NEED SATISFACTION AND INTERNET GAMING DISORDER: THE MEDIATING ROLE OF GAMING MOTIVATIONS

JESSIE KONG JING WEI

NG PHEI YIN

THUM WENG YEW

Need Satisfaction and Internet Gaming Disorder: The Mediating Role of Gaming Motivations

Jessie Kong Jing Wei, Ng Phei Yin, Thum Weng Yew

Department of Psychology and Counselling, Universiti Tunku Abdul Rahman

Dr. T'ng Soo Ting

August 28, 2023

This research project is submitted in partial fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology, Faculty of Arts and Social Science, Universiti Tunku Abdul Rahman. Submitted on August 2023

ACKNOWLEDGEMENTS

We would like to express our sincere gratitude to all of the people who helped make our final year project happen. Without them, we would not have been able to accomplish it. We wish to extend our thanks to Dr. T'ng Soo Ting, our supervisor. Her expertise, patience and continuous support were valuable during the entire process. We would also want to thank each and every one of the group members for their cooperation, dedication and mutual support.

Besides, our academic advisors deserve a recognition too, for their continuous encouragement and advice, especially when we feel stressed out and lost. We thank our loved ones including family and friends, as they have been giving us the psychological support through stressful times and they were the continual source of strength. Lastly, this project could not have been accomplished without the assistance of all the participants who kindly offered their precious time to fill in our questionnaires, and their contributions greatly benefited our findings.

In conclusion, we would like to express our sincere appreciation to everyone who helped make our Final Year Project a success. We are truly grateful to have such an abundance of network of social and academic support, and everyone deserves this credit.

JESSIE KONG JING WEI

NG PHEI YIN

THUM WENG YEW

APPROVAL FORM

This research paper attached here to, entitled "Need satisfaction on internet gaming disorder: The mediating role of gaming motivation", prepared and submitted by Jessie Kong Jing Wei, Ng Phei Yin, and Thum Weng Yew in partial fulfillment of requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

_____

Supervisor

(Dr. T'ng Soo Ting)

Date: _____

Abstract

A notably higher prevalence of Internet Gaming Disorder (IGD) in Asia is demonstrated by several recent researchers, but still, only limited studies are available on this topic. The present study aimed to explore (1) the predictive effects of need satisfaction (NS) on IGD, (2) the predictive effects of gaming motivation (e.g., intrinsic motivation (IM), extrinsic motivation (EM), and amotivation (AM)) on IGD, and (3) the mediating effects of gaming motivation (e.g., IM, EM, and AM) on the prediction of NS on IGD among multiplayer online battle arena (MOBA) gamers in Malaysia context with Self-Determination Theory (SDT) as theoretical guideline. In general, the current research was a cross-sectional study with a total sample size (*N*=495) were selected. The participants were recruited by using homogenous purposive sampling method and were given online survey with Internet Gaming Disorder Scale-Short Form (IGDS9-SF), Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) and Gaming Motivation Scale (GAMS) instruments to fill in. The selected participants met the criteria of (1) MOBA player, (2) at least one-year of MOBA gaming experience, (3) Malaysian, (4) non-professional gamer, (5) age ranging of 18 and 29 years old. Present findings demonstrated that NS, EM, and AM predicted significantly on IGD, while IM predicted IGD non-significantly. On the other hand, all gaming motivations (e.g., IM, EM, and AM) had mediating effects on the prediction of NS on IGD. As a conclusion, current findings had filled in the gap of knowledge relevant to IGD, thus, provided insights to the stakeholders (e.g., policy makers, game developers, and educators) for future interventions.

Keywords: Internet Gaming Disorder, gaming motivation, need satisfaction, MOBA gamers, mediating effects

DECLARATION

We declare that the material contained in this paper is the result of our own work and that due acknowledgement has been given in the bibliography and references to ALL sources be they printed, electronic or personal.

