THE IMPACT OF GAME ENGAGEMENT AND GAME MOTIVATION ON GAME ADDICTION AMONG THE YOUNG ADULT MULTIPLAYER ONLINE BATTLE ARENA PLAYERS IN MALAYSIA

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A RESEARCH PROJECT

SUBMITTED IN

FULFILLMENT OF THE REQUIREMENTS FOR

THE BACHELOR OF SOCIAL SCIENCE (HONS) PSYCHOLOGY

FACULTY OF ARTS AND SOCIAL SCIENCE

UNIVERSITI TUNKU ABDUL RAHMAN

MARCH 2019

The Impact of Game Engagement and Game Motivation on Game Addiction among Young Adult Multiplayer Online Battle Arena Players in Malaysia

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This research project is submitted in fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology, Faculty of Arts and Social Science, Universiti Tunku Abdul Rahman. Submitted on March 2019.

ACKNOWLEDGEMENTS

It would be impossible to complete this final year project without the assistance and cooperation of host of individuals and organisation. Therefore, we are deeply thankful to our supervisor, Puan Wirawahida for her guidance and directions on completing this research. We would like to thank everyone who contributed in this research, whether directly or indirectly, whom without them, we would not be able to make it this far.

We are deeply grateful to our parents and family members for their kind support and understanding while completing this research. Besides, we would like to thank our dear friends who helped in giving us help and insight throughout the completion of this research. We appreciate all the participants for willingly participating in this research.

We are utmost grateful and blessed to have all the warm support and guidance from everyone involved. Without all the help and support we receive, it would not be possible for us to complete this research. A big thank you to everyone involved.

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APPROVAL FORM

This research paper attached here to, entitled “The Impact of Game Engagement and Game Motivation on Game Addiction among Young Adult Multiplayer Online Battle Arena Players in Malaysia” prepared and submitted by Chua Hung Ming, Goh Xin Yi and Lim Zhee Yen in fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

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Abstract

Playing games have been a way of spending leisure time and releasing stress and also a time to bond with each other. However, in recent years, gaming addiction has made game playing a priority over other activities. Game addiction has been included as a disorder. This study aims to investigate the relationship of game engagement and game motivation on game addiction among young adult Multiplayer Online Battle Arena (MOBA) players in Malaysia. Self-administered survey was distributed online through social media and online forums. A total of 319 participants consisting of young adult MOBA players in Malaysia from 18 to 35 years old participated in this study. The survey includes demographic data, Game Engagement Questionnaire (GEQ), Gaming Motivation Scale (GAMS) and Internet Gaming Disorder Scale – Short-Form (IGDS9-SF). Results from correlation showed that game engagement and all six subscales of game motivation: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation were significantly correlated to game addiction. Result from the multiple regression showed that game engagement, integrated regulation, introjected regulation and amotivation significantly predicted game addiction. The outcome of the factors, such as game engagement, integrated regulation, introjected regulation and amotivation, in predicting game addiction can be explored in future researches. The outcome of this study can give awareness to the young adults and general public regarding their gaming behaviors. Alternative prevention and intervention can be done based on the variables studied in relation to game addiction.

Keyword: game engagement, game motivation, game addiction, MOBA

DECLARATION

We declare that the end result of this research is all by our hard work, and all due acknowledgements have been stated in the references, be it printed, electronic or personal.

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List of Abbreviations

Adjusted R Square……	R Square statistic that penalizes models with large numbers of parameters
AM……	Amotivation
APA……..	American Psychiatric Association
B…….....	Beta
CDF……...	Cumulative Distribution Function
df……..	Degrees of freedom
DSM-5……..	Diagnostic and Statistical Manual of Mental Disorders
ER…….	External Regulation
f^2……	Effect size
GA…….	Game Addiction
GAMS……...	Gaming Motivation Scale
GEM…….	Game Engagement Model
GEn……	Game Engagement
GEQ……...	Game Engagement Questionnaire
IDENT……...	Identified Regulation
IGD……	Internet Gaming Disorder
IGDS9-SF……..	Internet Gaming Disorder Scale – Short-Form
IM……..	Intrinsic Motivation
INTEG……...	Integrated Regulation
INTROJ…….	Introjected Regulation
MOBA……...	Multiplayer Online Battle Arena
N……	Number of participants

p…….	Probability
r…….	Correlation
R……	Multiple correlation coefficient
R^2……...	Regression
SD……..	Standard Deviation
SDT……...	Self-Determination Theory
Sig. ……	Significance
Std. Deviation……	Standard Deviation
Std. Error……...	Standard Error
Std. Predicted Value…..	Standardized Predicted Value
Std. Residual……..	Standardized Residuals
Stud. Deleted Residual..	Studentized Deleted Residual
VIF…….	Variance Inflation Factor
α..……...	Probability of making type I error
β…….	Probability of making type II error

The Impact of Game Engagement and Game Motivation on Game Addiction among the Young Adult Multiplayer Online Battle Arena Players in Malaysia

Chapter 1: Introduction

1.1 Background of Study

Game addiction has been an uprising issue among young adults and teenagers. When someone has impaired control over gaming, increase their precedence of playing games over other activities to the extent that it takes priority over their other interest or daily activities, and persistence or increase of gaming behavior regardless of the happening of negative consequences, it becomes gaming disorder or game addiction ("Gaming disorder", 2018). Recently, World Health Organization (WHO) announces that they will include "gaming disorder" in its 11th International Classification of Diseases (ICD) (Wakefield, 2018). Although game addiction is not included in 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as evidence are not strong enough when it was published in year 2013, American Psychiatric Association (APA) listed internet gaming disorder as "Condition for Further Study" in DSM-5 (Parekh, 2018).

Although game addiction itself seems to be a rare disorder, it may be a co-morbid condition which it may cause other form of disorders (Scutti, 2017). Other form of disorder may prevent professionals from identifying and treating the underlying cause which is game addiction. If the underlying reason is not solved, then it may cause recurrence of other form of disorders.

In a study by Zhu, Zhang, Yu, and Bao (2015), they found that external motivation such as peer support has a cascading effect on the beginning of internet gaming addiction. Thus, it is important to take count of different causes in promoting prevention and intervention in gaming

addiction. In a study by Kowert, Vogelgesang, Festl, and Quandt (2015), they found no inverse relationship between game engagement and game addiction, despite there are a lot of claims that adolescent suffer from psychological consequences due to game engagement.

1.2 Statement of the Problem

Playing games is one of the main ways to spend leisure time in nowadays society, whether in the form of board games, card games or video gaming. Some may play games for spending leisure time, releasing stress or playing together with their peers and family to strengthen their relationship. Researches about game addiction tend to focus more in adolescents and children compared to young adults. In a report by Malaysian Communications and Multimedia Commission (MCMC) in 2017, young adult internet users which are from the age category of 20 to 34 years old are 53.6% with the adoption rate of 83.1%. In the report of percentage of internet users by online activities, games are reported to score 41.6% (MCMC, 2017). Yet, in nowadays society, some individuals are having impaired control over gaming which is known as gaming disorder or game addiction.

The variables that contributed to game addiction should be identified and addressed. Extensive researches were carried out by using only either one of the predictors on game addiction (Beard & Wickham, 2016; Brunborg, Mentzoni, Melkevik, Torsheim, Samdal, Hetland, Andreassen, & Palleson, 2013; Xu, Turel, & Yuan, 2012).

1.3 Significance of Study

This study is to create awareness and extend knowledge on the game addiction. The findings of this study will benefit the society considering that there is a need to explore the predictors of game addiction among young adults in Malaysia. Through the findings of this study,

the element that plays a crucial role in leading to game addiction may be identified. The identified element can also be used to establish treatment for game addiction as the amount of treatment available is limited. Besides, this study may raise the awareness of young adults towards game addiction. Public awareness could also be increased to enable the society to have more knowledge about game addiction. Moreover, future researches on game addiction located in Malaysia may have richer information about this topic.

1.4 Research Questions

1. Is there a significant relationship exists between game engagement and game addiction of MOBA young adult players in Malaysia?

2. Is there a significant relationship exists between game motivation and game addiction of MOBA young adult players in Malaysia?

3. Do game engagement and game motivation predict game addiction of MOBA young adult players in Malaysia?

1.5 Research Objectives

The objective of this study is to investigate the relationship of game engagement and game motivation on game addiction among young adult MOBA players in Malaysia.

1.6 Conceptual Definition

Game addiction. Game addiction is defined as whether a person is playing games until it bring detrimental effects to themselves. For gaming addiction to be diagnosed, the person is shown by having negative control towards gaming, putting gaming as priority or other activities and continuation of gaming despite the negative effects and the behavior pattern resulted in large

damage in important areas of functioning such as personal, family, social, educational and occupational, and has been apparent for at least 12 months ("Gaming disorder", 2018). Although it has not been scientifically proven about their success in reducing internet addiction, some group therapies and inpatient treatment models have been launched in some Asian countries (Yen, Yen, & Ko, 2010).

Game engagement. Game engagement is defined as a person's commitment to their gaming activities ("What is Game Engagement", n.d.). Deep engagement is often related to the player is fully focused and immersed in their games and is not aware of their surroundings. There is also myth saying that deep engagement in gaming is equals to game addiction, but it is debunked by many researchers. For example, Blinka, Škařupová, and Mitterova (2016) mentioned that higher impulsivity is present in gaming addiction but it plays no role in game engagement.

Game motivation. Game motivation is defined as what form of support a person has to continue in playing games. Game motivation is often labeled into two categories: intrinsic motivation and extrinsic motivation (Legault, 2016). Intrinsic motivation may present as the joy that a person obtained during competition and achievement in games. Extrinsic motivation could be a currency form either in-game currency or real life money they get when playing the game or points they obtain in the game.

Multiplayer Online Battle Arena (MOBA) games. MOBA games are played real-time with other players, either in the same team or opposition team (Mora-Cantallops & Sicilia, 2018). The objective of the game is to destroy opposition team's main structure with the help of your teammates and units which are spawned periodically and controlled by computer. Player

characters usually have skills and abilities that they can utilize to help and assist in overall team strategy. Among some known MOBA games are League of Legends (LoL), Defense of the Ancient 2 (DOTA 2), Heroes of Newerth (HoN) and Mobile Legends (Mora-Cantallops & Sicilia, 2018).

1.7 Operational Definition

Game addiction. Internet Gaming Disorder Scale–Short-Form (IGDS9-SF) is used to measure the level of Internet Gaming Disorder (IGD) and its negative consequences by investigating on both online and/or offline gaming behaviors over a 12-months phase. The scale is developed by Pontes & Griffiths (2015) derived from the latest diagnostic criteria of DSM-5 for IGD as a brief screening tool to access game addiction. The higher score indicates that the individual has greater chance to be addicted to gaming.

Game engagement. Game Engagement Questionnaire (GEQ) will be used to measure the level of game engagement of the participants. The questionnaire is developed by Brockmyer et al. (2009) and was developed as a self-report measure of an individual's potential for becoming occupied in video-game-play at differing levels. The level of engagement of the participants is determined by the sum score of the questionnaire; higher score means higher engagement, and lower score means lower engagement.

Game motivation. Gaming Motivation Scale is used to measure the types of motivation that affect the participants the most. The scale is developed by Lafrenière, Verner-Filion, and Vallerand (2012) because there is no measure of game motivation that follows the tradition of Self-Determination Theory (SDT) is available yet during the development of the scale.

Chapter 2: Literature Review

2.1 Theoretical Framework

Game engagement model. Game Engagement Model (GEM) often being adapted to explain the relationship between game engagement and other variables such as aggression level and violent outcomes of gaming (Brockmyer et al., 2009). Game engagement is the subjective experience of gaming (Procci, Bowers, Jentsch, Sims, & McDaniel, 2018). The GEM categorised the game engagement into immersion, presence, flow, and psychological absorption (Brockmyer et al., 2009). This model proposed that immersion is the lowest level of game engagement experience. The individual may experience the engagement in gaming from immersion to presence, presence to flow, flow to psychological absorption (Brockmyer et al., 2009). According to Procci and her colleagues (2018), some of the individuals in the mental state of presence may tend to prolong the disbelief that they are interacting and physically present in the game. This could cause them to be more engaged in the game and slowly become addicted to the game. The gamers may experience flow when they experienced the enjoyment from playing the game (Brockmyer et al., 2009). A mental state of flow may be achieved as the individual is intrinsically satisfied through the balance between challenges and own skills (Procci et al., 2018).

