINDING AND DISCUSSION



Figure 1: Trends of Articles Published From 2016 Until 2020
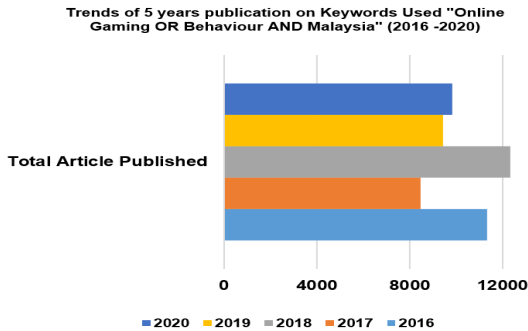
Figure 2: Trends of Articles Latest 5 Years From 2016 Until 2020

Both bar charts display the trends of articles published from 2016 until 2020 in an online database using online gaming or behaviour and Malaysia keywords. In figure 1, the table charts show that ProQuest online database has the highest number of published articles using the keywords with 5,628. The second highest number of articles published also comes from the same online database with 5,597. Next, as for bar charts in figure 2, shows that the year of 2018 has the highest number of articles published with 12,322 and the lowest number of articles published are in 2017 with 8,462.
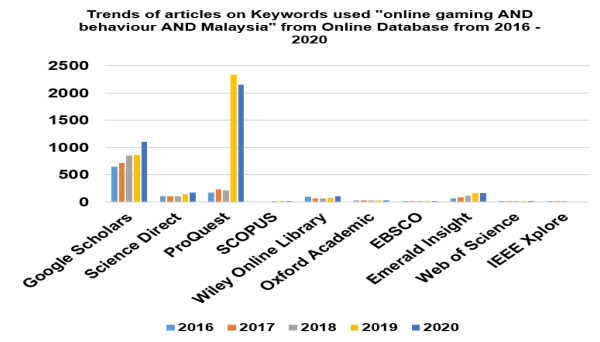


Figure 3: Trends of Articles Published in Online Databases Using Online Gaming and Behaviour and Malaysia Keywords

**Trends of 5 years publication on Keywords Used "online gaming AND behaviour AND Malaysia" (2016 -2020)**
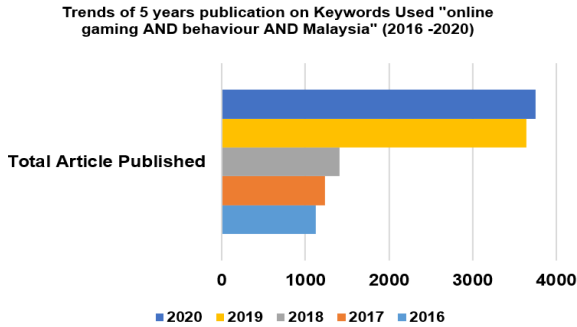


Figure 4: Trends of 5 Years Publication Online Databases Using Online Gaming and Behaviour and Malaysia Keywords

Figure 3 and Figure 4 shows information about the trends of articles published in online databases using online gaming and behaviour and Malaysia keywords. Based on Figure 3, it shows that ProQuest online database has the highest number of articles published with 2,337. Online databases that have the lowest number of articles published using the keywords given are SCOPUS and IEEE Xplore as there are no articles being published. As for SCOPUS the year that has no article published are in 2016 and 2017. Meanwhile, IEEE Xplore is in 2019 and 2020. Referring to Figure 4, the years that have the highest number of articles published using the keywords are in 2020 with 3,751 and the lowest year articles published are in 2016 with 1,128.