Name: JESSIE KONG JING WEI

Student ID: 20AAB06384

Signed: 

Date: 28 August 2023

Name: NG PHEI YIN

Student ID: 19AAB03902

Signed: 

Date: 28 August 2023

Name: THUM WENG YEW

Student ID: 19AAB03881

Signed: 

Date: 28 August 2023

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Abbreviations	
AM	Amotivation
APA	American Psychiatric Association
BPNSF	Basic Psychological Need Satisfaction and Frustration Scale
BPNT	Basic Psychological Needs Theory
CET	Cognitive Evaluation Theory
COT	Causality Orientations Theory
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
EM	Extrinsic Motivation
GAMS	Gaming Motivation Scale
GCT	Goal Contents Theory
IGD	Internet Gaming Disorder
IGDS9-SF	Internet Gaming Disorder Scale-Short Form
IM	Intrinsic Motivation
MCMC	Malaysian Communications and Multimedia Commission
MOBA	Multiplayer Online Battle Arena
NS	Need Satisfaction
OIT	Organismic Integration Theory
RMT	Relationships Motivations Theory
SDT	Self-Determination Theory
WHO	World Health Organization

Chapter I

Introduction

Background of Study

In this era of digitalization, the Internet has become essential in our daily life as we are highly dependent on it especially during the pandemic period due to social distancing norms and nationwide lockdown with a rise on internet usage from 40% to 100% globally compared to before lockdown (De et al, 2020). The advancement of digitalization leads to an increased usage of Internet services like information systems and networks which had altered normal usage patterns and behavior and the internet penetration in Malaysia was at 89.6% in year 2022 (Kemp, 2022). As usage patterns and behaviors on internet usage had changed, video games have been a very popular and fast-growing entertainment activity, especially among youngsters, and have kept on developing since the year 2000 (Bassey, 2020; Macur & Pontes, 2021). The Malaysia gaming market was estimated at US$786 million, ranking the third largest in Southeast Asia (Poh & Zain, 2021). Statistics from "Malaysia: Online gamers by age group" (2020), shows that majority of the online gamers in Malaysia belong to the 18-29 years old age group whereby they accounted for 73% when compared to other age groups.

The number of players globally was forecasted to have 3198 million in the year 2022 and by region distribution, the Asia-Pacific region would have the most with a number of 1746 million players playing online games during their leisure time ("Global Games Market Report," 2022; Zul Kamal et al., 2020). It was estimated that during the pandemic timeframe, user involvement in online games had surged due to the lockdown (Amin et al., 2020; Barr & Copeland-Stewart, 2021; Claesdotter-Knutsson et al., 2022). The increasing engagement in online games would result in addiction and then develop internet gaming disorder (IGD) (Bassey, 2020). According to King and Delfabbro (2018) number of individuals who engage in video games are more likely to experience significant adverse psychological impacts

(depressive episodes, anxiousness, and suicidal thoughts) and adverse physiological effects (substance misuse, self-harm, and poor-quality sleep). These impacts are thought to be largely caused by prolonged and worrisome habits of active online gaming engagement (Bonnaire & Baptista, 2019; King & Delfabbro, 2018).

According to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), IGD can be identified with five or more of the nine criteria within a 12-month period. The 9-criteria suggested for IGD diagnosis would be preoccupation, withdrawal, tolerance, lack of control, surrender from other activities, continuation, deception, escape and negative consequences (APA, 2013). On the other hand, the World Health Organization (WHO) had also included IGD as a mental health condition within the latest 11th revision of the International Classification of Diseases (ICD-11) (WHO, 2018). Thus, this study is to examine the prediction of need satisfaction (NS) on IGD with gaming motivation (e.g., IM, EM, and AM) serving as a mediator.

Problem statement

As of July 2022, Internet users have reached 5.03 billion worldwide, representing 63.1% of the global population ("Internet and social media users in the world 2022", 2022). In addition, from 15.88 million in 2010 to 28.38 million in 2020, it is anticipated that there will be a continuous rise in Internet users in Malaysia ("Malaysia number of internet users", 2021). According to the Malaysian Communications and Multimedia Commission (MCMC) (2020), almost 50% of Internet users tend to spend around 5 to 12 hours on the Internet daily. Among those users, 42.8% of them play online games using the Internet (MCMC, 2020). To better understand the statistics, approximately 12.15 million Malaysians were involved in gaming activities in 2020. Undeniably, it is indeed worrisome as the number of Internet gamers rises in the Malaysian community (MCMC, 2020).

Research shows that IGD in Asia is found to have a higher prevalence rate as compared to other continents (Fam, 2018; Stevens et al., 2020). Stevens et al. (2020), reported that gaming is well-known to be immensely popular and is recognized as a national activity in countries such as South Korea. Nevertheless, the explanations for these regional disparities remain unknown. The greater prevalence of gaming in Asian nations is frequently explained by the emergence of E-sports, the proliferation of gaming facilities (e.g., 24-hour gaming cafes), and more tolerant public attitudes toward gaming in general, despite the presence of stringent regulatory restrictions. To support the statement, according to Mak et al. (2014), the local prevalence of Internet gaming in Malaysia is 19% while another study shows that 52.8% of Malaysian undergraduates achieved relatively high IGD (Nik Jaafar et al., 2021). These proposed that there is a demand to conduct more research on the effects of IGD as well as the factors that could potentially affect IGD in the Malaysian context.