Self-determination theory. The Self-Determination Theory (SDT) is an important theory to explain the motivations such as intrinsic, extrinsic motivation and amotivation. According to Ryan and Deci (2000), intrinsic motivation is the individual's innate tendency to seek out challenges, explore the original and unusual things, and expand knowledge through learning. It can be understood as the individual plays games to fulfil his inherent satisfaction. Besides, intrinsic motivation has been perceived as more self-determined as compared to

extrinsic motivation and amotivation (Ryan & Deci, 2000). According to a study done by Ryan, Rigby, and Przybylski in 2006, intrinsic motivation is an important type of motivation that drives the players to engage in gaming. To illustrate, the gamer plays the game simply because he enjoys playing that online video game. In contrast, extrinsic motivation is the tendency to complete the tasks as driven by external causes or rewards (Legault, 2016). For instance, an individual plays the game in order to achieve the highest rank in the game.

Different types of motivations have distinct types of regulatory styles. There are six types of regulatory styles as stated along the self-determination continuum. The regulatory style of intrinsic motivation is intrinsic regulation while amotivation is non-regulation (Ryan & Deci, 2000). Extrinsic motivation has four types of regulatory styles which are external regulation, introjected regulation, identified regulation and integrated regulation (Ryan & Deci, 2000).

There are six subtheories introduced under SDT to explain the human behaviours across life domains including cognitive evaluation theory, causality orientation theory, goal content theory, organismic integration theory, basic psychological need theory, and relationship motivation theory (Legault, 2017; Ryan & Deci, 2000).

SDT has been adopted by quite a number of researches to explain motivations in gaming (Beard & Wickham, 2016; Lafreniere, Verner-Filion, & Vallerand, 2012; Mills, Milyavskaya, Mettler, & Health, 2018; Rogers, 2017). According to SDT, individuals' behaviours are highly influenced by the intrinsic and extrinsic motivations in them. Moreover, both intrinsic and extrinsic motivations drive the individuals to meet their three psychological basic needs (Legault, 2016). SDT explained that the individual experienced greater intrinsic motivation and satisfaction when the three basic psychological needs are being fulfilled during the activity

engagement (Ryan & Deci, 2000). The three basic psychological needs are autonomy, competence and relatedness (Legault, 2017). In other words, the players whose basic psychological needs have been satisfied during gaming tend to be more intrinsically motivated.

As explained in the previous paragraph, SDT proposed that the individuals strive to achieve the psychological needs. Autonomy in the SDT is the need to make decisions, to feel the ownership of one's life (Legault, 2017). MOBA games allow the players to feel the autonomy as they have to decide the strategies used to win the game. Next, competence is the possessing of adequate knowledge and skills (Mills, Milyavskaya, Mettler, & Health, 2018). The third basic psychological need is relatedness. It is the sense of belonging experienced by the individual during gaming (Mills, Milyavskaya, Mettler, & Health, 2018). The competence and relatedness are able to be fulfilled through MOBA games. This is because the players have to cooperate with each other and use their skills to win the games.

2.2 Conceptual Framework

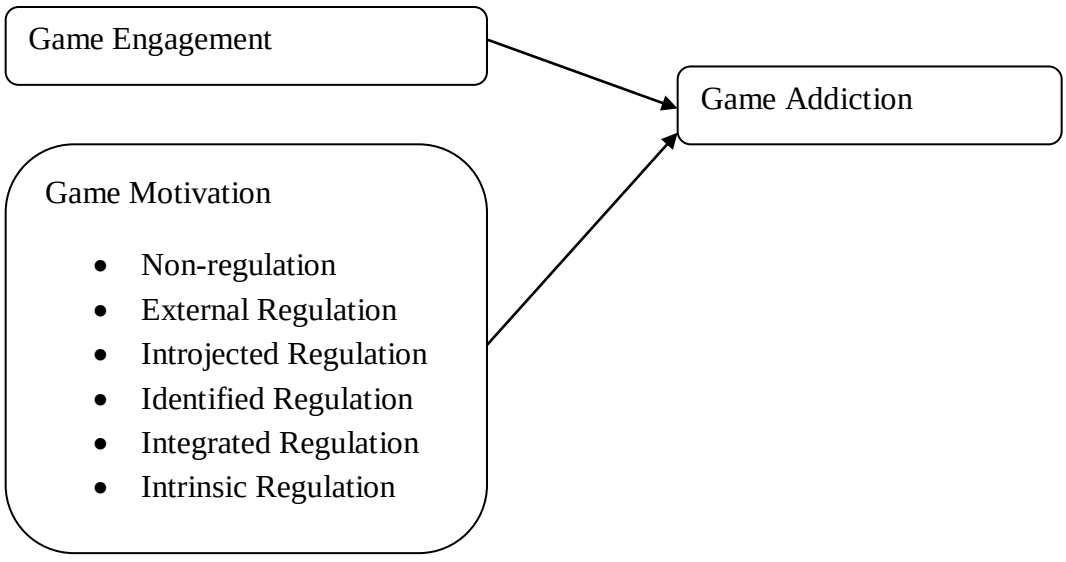


Figure 2.1. Conceptual Framework Developed through Theoretical Framework.

The present study is to understand the impact of game motivation and game engagement on game addiction. The target participants of this study are the young adult players of multiplayer online battle arena games. According to GEM, the experience of presence and flow while gaming could lead to game addiction. Consequently, high game engagement may predict game addiction. As proposed by SDT, both intrinsic and extrinsic motivations drive the individual to engage in gaming. The game motivation has been further divided into six categories that may lead to game addiction. They are non-regulation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation (Legault, 2016). The assumption can be made that high game motivation leads to excessive game plays. Thus, it caused the individual addicts to the games. Generally, the purpose of this study is to understand the impact of game engagement and game motivation on game addiction.

2.3 Game Addiction

Although game addiction is not a new area in psychological research, there is still a need to focus on this type of addiction. The reason is that the causes of gaming addiction are lots and distinct. For instance, some studies proved that flow (Park & Hwang, 2009), video game characteristics (Hull, Williams, & Griffiths, 2013), and narcissistic personality traits (Kim, Namkoong, Ku, & Kim, 2008) are significant predictors of game addiction. Moreover, a study recruited personality as the independent variable indicated that neuroticism is a significant predictor of game addiction (Braun, Stopfer, Muller, Beutel, & Egloff, 2016). In terms of the outcomes of game addiction, variables such as poor sleep habits (Usman, 2018) and psychological health complaints (Brunborg, Mentzoni, Melkevik, Torsheim, Samdal, Hetland, Andreassen, & Palleson, 2013) are often associated with it.

Online game addiction falls into the category of Internet addiction (Saquib, Saquib, Wahid, Ahmed, Dhuhayr, Zaghloul, Ewid, & Al-Mazrou, 2017; Xu, Turel, & Yuan, 2012). It is often being compared with gambling disorder (Saquib et al., 2017). Game addiction is also known as Internet Gaming Disorder (IGD; Yilmaz, Griffiths, & Kan, 2017), video game addiction, video game dependence, compulsive gaming and pathological gaming (Brunborg et al., 2013). These terms could be used interchangeably in the works of literature. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), IGD is the compulsive use of online gaming that contributes to the individual's cognitive and behavioural symptoms. For instance, the individual tends to withdraw himself from the reality, and gradually becomes uncontrollable over gaming.

Game addiction is characterised by six factors such as salience, euphoria, tolerance, withdrawal, conflict and relapse (Loton, Borkoles, Lubman, & Polman, 2015). Most of the researchers developed the game addiction scale based on the six factors of game addiction like Game Addiction Scale for Adolescents (Lemmens, Valkenburg, & Peter, 2009) and Indonesian Online Game Addiction Questionnaire (Jap, Tiatri, Jaya, & Suteja, 2013).

In the most recent journals, Internet Gaming Disorder Scale – short-form (IGDS9-SF; Pontes & Griffiths, 2015) and Internet Gaming Disorder Test (Pontes, Kiraly, Demetrovics, & Griffiths, 2014) were the psychometric tools developed based on nine core criteria define internet gaming disorder as stated in DSM-5. In DSM-5 (American Psychiatric Association, 2013), the nine core criteria that used to explain IGD are preoccupation with internet games, withdrawal symptoms, tolerance, loss of interest in hobbies, loss control over internet games, lie to the significant others on the amount of internet gaming, persistent in the excessive use of online games even with the knowledge of psychosocial problems, escape negative mood using internet

games, and lost a significant relationship or career as affected by the involvement in online games.

In terms of age group, the large number of researches were focused on the adolescents (Kim, Hughes, Park, Quinn, & Kong, 2016; Lee & Kim, 2016; Seok, Lee, Park, & Park, 2018). In other words, most of the studies on game addiction give special attention to the individual in between the age of twelve to eighteen. In the view of gender, some of the studies of game addiction tend to focus on the male players rather than both female and male gamers (Kim, Hughes, Park, Quinn, & Kong, 2016). The researches about game addiction focused on adults mentioned that male gamers have higher risks to become game addicts as compared to the female players (Stockdale & Coyne, 2018; Toker & Baturay, 2016). Additionally, the review on the studies of IGD by Chen, Oliffe and Kelly (2018) concluded that male players are the majority patient of IGD although the scales used in the researches were different.

Furthermore, Lemmens and Hendriks (2016) proposed that online role playing games and shooters are the potentially addictive game genre. This result differs from other researches as most of the studies proposed that the potentially addictive game genres are first-person shooters (Metcalf & Pammer, 2014) and massively multiplayer online role playing games (Hsu, Wen, & Wu, 2009; Schimmenti, Infanti, Badoud, Laloyaux, & Billieux, 2017).

2.4 Game Engagement

Game engagement has been referred to as game involvement in other studies (Brockmyer et al., 2009). Game engagement can be explained through flow, presence, immersion, and absorption (Bouvier, Lavoue, & Sehaba, 2014; Brockmyer et al., 2009). Flow is the optimal experience whereby the individual builds inner harmony, gains control of the conscious, and feel

the pleasure and enjoyment (Cziksentmihalyi, 1990). According to Cziksentmihalyi (1990), the individual in the mental state of flow is fully concentrated on the task and loss of awareness to the surrounding. Pleasure will be experienced when the balance between the individual's skills and challenges is achieved (Bouvier, Lavoue, & Sehaba, 2014). Presence is the sense of being in the situation as if it is real (Bouvier, Lavoue, & Sehaba, 2014). It is a subjective experience whereby the individual has the feeling of being in the virtual world and forget about the reality (Park & Hwang, 2009).

The next component of game engagement – immersion, has been defined as the result of a good gaming experience (Jennett, Cox, Cairns, Dhoparee, Epps, Tijs, & Walton, 2008). According to Jennett and her colleagues (2008), the conditions of immersion are lost track of time, lack of awareness of the reality, participation and a sense of being absorbed into the task environment. Ermi and Mayra (2005) proposed the three dimensions of immersion as sensory immersion, challenge-based immersion, and imaginative immersion.

2.5 Game Motivation

Game motivation is often being explained by using the self-determination theory approach. It has been linked to various variables in the past researches such as passion (Wang, Khoo, Liu, & Divaharan, 2008) and gender traits (Cheng & Hsu, 2016). Besides, game motivation has been recruited by some studies as a mediator (Sterling, 2017).

As proposed by the SDT, gamers have the game motivation to fulfil their autonomy, relatedness, and competence needs (Przybylski, Rigby, & Ryan, 2010). Motivation has been categorized into amotivation, intrinsic motivation, and extrinsic motivation. Intrinsic motivation is when the individual carryout a task out of enjoyment and would continue to do so even in the

absence of external separable consequences (Deci & Ryan, 2000). Conversely, extrinsic motivation is performing the tasks in order to obtain certain external rewards (Ryan & Deci, 2000). The types of motivation along the SDT continuum are non-regulation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation.