**Trends of articles on Keywords used "Online gaming addiction OR behaviour AND Malaysia" from Online Database from 2016 -2020**
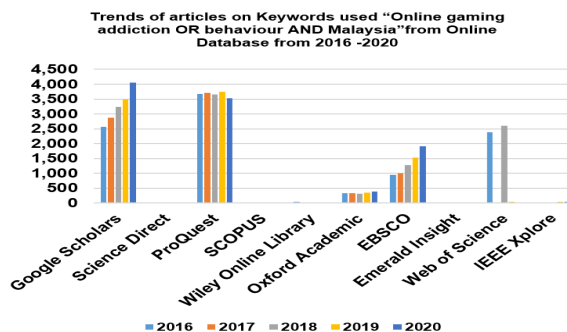


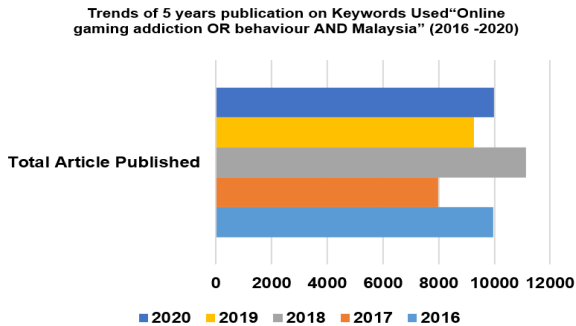Figure 5: number of articles published in Google Scholars online database

Figure 6: trends of articles published in online databases in five years from 2016 until 2020 using online gaming addiction or behaviour and Malaysia

The bar charts give information about the trends of articles published in online databases in five years from 2016 until 2020 using online gaming addiction or behaviour and Malaysia keywords. Based on figure 5, the chart shows that the number of articles published in Google Scholars online database are the highest with 4,050 compared to other online databases**.** The second highest number of articles published is in ProQuest online database with 3,745. Online database that has the lowest number of articles published is SCOPUS in the year of 2016 with no article being published. Meanwhile, in figure 6, it shows that 2018 has the highest number of articles published with 11,119. The year that has the lowest number of articles published in online databases is in 2017.
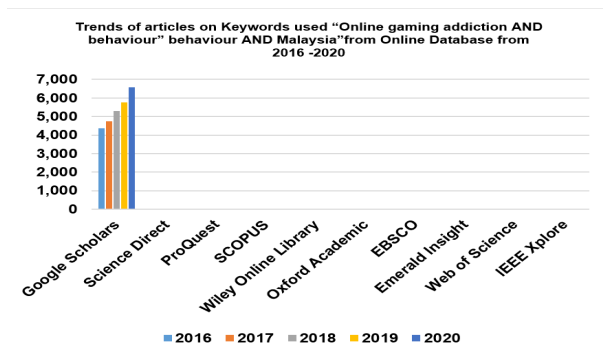


Figure 7: Articles Published Using the Keywords Given Google Scholars Online Database

**Trends of 5 years publication on Keywords Used "Online gaming addiction AND behaviour AND Malaysia" (2016 -2020)**
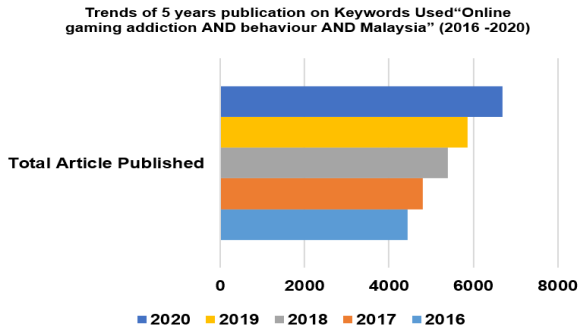


Figure 8: Trend of Articles Published in Various Online Databases Using Online Gaming Addiction and Behaviour and Malaysia Keywords