Moreover, gaming addiction would have adverse effects on physical and mental health, as well as cognitive, interpersonal, academic, and vocational functioning (Wong & Lam, 2016). According to King et al. (2013), pathological gamers display addiction characteristics such as salience, withdrawal, tolerance, mood manipulation, loss of control, covering up, and endangering important relationships or opportunities. On the other hand, Brunborg et al. (2014) reported that gaming addiction is correlated to sleep disturbance, eating disorders, weariness and physical strain, emotional disorders, obesity, social isolation from peers and family members as well as social incompetence in daily interactions with others. In addition, a local study by Nik Jaafar et al. (2021) claimed that youths who are diagnosed with IGD exhibit dysfunctional beliefs regarding their gaming behavior, which include an overemphasis on gaming incentives and gaming identities which are also known as the formation of self-esteem management via gaming, and indeed the acquisition of social acceptance from the digital reality. It is known that there is no article focusing on the impacts

of IGD specifically on MOBA gamers. As such, the importance of studying IGD among MOBA gamers could not be overlooked.

Despite knowing the rise of Internet gamers in Malaysia, there is still a lack of studies focusing on IGD, its prevalence, and its determinants in this community. Research done by Allen and Anderson (2018) investigated the predictive effects of NS and need frustration on IGD in different settings (in the real world and in video games), with self-control and gaming motivations acting as the mediator in between. However, the research was conducted in a Western context, which would not be fully applicable in our community. Focusing on local studies, a meta-analysis conducted by Fam (2018) has included 16 studies that focus on the prevalence of IGD among adolescents across three decades. However, no Malaysian context study has been selected. Furthermore, the effects of online gaming on undergraduates have been evaluated by Abdul Latif et al. (2017), and the study only focuses on undergraduate students, and determinants of IGD such as NS are not addressed. As such, current research aims to fill in the knowledge gap by exploring the mediating effects of gaming motivations (e.g., IM, EM, and AM) on the predictive effect of NS towards IGD, specifically in Malaysian youth who are MOBA gamers.

In this current study, we apply gaming motivation (e.g., IM, EM, and AM) as the mediator in the relationship between NS and IGD among MOBA gamers. We have adopted components of gaming motivations from SDT, which included IM, EM, and AM (Ryan & Deci, 2000; 2017). Although there are several studies which focused on gaming motivations as an underlying factor of IGD, the structure of theory used is different with present study (Dauriat et al., 2011; Kwok & Khoo, 2011). For instance, according to Dauriat et al. (2011), the researchers have applied motivation which incorporates the dimensions of (1) achievement, (2) social as well as (3) immersion, and they are focusing on MMORPG gamers. On the other hand, the study of Kwok and Khoo (2011), focused on motivations

based on both SDT and Yee's player orientations, specifically on MMO players. This evidence shows that it is vital to fill in the gaps.

Research Questions

Q_1: Does NS positively predict IGD?

Q_2: Does IM negatively predict IGD?

Q_3: Does EM positively predict IGD?

Q_4: Does AM positively predict IGD?

Q_5: Does IM work as a mediator in the prediction of NS on IGD?

Q_6: Does EM work as a mediator in the prediction of NS on IGD?

Q_7: Does AM work as a mediator in the prediction of NS on IGD?

Research Objectives

1. To investigate the predictive effects of NS on IGD.
2. To investigate the predictive effects of IM on IGD.
3. To investigate the predictive effects of EM on IGD.
4. To investigate the predictive effects of AM on IGD.
5. To investigate the mediating effects of IM on the prediction of NS on IGD.
6. To investigate the mediating effects of EM on the prediction of NS on IGD.
7. To investigate the mediating effects of AM on the prediction of NS on IGD.

Hypotheses

H_1: NS positively predicts IGD among MOBA gamers in Malaysia.

H_2: IM negatively predicts IGD among MOBA gamers in Malaysia.

H_3: EM positively predicts IGD among MOBA gamers in Malaysia.

H_4: AM positively predicts IGD among MOBA gamers in Malaysia.

H_5: NS on IGD is mediated by IM among MOBA gamers in Malaysia.

H_6: NS on IGD is mediated by EM among MOBA gamers in Malaysia.

H_7: NS on IGD is mediated by AM among MOBA gamers in Malaysia.