According to Ryan and Deci (2000), non-regulation is performing the behaviour with little intention. External regulation is the completion of the task solely because of the separable rewards or reinforcement. For example, the individual plays the game as he wants to get the new skin of the character. Next, introjected regulation involves internalising the goals and performs the behaviour to avoid guilt (Ryan & Deci, 2000). Identified regulation is a more self-determined form of extrinsic motivation (Ryan & Deci, 2000). For instance, the individual with greater identified regulated motivation tends to value and recognise the gaming behaviour (Lafreniere, Verner-Filion, & Vallerand, 2012). Integrated regulation happened when the gaming behaviour has been fully integrated by the players into their value and beliefs (Beard & Wickham, 2016). Lastly, intrinsic regulation is the most self-determined motivation. The individual plays a game because of enjoyment but not because of other external rewards.

Individual plays games in order to satisfy the three basic psychological needs as mentioned in the SDT. Need for autonomy is to make decisions and responsible for one's life (Mills, Milyavskaya, Mettler, & Health, 2018). In gaming, the individual's autonomy need is able to be fulfilled as he has the opportunity to decide the strategy and characters that he wants to employ. Next, competence need is the possessing of adequate knowledge and skills (Mills, Milyavskaya, Mettler, & Health, 2018). The players tend to play the games that are able to provide an optimal level of challenges as this may satisfy their competence need (Uysal &

Yildirim, 2016). According to Uysal and Yildirim (2016), relatedness need is commonly being fulfilled through multiplayer games.

2.6 Game Engagement and Game Addiction

In the past researches that associated game engagement and game addiction, quite a numbers of them used the time spent to represent game engagement (Brunborg et al., 2013). However, past studies stated that game engagement can be explained through flow, presence, immersion, and involvement rather than the duration of gaming (Bouvier, Lavoue, & Sehaba, 2014; Brockmyer et al., 2009).

Flow is the reason that caused the individuals to engage in problematic gaming behaviours (Reid, 2012). According to Sanjamsai and Phukao (2018), salience time spent on gaming was not a key indicator of game playing consequences while flow is able to predict the gaming outcomes such as game addiction. Immersion is found to be correlated with game addiction in the study done by Seah and Cairns (2007). Besides, Park and Hwang (2009) stated that there is a significant relationship exists between presence and game addiction. In other words, past quantitative studies with the young adult participants proved that game engagement is correlated with game addiction (Park & Hwang, 2009; Sanjamsai & Phukao, 2018; Seah & Cairns, 2007).

2.7 Game Motivation and Game Addiction

One of the primary causes of game addiction is game motivation (Tang, Koh, & Gan, 2017). A study done by Ryan, Rigby, and Przybylski in 2006 stated that gamers are mostly affected by their intrinsic motivation. It mentioned that some of the gamers continue to play games although they are being scolded by others because they are intrinsically satisfying.

Intrinsic motivation is the most prevalent motivation that leads to game addiction (Reid, 2012; Ryan, Rigby, & Przybylski, 2006). According to Reid (2012), gamers are being divided into periodic gamers and regular gamers. Periodic gamers play games as driven by extrinsic motivation while the regular gamers are motivated by the intrinsic factors (Reid, 2012). A research done by Xu, Turel, and Yuan (2012) claims that game addiction is predictable by the individual's need for relationship and escapism. In other words, the relatedness need of the individual gradually drives him to be addicted to the game.

Moreover, game motivation serves as the mediator in some past studies on game addiction. Most of the studies recruited motivational factors as the predictor (King, Herd, & Delfabbro, 2018; Laconi, Pires, & Chabrol, 2017; Yee, 2006; Yee, Ducheneaut, & Nelson, 2012) or mediator (Chang, Hsieh, & Lin, 2018; Kircaburun, Jonason, & Griffiths, 2018) of game addiction rather than the types of game motivation. Thus, one purpose of the present study is to understand the types of motivation that drive the MOBA players to engage in problematic gaming behaviours.

Therefore, the current study is to understand the impact of game motivation and game engagement on game addiction among the young adult MOBA players in Malaysia.

2.8 Development of Hypotheses

The two independent variables in this study are game engagement and game motivation. There is one hypothesis developed to test the relationship between game engagement and game addiction. However, there are six hypotheses developed to test the relationship between game motivation and game addiction. This is because the Gaming Motivation Scale has further divided it into six different subscales based on the SDT.

As proposed in the GEM, the individual experiencing presence may believe that he is physically presented in the virtual world (Procci et al., 2018). He tends to engage in gaming behaviour by extending the disbelief. Consequently, the individual may engage more in gaming and gradually be addicted to it. Thus, this hypothesis is supported.

H_1: There is a significant positive relationship between game engagement and game addiction.

Game motivation has been further divided into non-regulation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation. Thus, there are six hypotheses to be tested in between game motivation and game addiction.

As stated in SDT, non-regulation is the regulation style for amotivation (Deci & Ryan, 2000). An individual with amotivation has no intention in gaming. Subsequently, he will not addict to gaming. Therefore, there is a negative relationship between non-regulation motivation and addiction in gaming. The hypothesis is supported by the theory.

H_1: There is a significant negative relationship between non-regulation and game addiction.

As stated in SDT, individual tends to be satisfied when the psychological needs are being fulfilled (Ryan & Deci, 2000). External regulated motivation is solely based on the rewards of the gaming or to avoid certain separable outcomes. This concept is adapted by the operant psychologists (Deci & Ryan, 2000). Thus, this hypothesis is supported as the individual with higher external regulated motivation has greater chance to be addicted in gaming.

H_1: There is a significant positive relationship exist between external regulation and game addiction.

According to the SDT, characteristics of introjected regulated motivation are congruent with the factors of game addiction (Beard & Wickham, 2016; Lafreniere, Verner-Filion, & Vallerand, 2012). In other words, this theory supported the hypothesis that the introjected regulation type of motivation is able to predict game addiction.

H_1: There is a significant positive relationship exists between introjected regulation and game addiction.

When the individual internalised the goals into himself, he will perform the behaviour and view it as important (Legault, 2016). To illustrate, the individual tends to play the game excessively when he thinks that achieving high rank is important. This hypothesis has been supported by SDT as identified regulation leads to game addiction.

H_1: There is a significant positive relationship between identified regulation and game addiction.

As stated in SDT, integrated regulation happens whereby the individual fully internalised the behaviours (Legault, 2016). The individual perceived the gaming behaviour as self-identity or self-expression. Thus, he deeply holds the belief that gaming is very important in his life and becomes highly involved in it.

H_1: There is a significant positive relationship between integrated regulation and game addiction.

The individual plays games are mainly affected by his intrinsic motivation (Ryan, Rigby, & Przybylski, 2006). High intrinsic regulated motivation will lead to game addiction (Reid, 2012). Thus, this hypothesis is supported by the past studies.

H_1: There is a significant positive relationship between intrinsic regulation and game addiction.

Chapter 3: Methodology

3.1 Research Design

Non-experimental research design is used in this study. Cross-sectional survey is used because it is a quantitative research design and is able to collect a significantly large amount of data in a relatively short period of time. Data collection is collected once. Self-administered online survey is used in this study. It is chosen to ensure its fairness as any participant who fulfils the criteria of being a young adult living in Malaysia and plays Multiplayer Online Battle Arena (MOBA) games can participate in this study. Using online survey can also ensure that the privacy of the respondents is protected as their names and identity will not be requested when answering.

Purposive sampling method is used to select the participants for this research. Criterion sampling, one of purposive sampling methods, involves individuals who meet the certain criterion needed for the study (Palys, 2008).

3.2 Population and Sample

As stated in the topic, this study is to investigate the relationship between young adult MOBA players in Malaysia. The population involved for this study is young adult that play games.

Inclusion criteria for the sampling frame are young adult in Malaysia between 18 years old to 35 years old that plays MOBA games. Participants who did not fulfil the criteria of this study and did not provide the necessary information are excluded from this study to ensure that all participating samples fit the stated criteria.

G*Power 3.1.9.2 was used to estimate the minimum sample size required (Faul, 2014). Multiple regression model for fixed model, with R^2 deviation from zero is used with an effect size of $f^2 = .35$, $\alpha = .05$, $\beta = .95$, with a total of 7 predictors, game engagement and six gaming motivation subscales, which are intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation. A minimum sample size of 70 participants was calculated for this study.

Effect size of this study was determined from past researches that included the same variables as in this study. Results from past researches showed the effect size of .37, .53 and .47 (Beard & Wickham, 2016; Li, Liau, Gentile, Khoo, & Cheong, 2013; Snodgrass, Lacy, Dengah, Eisenhauer, Batchelder, & Cookson, 2014). The average effect size from these three researches is .46. Therefore, the researchers of this study use the default large effect size of .35 for this study.

523 participants were recruited for this study. 54 of the participants were excluded from the study for not fulfilling the criteria of the study. Another 145 of the participants who submitted incomplete survey were removed from the study. 5 outliers were also removed, resulting in a total of 319 participants in this study. The participants in this study consist of young adults in Malaysia who plays MOBA games.232 males (73%) and 87 females (27%) participated in this study. The participants consist of 9 Malays (2.8%), 301 Chinese (94.4%), 5 Indians (1.6%) and 4 of other ethnics (1.3%) with the age range of 18 to 35 years old. The mean age of the participants is 22.1 years old (*SD*=2.6).

3.3 Instruments

Demographic data. The participants were required to fill in their demographic information such as their age, gender, ethnicity, state born at and occupation status. Participants were also asked to write down the games they play, average gaming frequency in a week and daily amount of time spent on gaming. This is used to screen the participants to make sure that the sample fulfils the inclusion criteria.

Game Engagement Questionnaire (GEQ). GEQ is a self-report measurement in measuring engagement levels when playing video games (Brockmyer, Fox, Curtiss, McBroom, Burkhart, & Pidruzny, 2009). GEQ consists of 19 items with a 3-point rating scale of No, Maybe and Yes. The items are arranged in a way where the items get increasingly difficult as the questionnaire go on. The scoring for the GEQ is by summing all 19 of the items. The progression of gaming engagement from low to high is consistent with the progression from immersion, to presence, to flow and psychological absorption (Brockmyer et al., 2009). Original Cronbach's alpha for GEQ is .85 (Brockmyer et al., 2009). Latest research shows that the Cronbach's alpha for GEQ is .85 (Denisova, Nordin, & Cairns, 2016). The Cronbach's alpha for this study is .82.

Gaming Motivation Scale (GAMS). GAMS consists of six motivational factors: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation. The intrinsic motivation factor is related to the eagerness of doing the activity for itself (Reiss, 2012). The integrated regulation factor requires being involved in the activity, not by choice but being as a part of the habitual functioning of the person as a result of self-determination (Ferguson, Gutberg, Schattke, Paulin, & Jost, 2015). The identified regulation factor refers to behavior that stemmed from choice and is of the individual's personal

significance (Howard, Gagné, Morin, & Van den Broeck, 2016). The introjected regulation factor deals with behaviour regulation through internal pressures but not accepting the behaviour stems from self (Wang & Hou, 2015). The external regulation factor is about behaviours that stem from external means (Ferguson, Gutberg, Schattke, Paulin, & Jost, 2015). The amotivation factor is the relative absence of either extrinsic or intrinsic motivation (Lafrenière, Verner-Filion, & Vallerand, 2012). There are three items for each motivational factor with a 7-point Likert scale score (1 = *do not agree at all* and 7 = *very strongly agree*). The original Cronbach's alpha for intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation are .75, .88, .82, .88, .75, and .89 respectively (Lafrenière, Verner-Filion, & Vallerand, 2012). The Cronbach's alpha for overall regulation, intrinsic motivation, external regulation, and amotivation are .93, .82, .85 and .85 respectively in the latest research (Chi, Lovett, & Chi, 2017). The Cronbach's alpha for this study for intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation are .74, .82, .79, .86, .77, and .80 respectively.