The bar chart shows information about the trend of articles published in various online databases using online gaming addiction and behaviour and Malaysia keywords. In figure 7, the highest number of articles published using the keywords given are from Google Scholars online database with 6,580 in 2020. The lowest number of articles published comes from SCOPUS, Oxford Academic and IEEE Xplore online database. This is because in some years these three online databases did not have any articles being published. Based on figure 8, the result shows that in 2020 about 6,700 articles were published and it is the highest number of articles published. Meanwhile, in 2016, the number of articles published in online databases was about 4,443 and it is the lowest number of articles published compared to other years.
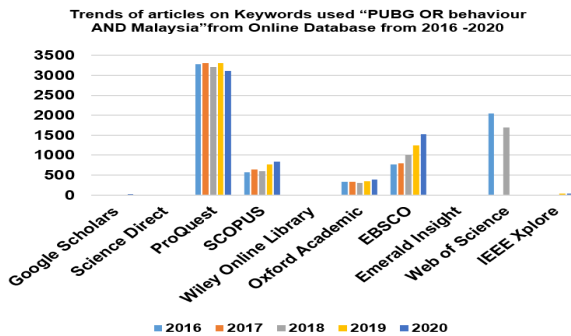
**Trends of articles on Keywords used "PUBG OR behaviour AND Malaysia" from Online Database from 2016 -2020**



Figure 9: Number of Articles Published Since 2016 until 2020

**Trends of 5 years publication on Keywords Used"PUBG OR behaviour AND Malaysia (2016 -2020)**
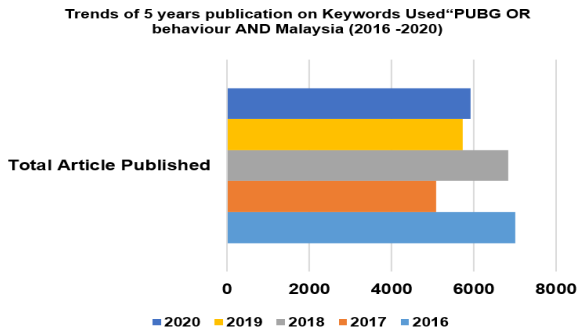


Figure 10: Number of Articles Published from 2016 to 2020

The bar charts show information about the trends of article publish in online database using PUBG or behaviour and Malaysia keywords from the year of 2016 until 2020. Based on figure 9, it shows that ProQuest has the highest number of articles publish since 2016 until 2020. The highest number of articles published in ProQuest is 3,308 in 2019. Online database that has the lowest number of articles publish are Wiley Online Library and Emerald Insight. This is because since 2016 until 2020 there are no article being publish in both online databases using the keywords. In Figure 10, the bar chart shows that 2016 has the highest number of articles publish with 7,004. Meanwhile the year that has the lowest number of articles publish is in 2017.
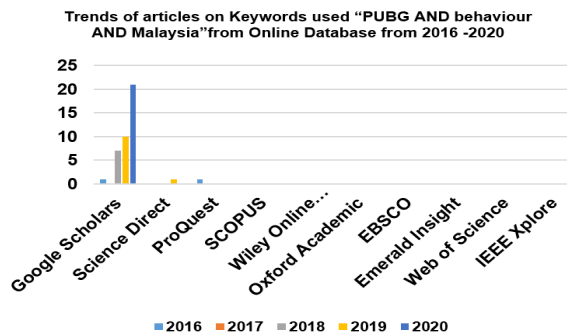
**Trends of articles on Keywords used "PUBG AND behaviour AND Malaysia"from Online Database from 2016 -2020**



Figure 11: Number of Articles Published From 2016 to 2020

**Trends of 5 years publication on Keywords Used "PUBG AND behaviour AND Malaysia" (2016 -2020 )**
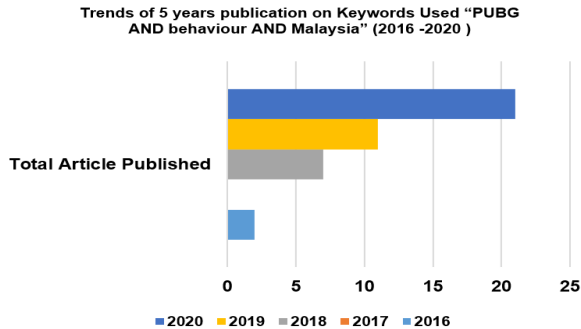
Figure 12: number of articles published in online databases