Conceptual Definition

Internet Gaming Disorder

It is identified as consistently and repeatedly involved in playing video games which may often result in significant impairments towards one's daily, work, and/ or education progress, and APA had suggested that this tentative psychiatric disorder required deeper study on it (American Psychiatric Association [APA], 2013; Schivinski et al., 2018).

Needs Satisfaction

Basic Psychological Need Satisfaction (BPNS) was explained under SDT, and it is identified as the motivating factor that is essential in directing one's behavior to achieve optimal performance and well-being (Deci & Ryan, 2000; Tiwari & Garg, 2019). The theory consists of three components which are the need for autonomy, the need for competence, and the need for relatedness (Chen et al., 2014).

Gaming Motivations

It is identified as the drive that initiates people to play games (Billieux et al., 2015; Brand et al., 2019). According to SDT, motivation can be classified into three different types which are IM, EM (e.g., IM, EM, and AM) and AM (Lafrenière et al., 2012).

Intrinsic Motivation. It is identified as one's urge to perform certain actions internally due to own curiosity, pleasure, and enjoyment rather than other consequences (Gomez et al., 2022, Johannes, 2021).

Extrinsic Motivation. It is identified as one urge to engage in activities in order to achieve other consequences rather than for its own sake. (Gomez et al., 2022, Johannes, 2021).

Amotivation. It is identified as the absence of both IM and EM when carrying out a certain action (Lafrenière et al., 2012; Oudeyer& Kaplan, 2007).

Operational Definition

Internet Gaming Disorder (IGD)

To assess the prevalence of IGD, Pontes and Griffiths (2014) developed the Online Gaming Disorder Scale-Short Form, often known as IGDS9-SF. On a Likert scale ranging from 1 (never) to 5 (very often), the 9-item questionnaire is assessed, and the higher the aggregate score signifies the greater the extent to which respondents exhibit IGD symptoms.

Needs Satisfaction

Chen et al. (2014) created the Basic Psychological Need Satisfaction and Frustration Scale (BPNSF) to evaluate individual perceptions of NS and frustration, The scale comprises four items for each of the six subscales. The items are rated on a 5-point Likert scale of 1 to 5 (completely disagree to completely agree), with a higher total score indicating greater satisfaction or frustration with a particular psychological criterion, such as autonomy, competence, and relatedness.

Gaming Motivations

To determine individuals' level of motivation in participating in video gaming activities, Lafrenière et al. (2012) created the Gaming Motivation Scale, often known as GAMS. The 24-item scale is scored on a 7-Likert scale, ranging from 1 (do not agree at all) to 7 (very strongly agree). There are a total of three subscales, which include IM, EM and AM. IM refers to a person's innate desire to do something, while EM comes from external

influences, such as integrated regulation, identified regulation, introjected regulation, and external regulation as well as AM refers to a person lacking volitional drive to engage in any activities. The greater the overall score signifies the greater the frequency at which the motivating component is being used.

Significance of Study

Theoretical Significance

SDT postulates that the presence of three basic psychological needs—specifically, autonomy, which is defined as the need to experience preference and allowed to select, competence, which refers to the need to feel efficacious or a sense of control and relatedness, which refers to the need to feel very connected with substantial others—is necessary for individuals to establish their fullest potential and accomplish emotional development. Because the SDT is such a flexible theory, it has been implemented in a great number of different study fields (Oudeyer and Kaplan, 2007). People who have satisfied their psychological needs are more likely to report high levels of interpersonal well-being and lower levels of psychopathology, such as IGD. There is a wealth of evidence from the scientific community that supports this hypothesis (Sheldon and Gunz, 2021), in a recent refinement of SDT, suggested a new construct that they referred to as need frustration or discontent. This concept is linked to, but distinct from, the concept of need (Oudeyer and Kaplan, 2007). According to this theory, individuals are driven to learn new things and improve themselves by three fundamental psychological demands that are shared by all people. The idea of engaging in activities because of the inherent benefit that comes from the conduct itself is referred to as IM, and it plays a significant role in this theory.

Practical Significance

The detrimental effects of IGD on both young people and adults drew our attention as the prevalence of playing video games online continues to rise. Previous research utilizing the SDT has investigated the implications that the three fundamental psychological demands of autonomy, competence, and relatedness have on troublesome video game playing among young people in Malaysia. However, as more evidence surfaced pointing to the possibility of a relation between need discontentment and higher weakness for ill-being and psychiatric problems, the present study sought to incorporate the impacts of both agreement and disagreement for autonomy, professionalism, and close relationships in trying to explain IGD, a condition that may in turn, hinder hedonistic well-being as demonstrated by flourishing (Abdul Latif et al, 2017). Considering the fact that the vast majority of users engage in the usage of the internet on a daily basis the prevalence of IGD as increased to the point that it is no longer rare.