Internet Gaming Disorder Scale–Short-Form (IGDS9-SF). IGDS9-SF consists of the nine core criteria of Internet Gaming Disorder (IGD) as defined by DSM-5. IGDS9-SF is used in assessing the severity of IGD and its harmful effects by examining both the online and/or offline gaming activities that occur over the period of one year. The nine items in this scale use a 5-point Likert scale (1 = *never* and 5 = *very often*). The higher the score of the scale, the higher the degree of IGD. A cutoff point of five or more criteria rated as 5-very often is required for diagnosing IGD according to DSM-5 (Lemmens, Valkenburg, & Gentile, 2015). Original Cronbach's alpha for IGDS9-SF is .87 (Pontes & Griffiths, 2015). The latest research shows that

the Cronbach's alpha for IGDS9-SF is .89 (Evren, Dalbudak, Topcu, Kutlu, Evren, & Pontes, 2018). The Cronbach's alpha for this study is .85.

3.4 Pilot Study

A pilot study was conducted before the actual study commence. The pilot study replicates the main study on a smaller scale (Cocks & Torgerson, 2013). The pilot study was commenced in the same way as in the main study. The survey for the pilot study includes demographic data, Game Engagement Questionnaire (GEQ), Gaming Motivation Scale (GAMS) and Internet Gaming Disorder Scale–Short-Form (IGDS9-SF). The survey was distributed online through Facebook.

A sample size of 33 participants was recruited for the pilot study. Participants in the pilot study consisted of 20 males (61%) and 13 females (39%). There are 3 Malays (9%), 28 Chinese (88%) and one Chinese-Indian (3%) with the age range of 19 to 29 years old. The mean age of the participants is 21.39 years old (*SD*=1.77).

Data collected from the pilot study was analysed. The Cronbach's alpha for Game Engagement Questionnaire (GEQ) for the pilot study is .78. The Cronbach's alpha of the six subscales of Gaming Motivation Scale (GAMS), intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation are .62, .88, .84, .76, .70, and .88 respectively. The Cronbach's alpha of Internet Gaming Disorder Scale – Short-Form (IGDS9-SF) for the pilot study is .78.

3.5 Procedure

The survey was done online and through face-to-face recruitment. The QR code and the link to the survey site were uploaded to several online gaming communities and forums. Facebook and the online forum, lowyat.net, one of the largest online communities in Malaysia, were selected as our research data pool. It is to ensure that the study could reach a wider range of participants as not all gamers participate in online forums.

Qualtrics was used in the collection of data from the participants. In the first page of the survey, participants were briefly informed about the purpose of the research and the research objectives. Participants were also informed of the privacy and confidentiality of their responses. Participation was completely voluntary, and participants could choose to withdraw from the survey whenever they want. The researchers' email was provided at the end of the page for the participants to contact if there were any questions or concerns regarding the survey. If the participant decides not to participate in the survey, they will be taken to the last page, thanking them for their time.

Participants can only be able to proceed to fill up the survey if they agreed to all the above matters and accept to participate in the study. The participants then proceeded to fill in their demographic data and the questionnaires, with a page break in between each questionnaire. After filling in all the questionnaires, a final page will be shown to the participants to thank them for their time and participation in the study.

Data collected from the survey are strictly confidential. Only the researchers and lecturers involved in the study will be able to assess the data. The data collected are used for academic

purpose only. This is to ensure that the privacy of the participants is protected. Data collected will be destroyed after an appropriate amount of time upon completion of the study.

3.6 Data Analysis

IBM SPSS Statistics 24 was used for data analysis. The data collected was analysed to remove the outliers and the data that did not fulfil the inclusion criteria of this study. A total of 318 responses were included in the study. The data collected was analysed to tabulate the demographic data of the participants. Correlation was done to determine the relationship between the game engagement and the six game motivation factors: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation to game addiction. Multiple regression was done to predict the relationship between game engagement and the six game motivation factors to game addiction.

Chapter 4: Results

4.1 Descriptive Statistics

A total of 319 responses were included in the current study after removing responses that do not fulfill the criterion and outliers. As shown in Table 4.1, the mean age for the participants is 22.09 and the median is 22.0. The mode of the age of the participants is 22 year old which consisted of 23.8% of our total data.

Table 4.1

Mean, Median and Mode of Age

N	Valid	319
	Missing	0
Mean		22.09
Median		22.00
Mode		22

Table 4.2

Frequency and Percentage of Participants According to Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18	14	4.4	4.4	4.4
	19	30	9.4	9.4	13.8
	20	37	11.6	11.6	25.4
	21	52	16.3	16.3	41.7
	22	76	23.8	23.8	65.5
	23	50	15.7	15.7	81.2
	24	19	6.0	6.0	87.1
	25	10	3.1	3.1	90.3
	26	14	4.4	4.4	94.7
	27	3	.9	.9	95.6
	28	5	1.6	1.6	97.2
	29	2	.6	.6	97.8
	30	2	.6	.6	98.4
	31	3	.9	.9	99.4
	33	1	.3	.3	99.7
	35	1	.3	.3	100.0
	Total	319	100.0	100.0	

There are a total of 232 male respondents which is 72.7% of our total responses and 87 female respondents which is 27.3% of our total responses.

Table 4.3

Frequency and Percentage of Participants According to Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	232	72.7	72.7	72.7
	Female	87	27.3	27.3	100.0
	Total	319	100.0	100.0	

For ethnicity, the respondents consisted of 2.8% Malay, 94.4% Chinese, 1.6% Indian and 1.3% from other ethnicity.

Table 4.4

Number and Percentage of Participants According to Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	9	2.8	2.8	2.8
	Chinese	301	94.4	94.4	97.2
	Indian	5	1.6	1.6	98.7
	Others	4	1.3	1.3	100.0
	Total	319	100.0	100.0	

As shown in Table 4.5, the respondents are mainly from Selangor (32.9%), followed by Sarawak (16.0%), Perak (11.3%), Wilayah Persekutuan (8.5%), Johor (7.2%), Penang (6.6%), Kedah (4.4%), Pahang (3.8%), Negeri Sembilan (3.1%), Sabah (2.5%), Terengganu (1.3%), Kelantan (0.9%), Malacca (0.9%) and Perlis (0.6%).

Table 4.5

Frequency and Percentage of Participants in Different States of Malaysia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Johor	23	7.2	7.2	7.2
	Kedah	14	4.4	4.4	11.6
	Kelantan	3	.9	.9	12.5
	Malacca	3	.9	.9	13.5
	Negeri Sembilan	10	3.1	3.1	16.6
	Pahang	12	3.8	3.8	20.4
	Penang	21	6.6	6.6	27.0
	Perak	36	11.3	11.3	38.2
	Perlis	2	.6	.6	38.9
	Sabah	8	2.5	2.5	41.4
	Sarawak	51	16.0	16.0	57.4
	Selangor	105	32.9	32.9	90.3
	Terengganu	4	1.3	1.3	91.5
	Wilayah Persekutuan	27	8.5	8.5	100.0
	Total	319	100.0	100.0	

78.7% of the participants are students, and 21.3% of them reported to be other occupations.

Table 4.6

Frequency and Percentage of the Participants According to Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	251	78.7	78.7	78.7
	Others	68	21.3	21.3	100.0
	Total	319	100.0	100.0	

4.2 Inferential Statistics

Pearson correlation.

RQ1: Is there a significant relationship exists between game engagement and game addiction of MOBA young adult players in Malaysia?

H_1: There is a significant positive relationship between game engagement and game addiction.

The results of *Pearson correlation* showed that there was a significant correlation between game engagement and game addiction, $r(317) = .539$, $p < .001$. The higher the score of game engagement, the higher the risk of someone develops game addiction.

Table 4.7

Pearson Correlation between Game Engagement and Game Addiction

		GEn	GA
GEn	Pearson Correlation	1	.539**
	Sig. (2-tailed)		.000
	N	319	319
GA	Pearson Correlation	.539**	1
	Sig. (2-tailed)	.000	
	N	319	319

Note. GEn = Game Engagement, GA = Game Addiction.

**. Correlation is significant at the 0.01 level (2-tailed).

RQ2: Is there a significant relationship exists between game motivation and game addiction of MOBA young adult players in Malaysia?

H_1: There is a significant negative relationship between non-regulation and game addiction.

H_1: There is a significant positive relationship exist between external regulation and game addiction.

H_1: There is a significant positive relationship exists between introjected regulation and game addiction.

H_1: There is a significant positive relationship between identified regulation and game addiction.

H_1: There is a significant positive relationship between integrated regulation and game addiction.

H_1: There is a significant positive relationship between intrinsic regulation and game addiction.

The results of *Pearson correlation* showed that all variables from game motivation are significantly correlated with game addiction. There was a significant correlation between intrinsic motivation and game addiction, $r(317) = .228$, $p < .001$, integrated regulation and game addiction, $r(317) = .443$, $p < .001$, identified regulation and game addiction, $r(317) = .293$, $p < .001$, introjected regulation and game addiction, $r(317) = .570$, $p < .001$, external regulation and game addiction, $r(317) = .296$, $p < .001$, and amotivation and game addiction, $r(317) = .392$, $p < .001$. The higher the score of intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation or amotivation, the higher the risk of someone develops game addiction. The result was shown in Table 4.8.

Table 4.8

Pearson Correlation between Game Motivation and Game Addiction

		IM	INTEG	IDENT	INTROJ	ER	AM	GA
IM	Pearson Correlation	1	.433**	.398**	.134*	.461**	.230**	.228**
	Sig. (2-tailed)		.000	.000	.017	.000	.000	.000
	N	319	319	319	319	319	319	319
INTEG	Pearson Correlation	.433**	1	.614**	.540**	.318**	.282**	.443**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	319	319	319	319	319	319	319
IDENT	Pearson Correlation	.398**	.614**	1	.457**	.404**	.138*	.293**
	Sig. (2-tailed)	.000	.000		.000	.000	.013	.000

	N	319	319	319	319	319	319	319
INTROJ	Pearson Correlation	.134*	.540**	.457**	1	.366**	.389**	.570**
	Sig. (2-tailed)	.017	.000	.000		.000	.000	.000
	N	319	319	319	319	319	319	319
ER	Pearson Correlation	.461**	.318**	.404**	.366**	1	.235**	.296**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	319	319	319	319	319	319	319
AM	Pearson Correlation	.230**	.282**	.138*	.389**	.235**	1	.392**
	Sig. (2-tailed)	.000	.000	.013	.000	.000		.000
	N	319	319	319	319	319	319	319
GA	Pearson Correlation	.228**	.443**	.293**	.570**	.296**	.392**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	319	319	319	319	319	319	319

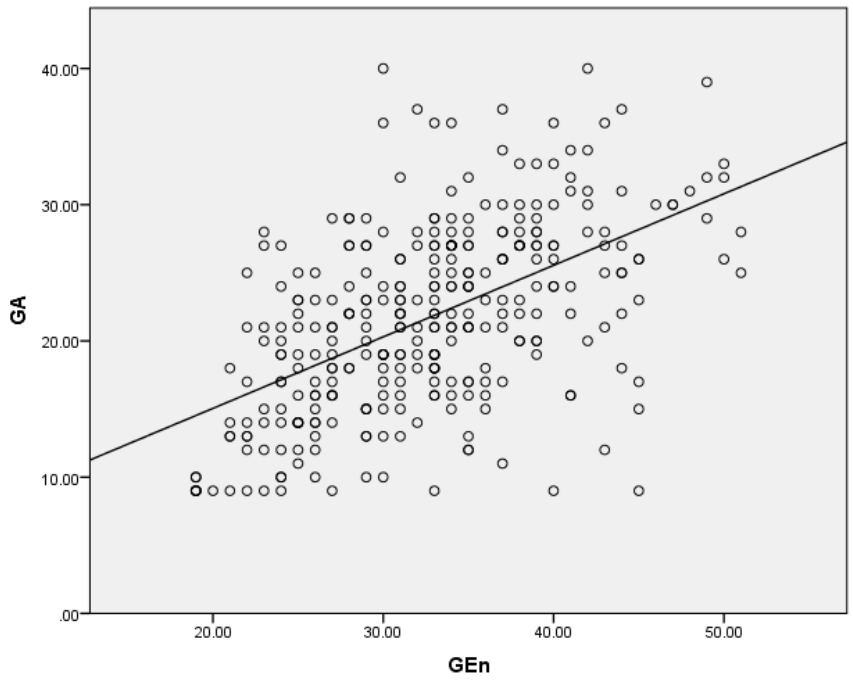
Note. IM = Intrinsic Motivation, INTEG = Integrated Regulation, IDENT = Identified Regulation, INTROJ = Introjected Regulation, ER = External Regulation, AM = Amotivation, GA = Game Addiction.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