This bar chart shows information about the trends of articles published in online databases using PUBG and behaviour and Malaysia keywords. In Figure 11, the results show that Google Scholars has the highest number of articles published with 21 articles. As for Science Direct and ProQuest, only one article has been published. As for other online databases such as SCOPUS, Wiley Online Library, EBSCO, Web of Science and IEEE Xplore there are no articles being published using the keywords from 2016 until 2020. In Figure 12, the data shows a big gap for some of the years. In the year of 2016, the number of articles published in online databases using the keywords given are about 12 articles but in 2017 there are no articles being published. However, from 2018 until 2020, the number of articles published in online databases started to increase from seven in 2018 to 21 in 2020.

## CONCLUSION

The data that have been collected by current researchers, shows that issues regarding PUBG, online gaming, addiction and behaviour are still popular and become the main issues in Malaysia especially in the year of 2016, 2018, 2019 and 2020. This is because most of the online databases that the researcher selects have articles published relating to the keywords stated. In terms of the research topic which covers keywords on PUBG OR behaviour AND Malaysia, the data in figure 9 and 10, shows articles published in the online database excluding Emerald Insight and Web of Science. As for the year, starting from 2016 until 2020, the data did not show any big gap from each year. However, as for keywords PUBG AND behaviour AND Malaysia, the data in Figure 11 and 12 shows that only

Google Scholars, Science Direct and ProQuest have articles published using the keywords. Additionally, these keywords are also popular in 2020. Even though not all online databases have articles published using the keywords, if referring to the year, this research topic is considered important because in 2020 the number of articles published will be highest compared to other years. Based on all of the data, the researcher has come out with a conclusion and the reasons why behaviour issues among students keep on rising is because PUBG does make the students in Malaysia become addicted and eventually causes them to have problems with their behaviour. Previous studies also support that the more the users being exposed to violent games the more aggressive the users will turn out (Shao and Wang, 2019). Therefore, the current researcher has come out with a prediction that problems regarding PUBG addiction and behavioural problems among students in Malaysia will keep on increasing in the future if there are no actions taken in order to cope with these issues.

Furthermore, in order to have a better understanding, the current researcher has identified several reasons why this research topic is still getting the attention from researchers. Firstly, this topic is still popular among researchers in Malaysia because Malaysian people, especially students, are still playing PUBG and the popularity will keep on increasing especially in 2020. The popularity of PUBG can be proven with research that has been done by AARP, where it mentions that the age of PUBG players has increased to 50 and above. The more popular the game, the more various topics and issues that can be covered by the researcher (Limelight Network, 2021). Another reason this topic is still popular among researchers is because PUBG addiction and behaviour are the current issues that are happening in Malaysia. From these reasons it can justify the reasons for the number of articles published relating to the research topic to keep on increasing until 2020.

The present study illustrates pools of ideas on how to further research on online gaming addiction trends among student's and identify factors that lead towards positive and negative behaviours in gaming specifically through PUBG. In addition, the findings that have been collected can be considered reliable and well-structured by the current researcher. The current research also will be beneficial to those who are interested and want to know more about this research topic. Apart from that, future researchers also are encouraged to do more research regarding this topic. By conducting more research relating to this topic, it will make other people more aware about the negative, positive and the effect of online gaming to themselves and also their family. Moreover, as this study is using PRISMA systematic review, as for future research, they

are suggested to use the Qualitative method which is by conducting an in-depth interview. In depth interviews are very beneficial especially when the future researcher wants to study about a person's behaviour. Moreover, this method also will help future researchers also gain a lot more information and get an accurate sampling. By using different methods, the results may lead to new data and conclusions that will be beneficial to many organizations and people especially in Malaysia.

## ACKNOWLEDGEMENTS

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