First, the results of this research help readers better understand IGD via the viewpoint of SDT. This, in turn, enables readers to have a clearer picture of the motivations that drive an individual to play online games. Secondly, the results of this research assist to bridge a gap in the existing body of knowledge, either for academic research or for the benefit of the general public regarding the potential role of gaming motivations playing as a mediator in the prediction of NS on IGD which allows for the knowledge gaps in these particular areas to be filled up. Thirdly, the findings of the study may be incorporated into clinical practice (Cheng et al, 2018). The general population, particularly the younger generations, may consider gaming to be an integral part of their daily routines. Nevertheless, the monotonous aspect of playing computer games might not get a significant amount of attention, particularly in the context of Malaysia.

In view of this, the empirical findings of the current study may serve as a steppingstone in the establishment of comprehensive therapeutic approaches or awareness campaigns to assist those who are struggling with the negative impacts of IGD. Lasty, the findings of this research might be helpful to individuals from all walks of life and organizations who are involved in the process of putting intervention programs into action (Cheng et al, 2018). These stakeholders include parents, educators, clinical psychologists, and policymakers have the potential to mitigate the negative consequences that are caused by IGD. In addition, gamers from the general community might use the findings of this research to increase their awareness of their own gaming behavior or, in some circumstances, to seek the support of a professional to overcome personal issues.

Chapter II

Literature Reviews

Conceptualizing on IGD

Referring to DSM-5, nine criteria have been included in IGD and an individual must meet at least five criteria over the preceding twelve months or within a year for a diagnosis (APA, 2013). The first criterion for IGD is a fixation with internet games, which indicates that a person's thoughts are dominated by internet games. Withdrawal symptoms are the second criterion. This indicates that a person may experience unpleasant emotions, such as melancholy, worry, or impatience if internet gaming is restricted from them. For the third criterion, tolerance in IGD refers to the notion that an individual will spend an increasing amount of time playing Internet games to obtain pleasure or fulfillment.

The fourth criterion is lack of control, which reveals an individual's futile attempts to minimize or quit internet gaming. The subsequent criterion will be interest loss. This refers to a person losing interest in past hobbies and other forms of enjoyment due to Internet gaming. The sixth criterion mentioned in IGD is that a person continues to engage in excessive internet gaming while being aware of the detrimental effects that internet gaming would have on him or her. The subsequent criterion would be deception. It refers to an individual's tendency to mislead others, for instance, family members and therapists, regarding the extent of internet gaming he or she has been involved in. Next, the eighth criterion for IGD is the intent to avoid or alleviate undesirable sentiments, emotions, or moods such as helplessness, remorse, or anxiety by engaging in internet gaming.

The last criterion of IGD includes jeopardizing or abandoning an important relationship, work-life, academics, or career opportunity because of internet gaming. This suggests that IGD can lead to failure in school or college, a failed marriage, or the loss of

employment because problematic gaming behavior can have a negative impact on one's everyday routine, which includes work or education, social, relationship, and family (APA, 2013).

Conceptualizing on Need Satisfaction

Decades of study demonstrate the importance of NS for the value of motivation, development, functioning, and physical and emotional well-being in all realms of life (Ryan and Deci, 2017). Under SDT, psychological need is defined as a psychological nutrient that is necessary for an individual to adjust, to grow and own integrity (Ryan, 1995). There are three conditions underlying NS which include autonomy, competence, and relatedness. First, autonomy is the notion that one can govern one's thoughts and behaviors when performing a given activity; competence is the notion in one's own capabilities and capacity to succeed; and relatedness is the feeling of being attached to others.

Conceptualizing on Gaming Motivations

Gaming motivations are referred to as the urge that initiates one to play games are often explained by SDT. Past research had linked gaming motivations with various variables such as game genres, self-control, and personality (Carlisle et al., 2019).It can be categorized into IM, EM and AM. IM is the urge to perform certain actions internally due to own curiosity, pleasure, and enjoyment rather than other consequences while EM is the urge to engage in activities in order to achieve other consequences rather than for own sake. EM can be divided into four subtypes which are externally regulated which refers to the behaviors performed regulated through external means, introjected regulation refers to the behaviors performed are regulated through internal pressure, identified regulation refers to behaviors

performed regulated through personal importance and integrated regulation refer as behaviors performed are regulated through a sense of self (Lafrenière et al., 2012).