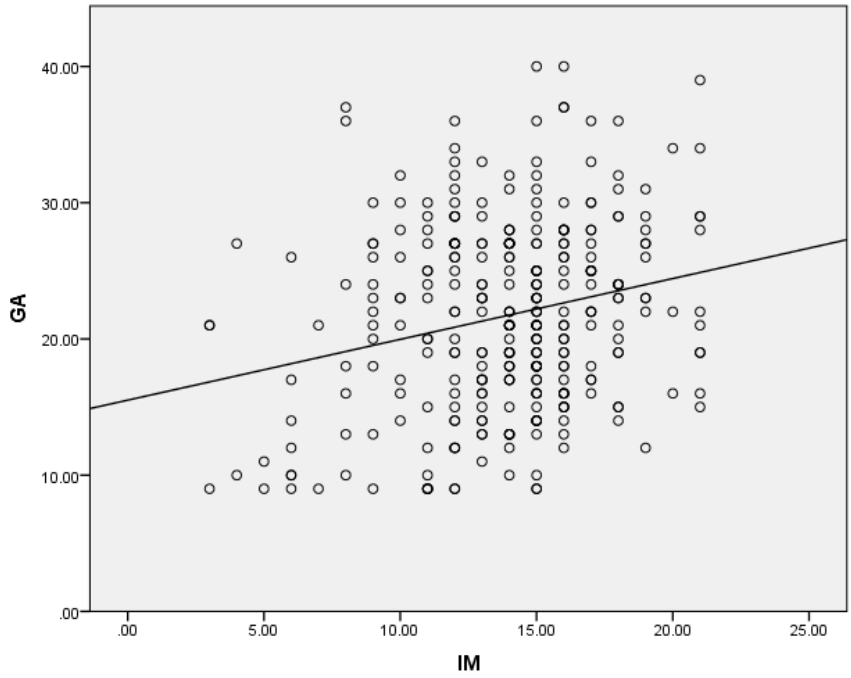
Assumption test for multiple regression.

The first assumption is the relationship between independent variables and dependent variable is linear. Referred to Figure 4.1 to Figure 4.7, game engagement, intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, amotivation and game addiction met the assumptions of linearity.



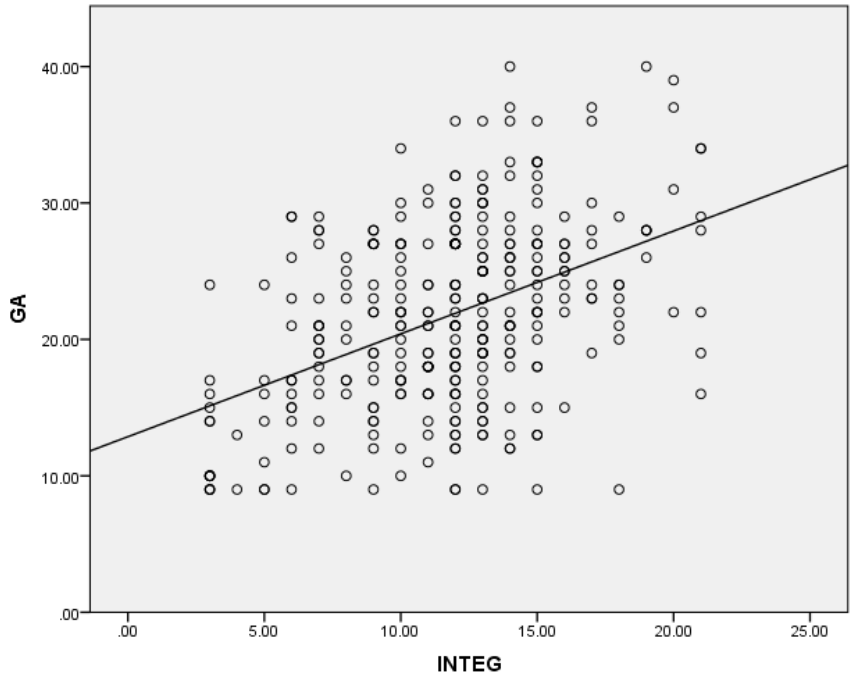
Note. GEn = Game Engagement, GA = Game Addiction.

Figure 4.1. Scatterplot for Game Engagement and Game Addiction.



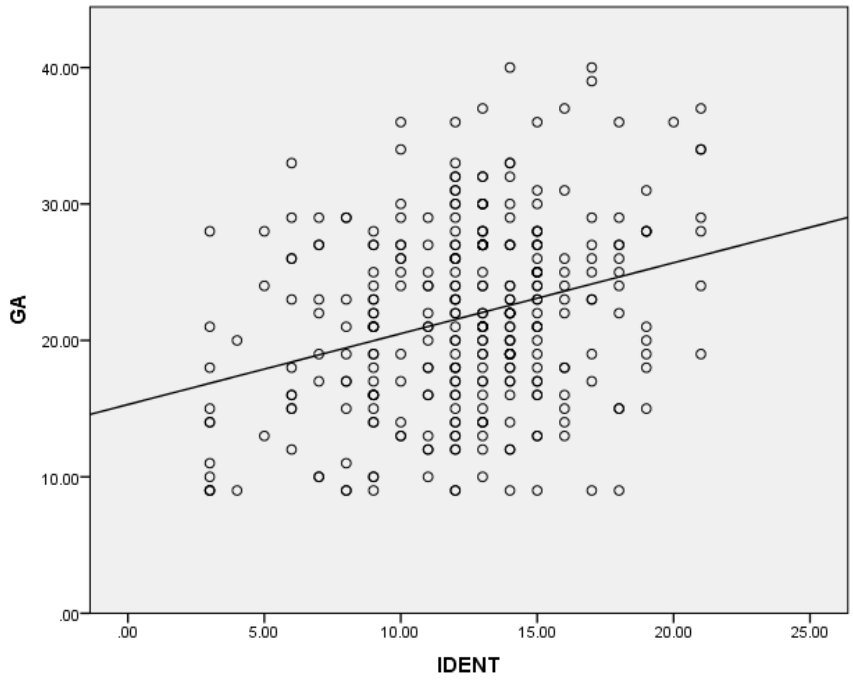
Note. IM = Intrinsic Motivation, GA = Game Addiction.

Figure 4.2. Scatterplot for Intrinsic Motivation and Game Addiction.



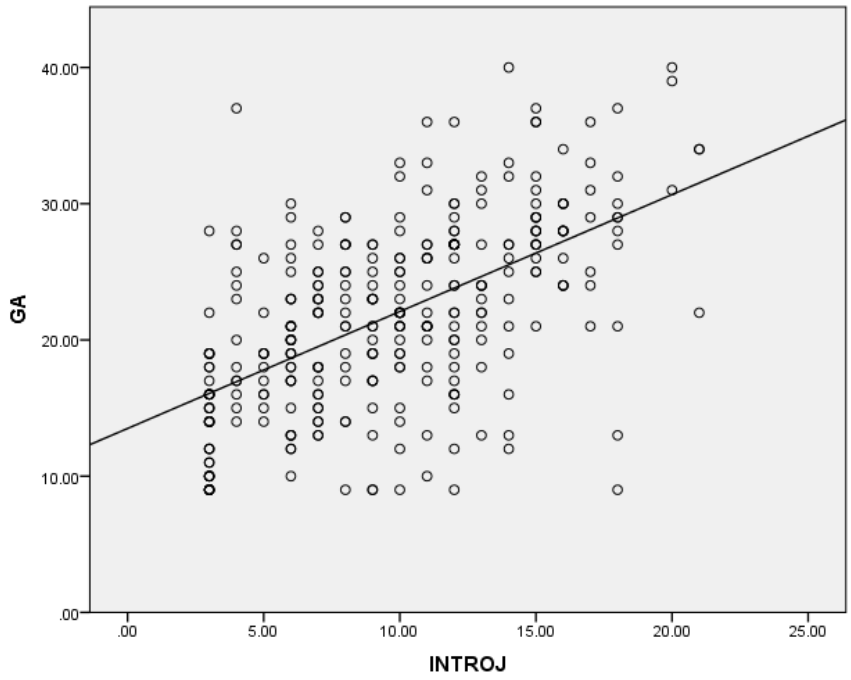
Note. INTEG = Integrated Regulation, GA = Game Addiction.

Figure 4.3. Scatterplot for Integrated Regulation and Game Addiction.



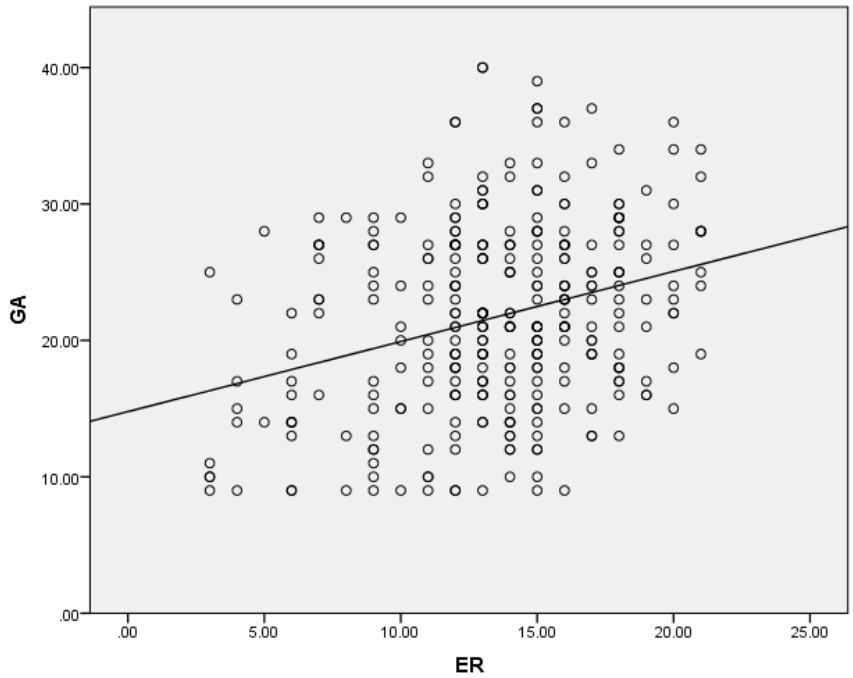
Note. IDENT = Identified Regulation, GA = Game Addiction.

Figure 4.4. Scatterplot for Identified Regulation and Game Addiction.



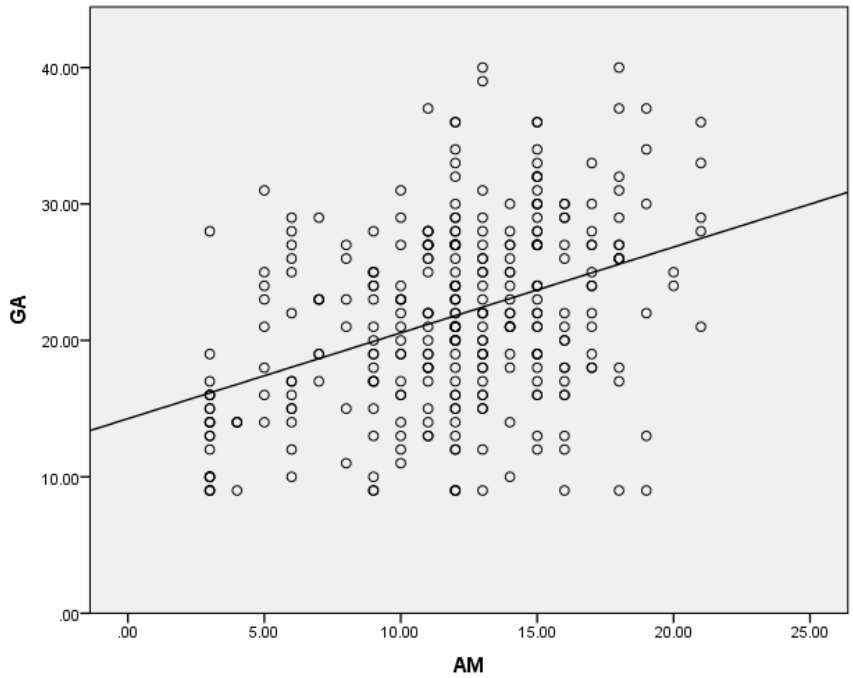
Note. INTROJ = Introjected Regulation, GA = Game Addiction.

Figure 4.5. Scatterplot for Introjected Regulation and Game Addiction.



Note. ER = Extrinsic Regulation, GA = Game Addiction

Figure 4.6. Scatterplot for External Regulation and Game Addiction.



Note. AM = Amotivation, GA = Game Addiction.

Figure 4.7. Scatterplot for Amotivation and Game Addiction.

The second assumption is there is no multicollinearity in the data. Analysis of collinearity statistics showed that all variance inflation factor (VIF) scores were below 10 and tolerance scores were below 0.2. Tolerance is used as an indicator of multicollinearity and VIF measures the impact of multicollinearity in the model. As shown in Table 4.9, the assumption is met as there is no multicollinearity in the data (Game Engagement, Tolerance = .697, VIF = 1.434; Intrinsic Motivation, Tolerance = .616, VIF = 1.624; Integrated Regulation, Tolerance = .475, VIF = 2.106; Identified Regulation, Tolerance = .542, VIF = 1.845; Introjected Regulation, Tolerance = .509, VIF = 1.964; External Regulation, Tolerance = .668, VIF = 1.498; Amotivation, Tolerance = .768, VIF = 1.301).

Table 4.9

Coefficients and Collinearity Statistics for Game Engagaement and Game Motivation

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.712	1.683		1.611	.108		
	GEn	.281	.049	.289	5.719	.000	.697	1.434
	IM	.062	.105	.032	.589	.556	.616	1.624
	INTEG	.227	.104	.133	2.176	.030	.475	2.106
	IDENT	-.113	.102	-.064	-1.112	.267	.542	1.845
	INTROJ	.498	.089	.331	5.592	.000	.509	1.964
	ER	.057	.090	.033	.634	.526	.668	1.498
	AM	.180	.077	.112	2.329	.020	.768	1.301

Note. IM = Intrinsic Motivation, INTEG = Integrated Regulation, IDENT = Identified Regulation, INTROJ = Introjected Regulation, ER = External Regulation, AM = Amotivation, GA = Game Addiction.

a. Dependent Variable: Game Addiction.

The third assumption is the values of the residuals are independent. Durbin-Watson statistic is used to measure in residuals from regression analysis and a value of 2 shows no autocorrelation detected in the sample. As shown in Table 4.10, the Durbin-Watson statistic showed that the obtained value is close to 2, so the assumption is met (Durbin-Watson value = 1.643).

Table 4.10

Model Summary and Durbin-Watson Statistics for Multiple Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.668[a]	.446	.433	5.13438	1.643

a. Predictors: (Constant), Game Engagement, Intrinsic Regulation, Integrated Regulation, Identified Regulation, Introjected Regulation, External Regulation, Amotivation.

b. Dependent Variable: Game Addiction.

The fourth assumption is the variance of the residuals is constant. As shown in Figure 4.8, the scatterplot showed that the data met the assumptions of the constant in variance of the residuals as there is no obvious pattern of funneling in the data.

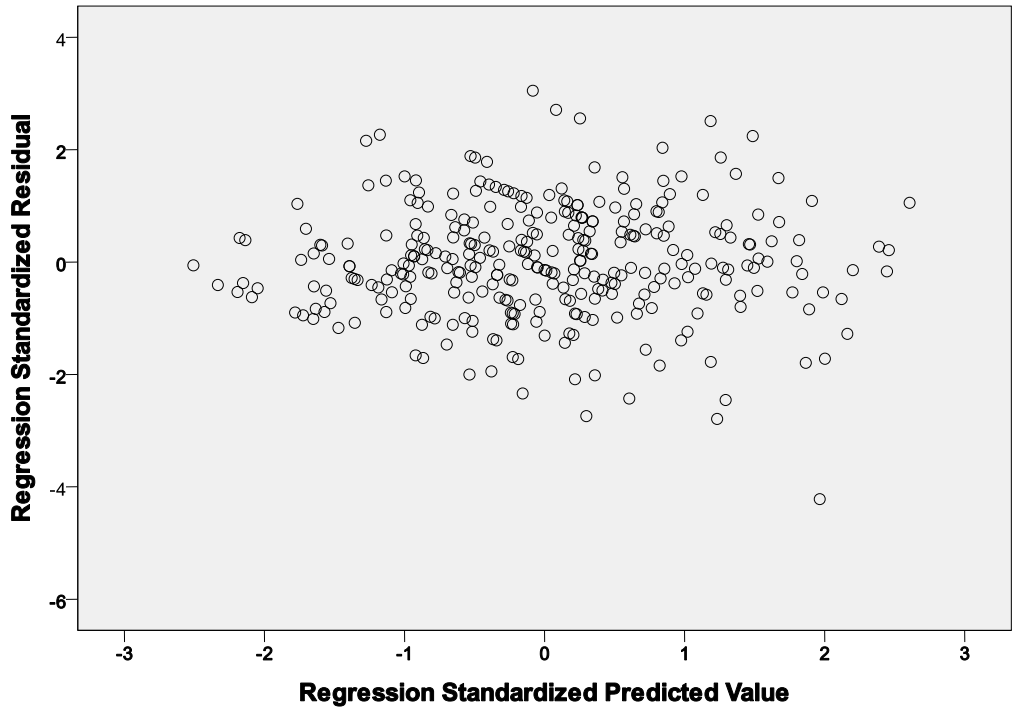


Figure 4.8. Scatterplot of Standardised Residuals and Standardised Predicted Values.

The fifth assumption is the values of the residuals are normally distributed. Referred to Figure 4.9, the P-P plot compares the observed cumulative distribution function (CDF) of standardized residual to the expected CDF of the normal distribution. The P-P plot showed the points are close to the line. The assumption of normality of the residuals is fulfilled.

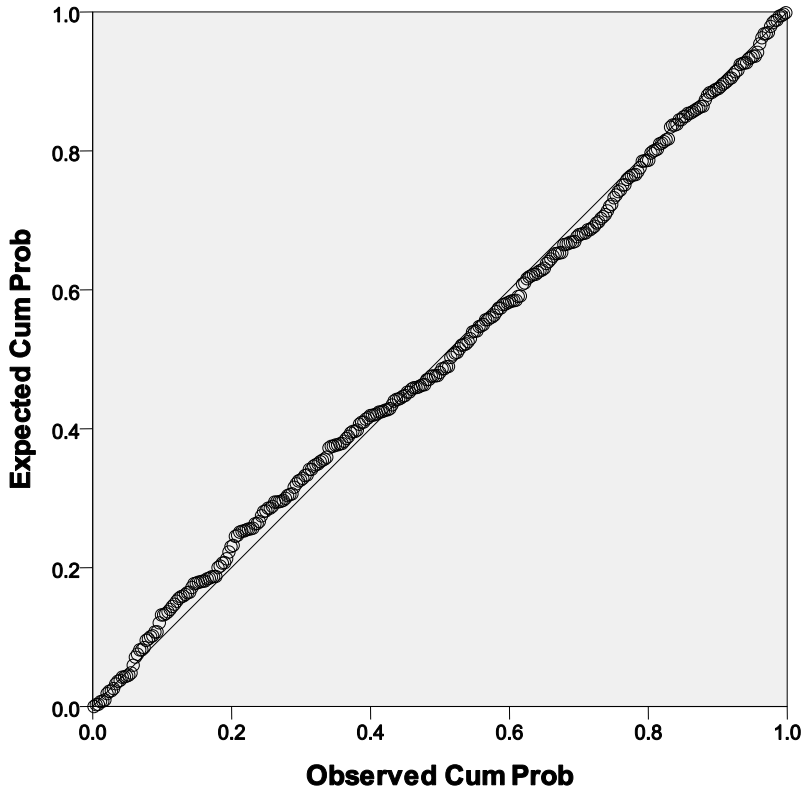


Figure 4.9. P-P plot of Regression Standardized Residual.

The sixth assumption is there are no influential cases biasing the model. Cook's distance is used to measure data that negatively affect the regression model. As shown in Table 4.11, Cook's distance values were all under 1, thus the assumption of no influential cases biasing the model is met.

Table 4.11

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	10.3015	33.5870	21.7179	4.55299	319
Std. Predicted Value	-2.507	2.607	.000	1.000	319
Standard Error of Predicted Value	.357	1.637	.780	.230	319
Adjusted Predicted Value	10.3151	33.3310	21.7216	4.55545	319
Residual	-21.66565	15.66189	.00000	5.07756	319
Std. Residual	-4.220	3.050	.000	.989	319
Stud. Residual	-4.345	3.098	.000	1.003	319
Deleted Residual	-22.96694	16.15705	-.00372	5.22006	319
Stud. Deleted Residual	-4.476	3.142	-.001	1.008	319
Mahal. Distance	.542	31.333	6.978	4.696	319
Cook's Distance	.000	.142	.004	.010	319
Centered Leverage Value	.002	.099	.022	.015	319

a. Dependent Variable: Game Addiction.

Multiple Regression.

RQ: Do game engagement and game motivation predict game addiction of MOBA young adult players in Malaysia?

Multiple regression analysis was used to test if game engagement, intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation significantly predicted game addiction. The model was statistically significant, $F(7, 311) = 35.723$, $p < .001$ and accounted for 43.3% of the variance. It was found that game engagement significantly predicted game addiction ($\beta = .289$, $p < .001$), integrated regulation significantly predicted game addiction ($\beta = .133$, $p = .030$), introjected regulation significantly predicted game addiction ($\beta = .331$, $p < .001$), and amotivation significantly predicted game addiction ($\beta = .112$, $p = .020$). It was found that intrinsic motivation, identified regulation, and external regulation did not significantly predict game addiction. The result was shown in Table 4.13, Table 4.14, and Table 4.15.

Table 4.12

Variables for Multiple Regression

Model	Variables Entered	Variables Removed	Method
1	AM, IDENT, IM, GEn, ER, INTROJ, INTEG[b]	.	Enter

a. Dependent Variable: Game Addiction.

b. All requested variables entered.

Table 4.13

Model Summary for Multiple Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.668[a]	.446	.433	5.13438

a. Predictors: (Constant), AM, IDENT, IM, GEn, ER, INTROJ, INTEG.

Table 4.14

ANOVA for Game Engagement and Game Motivation to Game Addiction

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6592.058	7	941.723	35.723	.000[b]
	Residual	8198.550	311	26.362		
	Total	14790.608	318			

a. Dependent Variable: Game Addiction.

b. Predictors: (Constant), AM, IDENT, IM, GEn, ER, INTROJ, INTEG.

Table 4.15

Coefficients for Game Engagement and Game Motivation

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.712	1.683		1.611	.108
	GEn	.281	.049	.289	5.719	.000
	IM	.062	.105	.032	.589	.556
	INTEG	.227	.104	.133	2.176	.030
	IDENT	-.113	.102	-.064	-1.112	.267
	INTROJ	.498	.089	.331	5.592	.000
	ER	.057	.090	.033	.634	.526
	AM	.180	.077	.112	2.329	.020

Note. GEn = Game Engagement, IM = Intrinsic Motivation, INTEG = Integrated Regulation, IDENT = Identified Regulation, INTROJ = Introjected Regulation, ER = External Regulation, AM = Amotivation.

a. Dependent Variable: Game Addiction.

Chapter 5: Discussion

Globally, the number of people playing Multiplayer Online Battle Arena (MOBA) games has been increased. The increasing growth of MOBA games leads to the needs in developing intelligent agents for this game genre (Silva & Chaimowicz, 2015). As affected by this increase, considerable researches have been done to determine the additional effects of MOBA games like gaming addiction and mental health condition of the players (Tang, Koh, & Gan, 2017). Some studies were conducted to find out the causes of internet gaming addiction on MOBA gamers such as personality traits, technological factors, media factors, aggressiveness, and interpersonal relationship (Arshad, Zakaria, Othman, & Mazlan, 2013; Karapetsas, Karapetsas, Zygouris, & Fotis, 2014; Wittek, Finseras, Pallesen, Mentzoni, Hanss, Griffiths, & Molde, 2016). In addition to these factors, gaming-contingent self-worth could use to predict internet gaming disorder (Beard & Wickham, 2016).