SDT proposed that gaming motivations will motivate gamers to fulfil their autonomy, relatedness, and competence needs. It is found that most people play games to satisfy their needs mentioned as autonomy needs are achievable when playing with games that are flexible over movement and strategies, choice over tasks and goals, relatedness needs are achievable when they are playing multiplayer games as team formation and cooperation is needed in order to win the game as well as competence needs are achievable when playing games that can acquire new skills or abilities, optimally challenged, or receiving positive feedback (Ryan et al., 2006; Uysal & Yildirim, 2016).

NS and IGD

NS is a predictor of how much an individual likes playing games. The more effectively a game meets the satisfying needs, the more entertaining it is (Tamborini et al., 2010). According to Celik et al. (2022), the feeling of control in the game can help in meeting the need for autonomy, the need for connectedness, as well as the challenge to grow. On top of that, a notion stated that exorbitant gaming may be best addressed as a (feasibly maladaptive) coping mechanism instead of an addiction, with individuals utilizing video games to reimburse for or flee from hardships in their daily lives (Kardefelt-Winther, 2014, 2017; Schimmenti & Caretti, 2010). Allen and Anderson (2018) have supported this notion by mentioning that when an individual's unfulfilled need for satisfaction in their daily life could be easily satisfied by online games, then excessive use may arise.

Past studies show that NS in different contexts would have different effects on IGD (Allen & Anderson, 2018; Bender & Gentile, 2020). According to Bender and Gentile (2020), as NS in video games exceeded the NS in reality, IGD scores rose. This is supported

by Rigby and Ryan (2011), who mentioned that the need-density hypothesis suggests that compulsive gaming is more likely to arise when the fulfillment of three fundamental human needs (e.g., autonomy, competence, and relatedness) is low in real-life but high in virtual gaming. Surprisingly, when the actual world NS is high, IGD scores are rather low, regardless of NS in internet games (Allen & Anderson, 2018). This indicates that a high level of NS in the real world may be adequate to prevent the emergence of IGD. Looking at the subscale level, the research reveals that satisfaction of relatedness needs towards games as well as the satisfaction of autonomy needs in daily life best explained the impacts of NS on IGD (Bender & Gentile, 2020).

NS and Gaming Motivations

SDT offers a theoretical framework for comprehending the factors that compel people to engage in, commit to and persevere in a particular activity. Particularly, the sub-theory of SDT known as cognitive evaluation theory (CET) relates motivation to the fulfilment of three fundamental psychological needs, namely autonomy, competence, and social relatedness. (Ryan et al., 2006).

NS in video games has been linked to a variety of good effects, including increased playtime and feelings of contentment (Kosa & Uysal, 2021). However, recent research has shown that fulfilling one's needs through video games may predict unhealthy gaming behaviors, especially if one's wants in real life are unmet. If these basic requirements are addressed, it is possible that gaming would not become a source of dysfunction in a gamer’s life (Bender & Gentile, 2020).

Intrinsically motivating activities like playing video games have been demonstrated to fulfil all three of the human mind's primary demands. Voluntary, with multiple paths to take and a visually appealing layout, these games promote independence (Cuthbert et al, 2020;

Reer & Krämer, 2020; Ryan et al., 2006). Video games allow players to feel competent because they provide opportunities to overcome obstacles while receiving reinforcement and praise (Ryan et al., 2006), and they allow players to feel linked because they often provide an atmosphere that encourages social interactions between players and non-player characters (Reer & Krämer, 2020; Ryan et al., 2006).

Gaming Motivations and IGD

Past studies have discussed the relations between gaming motivations and IGD (Beranuy et al., 2013; Hussain et al., 2015; Wang & Cheng, 2020). Furthermore, there are studies that examined gaming motivations and IGD in terms of SDT (Mills & Allen, 2020; Ryan, 2006; Uysal & Yildirim, 2016). The theory mentions that the motivation to perform is due to oneself determination which can be classified into IM, EM, and AM. IM is found to be a crucial factor that leads to IGD as addicts tend to exhibit higher IM than EM when playing internet games (Erol & Cirak, 2019; Wan & Chiou, 2007). However, there is also a study by Mills et al. (2017), mentioned that EM especially introjected regulation and AM have high association with IGD. Hence, there are inconsistent findings found between gaming motivation on IGD. Some studies also examine gaming motivation on IGD with different components (achievement, socialization, and immersion) (T'ng & Pau, 2020; Wang & Cheng, 2020). Different components of gaming motivations will have different roles in the development of IGD and past study found that achievement motivation has stronger association with IGD than socialization and immersion motivation (Wang & Cheng, 2020).