The result showed that all independent variable are positively associated with game addiction. In other words, game engagement, intrinsic regulation, introjected motivation, integrated motivation, identified motivation, external regulation, and non-regulation are positively correlated to game addiction. For instance, when game engagement increased, the young adult will be more addicted to the MOBA game. The result showed that game engagement had the strongest significant predictive relationship on game addiction followed by integrated regulation, introjected regulation, and non-regulation.

5.1 Game Engagement and Game Addiction

Consistent with previous studies, game engagement was a significant predictor of game addiction. The result showed that game engagement was positively correlated with game

addiction. The result is tally with the finding which has been done by the past studies (Seok & DaCosta, 2014). Game engagement and game addiction are two different variables (Brunborg, Mentzoni, & Froyland, 2014). A research conducted by Seok and DaCosta (2014) stated that individuals who are highly engaged to the games might display the symptoms or behaviours of Internet Gaming Disorder (IGD). For instance, individuals who where highly engaged in gaming may show similar traits or personality as the symptoms of internet gaming disorder. In other words, game addiction could be predicted by high level of game engagement as the individual may show certain traits that are similar to the symptoms of game addiction.

5.2 Game Motivation and Game Addiction

Intrinsic regulation and game addiction. Intrinsic regulation is the regulation style for intrinsic motivation. The result displayed that intrinsic regulation was positively correlated to game addiction. It was expected to be the significant predictor of game addiction. However, intrinsic motivation was not a significant predictor of game addiction in current study. The result is consistent with the past studies (Neys, Jansz, & Tan, 2014; Tsai & Pai, 2012). The greater the intrinsic regulation of the individual, the higher the chances for him to be suffered from IGD. In other words, the young adult gamers who were intrinsically motivated to play games have higher chances to be addicted to the games. According to self-determination theory (SDT), the individual is intrinsically motivated when he enjoys playing games (Legault, 2016). The individual might not want to stop when his inherent satisfaction is not being fulfilled. Consequently, this action might lead to game addiction.

Integrated regulation and game addiction. Integrated regulation is one of the regulation styles of extrinsic motivation. There was a significant positive relationship between

integrated regulation and game addiction. The result showed that it was a significant predictor of game addiction. The higher the integrated regulation, the greater the chances for the individual to be addicted to the games. According to Beard and Wickham (2016), integrated regulation has the most similar concept with intrinsic motivation along the continuum of SDT. Alternatively, the young adult with integrated regulation plays games when they wish to play because they have merged gaming into their self-concept (Beard & Wickham, 2016). As far as the researcher's concerned, there was no research done on integrated regulation and game addiction.

Identified regulation and game addiction. As referred to the continuum of SDT, identified regulation falls under extrinsic motivation. The result showed that identified regulation was positively correlated to game addiction. Nevertheless, identified regulation was not a significant predictor of game addiction. This result is contrary to past research. According to a research conducted by Kwok and Khoo (2011), identified regulation negatively predicts game addiction. Legault (2017) stated that identified regulation is more related to the conscious whereby an individual is able and has the right to make decisions in his life. It can be explained by the individual's autonomy needs (Kwok & Khoo, 2011). For instance, it is the individual's choice to continue or stop playing MOBA games. The young adult has the ability to control himself. He may choose to play games even though he knew that he should discontinue this action. There was relatively rare research on identified regulation and game addiction. As far as the researcher's concerned, there was only one published study focused on the relationship between identified regulation and game addiction.

Introjected regulation and game addiction. The result showed that introjected regulation was one of the significant predictors of game addiction. Introjected regulation was positively correlated to game addiction. The greater the introjected regulation in the individual,

the higher the possibility for him to have game addiction. The result is tally with the past research (Kwok & Khoo, 2011). According to Beard and Wickhan (2016), introjected regulation can be explained by the individual may experience anxiety or agitated when he is not engaging in the game. In other words, the withdrawal-like symptoms such as irritability may exist when the individual is not playing games (Mills, Milyavskaya, Health, & Derevensky, 2018). This can be explained by gaming serves as the coping mechanism for the young adult to cope with stress and anxiety from academic or depression (Plante, Gentile, Groves, Modlin, & Blanco-Herrera, 2018). Thus, the reason for the individual who plays as motivated by introjected regulation of motivation to be addicted to the game is they play games when they want to relieve stress. In fact, one of the criteria of IGD is the individual plays games to run away or reduce negative mood (Pontes & Griffiths, 2015). Individuals who recruited gaming as their way of dealing with stress were more vulnerable to game addiction (Plante, Gentile, Groves, Modlin, & Blanco-Herrera, 2018).

External regulation and game addiction. External regulation was positively correlated to game addiction. Nevertheless, external regulation was not a significant predictor of game addiction. The individual who plays the game with this regulation style is motivated by the reward system in the MOBA games (King & Delfabbro, 2009). Alternatively, the individual plays games solely because of the incentives given in the games such as new free character or equipments. According to King and Delfabbro (2009), shifting of gamers' motivation may happen along the way to game addiction. Initially, the individual play games because of the reward provided in the games. However, motivation might shift when he slowly perceived gaming as an interesting action. Therefore, external regulation indirectly leads to game addiction.

Non-regulation and game addiction. Non-regulation is the regulation style of amotivation. As referred to the result, amotivation is positively correlated with game addiction. The result showed that amotivation was a significant predictor of game addiction. Amotivation, the least self-determined form of regulation was being expected to have the lowest or no predictive relationship on game addiction. However, the result of this study showed that amotivation could positively predict game addiction. In other words, the individual who has little motivation to play MOBA game will be addicted to it. This result was proven by recent research as it concluded that there is a positive connection between amotivation and game addiction by having a strong attachment of self-esteem to the engagement on gaming (Beard & Wickham, 2016; Mills, Milyavskaya, Health, & Derevensky, 2018). The stronger the amotivation of the individual, the greater the chances for him to suffer from IGD. Alternatively, the individual with amotivation towards gaming may experience game addiction when he has a strong attachment of self-esteem on the MOBA games.

5.3 Implication of the Study

The finding of the current study provides insights to the readers as it serves as the reference for the young adult to be more aware of their gaming behaviour. Furthermore, the individual may seek help from the professionals when he is suspected to have IGD. According to Lemmens, Valkenburg, and Gentile (2015), individual who scored at least five marks each from more than five items in the Internet Gaming Disorder scale short form is at greater risk of having IGD (Lemmens, Valkenburg, & Gentile, 2015). The young adults who adapted gaming as a method to relieve stress may direct their way to other strategies to cope with it. Perceived gaming as a strategy to cope with stress or anxiety may lead to game addiction (Plante, Gentile, Groves, Modlin, & Blanco-Herrera, 2018). In order to reduce stress, individuals may practice

relaxation techniques rather than engaging in problematic gaming behaviour (King & Delfabbro, 2009).

The significant others of the young adult may be aware of the causes and symptoms of game addiction. Consequently, they may inform the young adult and encourage those suspected to have IGD to seek help from the professionals. In terms of society, professionals such as counsellors and clinical psychologists may gain a deeper understanding of the types of motivation that could predict game addiction. Therefore, they could consider more possibilities that lead to game addiction when developing a treatment plan with the IGD patients. The current finding may contribute to the prevention programmes or relapse prevention plan of IGD.

5.4 Limitation of the Study

There are limitations to every research study. Firstly, self-report data were used in this study. By using this method, it was assumed that the participants answer the questionnaire accurately and truthfully. Self-report biased may happen when the participants complete the survey dishonestly. Secondly, there is a risk of recall bias to happen in the cross-sectional study. For instance, the participants have to recall the average weekly duration of playing the game and the experiences of game engagement when completing the questionnaire. Cross-sectional study allows the collection of data at a predetermined period. Alternatively, the responses from the same individual may be different after a period of time. Next, the result of the current study could not be generalised to the gamers in Malaysia. The reason is this study specifically focused on MOBA players. Thus, the finding is unable to generalise into a larger population.

5.5 Recommendation

Recommendation for future research is to conduct more studies focus on the effect of six motivational styles on Internet gaming disorder. There are relatively little studies recruited amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation as independent variables and investigate the causal relationships on game addiction. Most of the studies focus on the motivation that characterized it into three components such as achievement, social, and immersion (Yee, 2006; Yee, Nicolas, & Nelson, 2012). Future research may explore the relationship between game motivation and game addiction on other genres of games. Besides, future studies could be conducted on investigating the predictive relationship of game engagement, intrinsic regulation, introjected regulation, and amotivation on game addiction.

5.6 Conclusion

There are different causes of game addiction other than the variables being recruited in the current study. In terms of consequences, game addiction may lead to lots of negative outcomes such as the problem in interpersonal relationship, low sleep quality, health and financial issues (“Video game addiction symptoms, causes and effects”, n.d.). Individual who perceived gaming as a coping strategy for stress and anxiety should be aware of his gaming behaviour. Past research showed that individual use gaming as a way to relieve stress is more vulnerable to gaming addiction (Plante, Gentile, Groves, Modlin, & Blanco-Herrera, 2018). In order to reduce the chances of suffering from IGD, the individual should adapt to other activities to cope with stress like exercise and discuss the problems with parents or friends.

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Appendices

Appendix A Pilot Study Informed Consent and Demographic Data

UNIVERSITY TUNKU ABDUL RAHMAN

FACULTY OF ARTS AND SOCIAL SCIENCE

BACHELOR OF SOCIAL SCIENCE (HONS) PSYCHOLOGY

Dear respondents,

We are undergraduate students pursuing **Bachelor of Social Science (Hons) Psychology** and we are currently working on our Final Year Project titled **'The Impact of Game Engagement, Game Motivation on Game Addiction among the Young Adult Multiplayer Online Battle Arena Players in Malaysia**'.

This questionnaire consisted of 4 sections: Demographic data, game engagement, gaming motivation and game addiction assessment. This questionnaire may take **approximately 15 minutes** to complete.

Participation

Your participation is strictly voluntary. Should you feel uncomfortable answering the questions, you may withdraw from the participation at any time and your responses will be discarded. You are not under any obligation to participate and there is no penalty for not participating. Completion of the survey, however, is taken as your consent for the information you have provided to be included in the study.

Confidentiality

All responses collected will be kept private and confidential. Your responses will only be coded numerically for data analysis, discussions and presentations. No personal information will be released or published. Data will be stored in the researchers' computer and database of the online survey system. Data will be held for 5 years after the study's completion, in keeping with the policy of the American Psychological Association (APA). At that time, they will be erased. Should you have any doubts or questions, feel free to contact us via email at xinyigoh97@1utar.my

Declaration

I have read or have the information above read to me, in the language understandable to me. The above content has been fully explained to me.

I have asked all questions that I need to know about the study and this form. All my questions have been answered. I have read, or have had read to me, all pages of this consent form and the risks described. I voluntarily consent and offer to take part in this study. By signing this consent form, I certify that all information I have given, including my medical history, is true and correct to the best of my knowledge. I will not hold UTAR or the research team responsible for any consequences and/or liability whatsoever arising from my participation in this study.

o I agree to participate in this study

o I DO NOT agree to participate in this study

Demographic data

Age

_____

Gender

o Male

o Female

Ethnicity

o Malay

o Chinese

o Indian

o Others _____

State currently living in (eg. Kuala Lumpur, Selangor, Perak etc.)

o Johor

o Kedah

o Kelantan

o Malacca

o Negeri Sembilan

o Pahang

o Penang

o Perak

o Perlis

o Sabah

o Sarawak

- o Selangor
- o Terengganu
- o Wilayah Persekutuan

Occupation

_____

Names of games played

- ▢ League of Legends (LoL)
- ▢ Defense of the Ancient 2 (DOTA 2)
- ▢ Mobile Legends
- ▢ Heroes of Newerth (HoN)
- ▢ 王者荣耀
- ▢ Others _____

Amount of hours spent on gaming in a week

_____

Appendix B Actual Study Informed Consent and Demographic Data

UNIVERSITY TUNKU ABDUL RAHMAN

FACULTY OF ARTS AND SOCIAL SCIENCE

BACHELOR OF SOCIAL SCIENCE (HONS) PSYCHOLOGY

Dear respondents,

We are undergraduate students pursuing Bachelor of Social Science (Hons) Psychology and we are currently working on our Final Year Project titled 'The Impact of Game Engagement, Game Motivation on Game Addiction among the Young Adult Multiplayer Online Battle Arena Players in Malaysia'.