Meta-analysis was carried out examining on the association between gaming motivations and IGD and findings from cross cultural comparison shows that escapism motivation under the subcomponent of immersion motivation has the strongest association with IGD especially in individualistic regions (Wang & Cheng, 2020). This was supported by

findings from Yee (2006), who indicated that escapism motivation is often found to have a moderate or strong association with IGD. On the other hand, a study by Erol and Cirak (2019), found that there are a few variables which are gender, gaming experience, and duration that will influence one's gaming motivations and their willingness to play. Limited past study were found on the mediating effect of gaming motivation on IGD which required more studies to be conducted on the mediating effect of gaming motivation in terms of SDT on IGD (Király et al., 2015).

Thus, this study is designed with the aim to study on the prediction of NS on IGD as well as also to explore on the mediating effect of gaming motivation on the predictive effects of NS on IGD.

Theoretical Framework

SDT describes human behavior and personality development by analyzing the types of motivations ranging from controlled to autonomous, as well as the innate psychological needs for competence, autonomy, and relatedness (Ryan & Deci, 2000; 2017). To put it simply, it is an influential theory that attempts to explain several types of motivation, namely IM, EM as well as AM. It is a sophisticated macro-motivational theory with six other mini theories which are cognitive evaluation theory (CET), organismic integration theory (OIT), causality orientations theory (COT), basic psychological needs theory (BPNT), goal contents theory (GCT) and relationships motivations theory (RMT), all of which share an emphasis on the interplay between behavioral context and personal ability (Ryan & Deci, 2017). In addition to that, there are also several distinct types of regulatory styles that correspond to various kinds of motivations. According to what is mentioned throughout the spectrum of self-determination, there are six different types of regulating styles (Ryan & Deci, 2000) and this will be discussed in further detail in the paragraphs that follow.

The BPNT can be explained by NS and need frustration which focuses on an individual's capacity to meet their basic psychological needs, with the expectation that would result in positive results such as improvement in both their physical and mental health (Martela et al., 2016; Mills & Allen, 2022). Autonomy, competence, and a sense of connectedness are the three fundamental psychological needs. Firstly, autonomy is the belief that one can control their behavior and thoughts when engaging in a specific task; competence describes the confidence in one's own abilities and capacity to succeed; relatedness is the sense of connectedness towards others.

As mentioned previously, SDT focuses on the variables that either encourage or discourage an individual's motivation, which can be either IM, EM, or AM (Ryan et al., 2006; T'ng et al., 2022). In the research of Ryan and Deci (2000), the term IM refers to an individual's innate predisposition to seek out challenges, explore new and unfamiliar things, and increase their level of knowledge through the process of learning. It is possible to see it as the person engaging in games in order to meet his or her own innate satisfaction. Similarly, to participating in sports, the majority of gamers do not obtain incentives or recognition for their gaming behavior. Not to mention, most players must pay a fee to compete, despite the possibility of being disqualified (Ryan et al., 2006). Thus, individuals play these games mainly because they are entertaining or to put it in another way because they are "intrinsically gratifying", which drives gamers to engage in gameplay.

EM, on the other hand, refers to the inclination to accomplish activities when one is compelled to do so by external factors or incentives (Lafrenière et al., 2012; Legault, 2016). Take for example, an individual who plays the game with the goal of getting to the greatest possible rank within the game. EM has been analyzed from a multifaceted viewpoint, with the degree of internalization serving as a variable, using SDT as the theoretical base. According to Ryan (1995), the term "internalization" refers to the process by which an

individual turns a regulation that was originally imposed by external sources into one that is personally accepted by the individual. As mentioned in the first paragraph of the literature review, there are six different types of regulatory styles in total.

According to the theory put forward by Lafrenière et al. (2012), there are four distinct types of EM. To begin with, there is the concept of external regulation, in which a person's behavior is controlled by factors that are external to themselves, such as benefits or rewards. The second kind of regulation is known as introjected regulation, in which behavior is controlled by internal influences such as shame and anxiousness. Thirdly, identified regulation, which is a behavior that is conducted by persons in which they see its purpose or its relevance to personal objectives even while the action does not provide them with enjoyment. Last but not least, would be integrated regulation, which describes a cohesive aspect of one's own internal organization. The regulation eventually becomes ingrained in an individual's routine functioning and sense of who they are as an individual. To further illustrate, there are players who participate in the activity because it complements their other aspirations in life. For instance, a player transitions him or herself into a game developer (T'ng et al., 2022).