This questionnaire consisted of 4 sections: Demographic data, game engagement, gaming motivation and game addiction assessment. This questionnaire may take approximately 10 minutes to complete.

Participation

Your participation is strictly voluntary. Should you feel uncomfortable answering the questions, you may withdraw from the participation at any time and your responses will be discarded. You are not under any obligation to participate and there is no penalty for not participating. Completion of the survey, however, is taken as your consent for the information you have provided to be included in the study.

Confidentiality

All responses collected will be kept private and confidential. Your responses will only be coded numerically for data analysis, discussions and presentations. No personal information will be released or published. Data will be stored in the researchers' computer and database of the online survey system. Data will be held for 5 years after the study's completion, in keeping with the policy of the American Psychological Association (APA). At that time, they will be erased. Should you have any doubts or questions, feel free to contact us via email at *xinyigoh97@1utar.my*

Multiplayer Online Battle Arena (MOBA) games are played in real-time with other players. Player characters usually have skills and abilities to help them in destroying the opposition team's main structure with the help of the teammates and units which are spawned periodically and controlled by computer.

Please ensure that you have fulfilled the following criteria:

1) Age between 18 and 35 years old

2) Have experience playing MOBA games

Declaration

I have read or have the information above read to me, in the language understandable to me. The above content has been fully explained to me.

I have asked all questions that I need to know about the study and this form. All my questions have been answered. I have read, or have had read to me, all pages of this consent form and the risks described. I voluntarily consent and offer to take part in this study. By signing this consent form, I certify that all information I have given, including my medical history, is true and correct

to the best of my knowledge. I will not hold UTAR or the research team responsible for any consequences and/or liability whatsoever arising from my participation in this study.

o I agree to participate in this study

o I DO NOT agree to participate in this study

Demographic data

Age

_____

Gender

o Male

o Female

Ethnicity

o Malay

o Chinese

o Indian

o Others _____

State

o Johor

o Kedah

o Kelantan

o Malacca

o Negeri Sembilan

o Pahang

o Penang

o Perak

o Perlis

o Sabah

o Sarawak

- o Selangor
- o Terengganu
- o Wilayah Persekutuan

Occupation

- o Student
- o Others _____

Names of games played

- ▢ League of Legends (LoL)
- ▢ Defense of the Ancient 2 (DOTA 2)
- ▢ Mobile Legends
- ▢ 王者荣耀 WangzheRongyao
- ▢ Arena of Valor 传说对决
- ▢ Smite
- ▢ Heroes of the Storm
- ▢ Others _____

Average gaming frequency in a week

- o 1 - 2 rounds
- o 3 - 4 rounds
- o 5 - 6 rounds
- o 7 - 8 rounds
- o 9 - 10 rounds
- o More than 10 rounds

Average time spent on gaming per day

- Less than 1 hour
- 1 - 3 hours
- 3 - 5 hours
- 5 - 7 hours
- 7 - 9 hours
- 9 - 11 hours
- More than 11 hours

Appendix C Game Engagement Questionnaire

Game Engagement Questionnaire (GEQ)

Please rate the following statement by its relevance on the 3-point scale (1 = no, 2 = maybe, and 3 = yes). Try to read and think about the statement that applies to you when you are gaming. There are no right or wrong answers, so don't spend a lot of time on any one item. We are looking for your overall impression regarding each statement. Be sure not to omit any items.

1. I lose track of time.

o No

o Maybe

o Yes

2. Things seem to happen automatically.

o No

o Maybe

o Yes

3. I feel different.

o No

o Maybe

o Yes

4. I feel scared.

o No

o Maybe

o Yes

5. The game feels real.

- o No
- o Maybe
- o Yes

6. If someone talks to me, I don't hear them.

- o No
- o Maybe
- o Yes

7. I get wound up.

- o No
- o Maybe
- o Yes

8. Time seems to kind of stand still or stop.

- o No
- o Maybe
- o Yes

9. I feel spaced out.

- o No
- o Maybe
- o Yes

10. I don't answer when someone talks to me.

- o No
- o Maybe

o Yes

11. I can't tell that I'm getting tired.

o No

o Maybe

o Yes

12. Playing seems automatic.

o No

o Maybe

o Yes

13. My thoughts go fast.

o No

o Maybe

o Yes

14. I lose track of where I am.

o No

o Maybe

o Yes

15. I play without thinking about how to play.

o No

o Maybe

o Yes

16. Playing makes me feel calm.

o No

o Maybe

o Yes

17. I play longer than I meant to.

o No

o Maybe

o Yes

18. I really get into the game.

o No

o Maybe

o Yes

19. I feel like I just can’t stop playing.

o No

o Maybe

o Yes

Appendix D Gaming Motivation Scale

Gaming Motivation Scale (GAMS)

Please rate the following statement by its relevance on the 7-point scale (1 = do not agree at all, 7 = very strongly agree). Try to read and think about the statement that applies to you when you are gaming. There are no right or wrong answers, so don't spend a lot of time on any one item. We are looking for your overall impression regarding each statement. Be sure not to omit any items.

Intrinsic Motivation

	Do not agree at all (1)	Mostly disagree (2)	Somewh at disagree (3)	Neither agree nor disagree (4)	Somewh at agree (5)	Mostly agree (6)	Very strongly agree (7)
1. Because it is stimulating to play	○	○	○	○	○	○	○
2. For the pleasure of trying/experiencing new game options (e.g., classes, characters, teams, races, equipment)	○	○	○	○	○	○	○
3. For the feeling of efficacy I experience when I play	○	○	○	○	○	○	○

Integrated regulation

	Do not agree at all (1)	Mostly disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Mostly agree (6)	Very strongly agree (7)
1. Because it is an extension of me	○	○	○	○	○	○	○
2. Because it is an integral part of my life	○	○	○	○	○	○	○
3. Because it is aligned with my personal values	○	○	○	○	○	○	○

Identified regulation

	Do not agree at all (1)	Mostly disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Mostly agree (6)	Very strongly agree (7)
1. Because it is a good way to develop important aspects of myself	○	○	○	○	○	○	○
2. Because it is a good way to develop social and intellectual abilities that are useful to me	○	○	○	○	○	○	○

3. Because it has personal significance to me	○	○	○	○	○	○	○

Introjected regulation

	Do not agree at all (1)	Mostly disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Mostly agree (6)	Very strongly agree (7)
1. Because I feel that I must play regularly	○	○	○	○	○	○	○
2. Because I must play to feel good about myself	○	○	○	○	○	○	○
3. Because otherwise I would feel bad about myself	○	○	○	○	○	○	○

External regulation

	Do not agree at all (1)	Mostly disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Mostly agree (6)	Very strongly agree (7)
1. To acquire powerful and rare items (e.g., armors, weapons) and virtual currency (e.g., gold pieces, gems) or to unlock hidden/restricted elements of the game (e.g., new characters, equipment, maps)	○	○	○	○	○	○	○

2. For the prestige of being a good player	○	○	○	○	○	○	○
3. To gain in-game awards and trophies or character/avatar's levels and experiences points	○	○	○	○	○	○	○

Amotivation

	Do not agree at all (1)	Mostly disagree (2)	Somewh at disagree (3)	Neither agree nor disagree (4)	Somewh at agree (5)	Mostly agree (6)	Very strongly agree (7)
1. It is not clear anymore; I sometimes ask myself if it is good for me	○	○	○	○	○	○	○
2. I used to have good reasons, but now I am asking myself if I should continue	○	○	○	○	○	○	○
3. Honestly, I don't know; I have the impression that I'm wasting my time	○	○	○	○	○	○	○

Appendix E Internet Gaming Disorder Scale – Short-form (IGDS9-SF)

Internet Gaming Disorder Scale–Short-Form (IGDS9-SF)

Instructions: These questions will ask you about your gaming activity during the past year (i.e., last 12 months). By gaming activity we understand any gaming-related activity that hasbeen played either from a computer/laptop or from a gaming console or any other kind of device (e.g., mobile phone, tablet, etc.) both online and/or offline.

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very Often (5)
1. Do you feel preoccupied with your gaming behavior? (Some examples: Do you think about previous gaming activity or anticipate the next gaming session? Do you think gaming has become the dominant activity in your daily life?)	○	○	○	○	○
2. Do you feel more irritability, anxiety or even sadness when you try to either reduce or stop your gaming activity?	○	○	○	○	○
3. Do you feel the need to spend increasing amount of time engaged	○	○	○	○	○

gaming in order to achieve satisfaction or pleasure?					
4. Do you systematically fail when trying to control or cease your gaming activity?	○	○	○	○	○
5. Have you lost interests in previous hobbies and other entertainment activities as a result of your engagement with the game?	○	○	○	○	○
6. Have you continued your gaming activity despite knowing it was causing problems between you and other people?	○	○	○	○	○
7. Have you deceived any of your family members, therapists or others because the amount of your gaming activity?	○	○	○	○	○
8. Do you play in order to temporarily escape or relieve a negative mood	○	○	○	○	○

(e.g., helplessness, guilt, anxiety)?					
9. Have you jeopardized or lost an important relationship, job or an educational or career opportunity because of your gaming activity?	○	○	○	○	○

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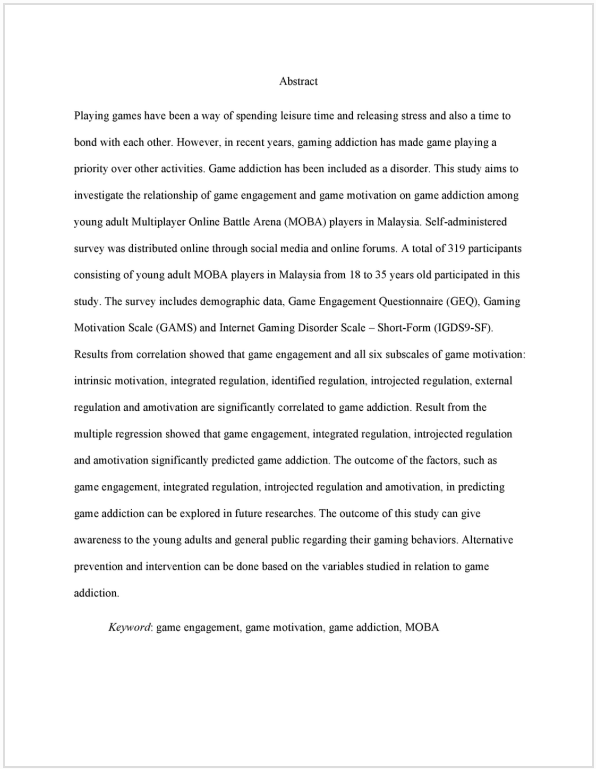

Abstract

Playing games have been a way of spending leisure time and releasing stress and also a time to bond with each other. However, in recent years, gaming addiction has made game playing a priority over other activities. Game addiction has been included as a disorder. This study aims to investigate the relationship of game engagement and game motivation on game addiction among young adult Multiplayer Online Battle Arena (MOBA) players in Malaysia. Self-administered survey was distributed online through social media and online forums. A total of 319 participants consisting of young adult MOBA players in Malaysia from 18 to 35 years old participated in this study. The survey includes demographic data, Game Engagement Questionnaire (GEQ), Gaming Motivation Scale (GAMS) and Internet Gaming Disorder Scale – Short-Form (IGDS9-SF). Results from correlation showed that game engagement and all six subscales of game motivation: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation are significantly correlated to game addiction. Result from the multiple regression showed that game engagement, integrated regulation, introjected regulation and amotivation significantly predicted game addiction. The outcome of the factors, such as game engagement, integrated regulation, introjected regulation and amotivation, in predicting game addiction can be explored in future researches. The outcome of this study can give awareness to the young adults and general public regarding their gaming behaviors. Alternative prevention and intervention can be done based on the variables studied in relation to game addiction.

Keyword: game engagement, game motivation, game addiction, MOBA