Another important point to keep in mind is that Deci and Ryan (1985) have proposed a third component of motivation, which they called AM. When individuals are amotivated, they do not see any connections between the behaviors they engage in and the results those behaviors produce. A lack of drives in life is known as AM, and it suggests that an individual blames the results of their actions mostly on chance or on circumstances that are outside of their reach owing to intense feelings of inadequacy (Ryan & Deci, 2017). In terms of regulatory styles, the distinction between the two is that the regulatory style of IM is known as "intrinsic regulation", whereas the regulatory style of AM is identified as "non-regulation" (Ryan & Deci, 2000).

Conceptual Framework

In this current study, NS is hypothesized as the determinant of IGD. Additionally, gaming motivations act as a mediator in the predictive effect of NS on IGD in this study. We hypothesized that (1) NS, EM and AM positively predicts IGD, (2) IM negatively predicts IGD and (3) the predictive effects of NS on IGD are mediated by gaming motivations among MOBA gamers.

The BPNT is also known as a micro-theory of SDT. It consists of three innate psychological needs such as autonomy, competence, and relatedness, which have been mentioned at the heart of this theory (Ryan & Deci, 2017). Additionally, both need frustration and NS are considered under the BPNT theory. The results of past research indicate that playing digital games positively contributes to an individual's fulfillment of one ‘s three aforementioned needs (Ryan et al., 2006; Uysal & Yildirim, 2016). This is achieved by creating higher levels of enjoyment and immersion, as well as the desire to play again in the future. This is supported by a study done by Rigby and Ryan (2011), where they mentioned that games are designed to be optimally difficult for the players (fulfilling competency needs); provided gamers a great deal of control over their endeavors in the game (fulfilling autonomous need); as well as fostered social bonds with either the in-game characters or with real-world people (fulfilling relatedness need). To elaborate, the degree to which one’s fundamental psychological needs have been met has a substantial impact on his or her motivation to engage in any activity. As such, internet gaming is a platform that provides a readily available approach to satisfying all three needs (Anderson et al., 2017).

The micro-theory is founded on the general idea that fulfillment of basic psychological needs and greater IM keep young people more inclined to engage in beneficial physical exercise (Teixeira et al., 2012). However, a recent study revealed that IGD scores soared when one’s need for satisfaction in video games overtook the satisfaction of need in

the actual world (Allen & Anderson, 2018). As such, the need-density hypothesis predicts that pathological gaming would be most prevalent when a large disparity appears between NS in the actual world and in virtual games, and it is supported by findings from quantitative studies (Rigby & Ryan, 2011; Wan & Chiou, 2007).

According to SDT, NS and gaming motivations are potentially influential variables in the establishment of addictive behaviors such as IGD (Wu et al., 2017). As mentioned in this theory, IM, EM, and AM are variables that could potentially affect one's engagement in a particular activity (Ryan & Deci, 2000; 2017). IM is the desire of an individual to involve in an activity because of one's enjoyment; EM is one's desire to engage in an activity due to external pressures, while AM refers to one's engagement in an activity without knowing the reason.

According to recent studies (Martela et al., 2016; T'ng et al., 2022), NS will develop when an individual possesses the competency to regulate their behavior and thoughts while completing a specific task (autonomy satisfaction), the competency to succeed with own ability (competence satisfaction), and the competency to feel connected from others (relatedness satisfaction). Meanwhile, according to the findings of Ryan and Deci (2017), NS develops more autonomous forms of motivation, for instance, IM. Past studies (Gomez et al., 2022; Wan & Chiou, 2007) have also demonstrated that game addicts exhibit greater levels of IM over EM since it is the primary motivator for IGD, particularly when preoccupation or escape criteria are presented throughout the gaming process. As a result, they will be more inclined to play repeatedly due to their desire to fulfill their innate satisfactions.

Further, EM has been found to be strongly associated with IGD, particularly in individuals who struggle with exercising self-control (Jordalen et al., 2018; Mills et al., 2017). Some of the EM like tension release, social approval and external regulation by in-game rewards will facilitate the urge to spend time longer playing games and it is found that

playtime has a negative relation with well-being (Johannes, 2021; King & Delfabbro, 2009). The ongoing research, which makes use of the theoretical framework provided by SDT literature, aims to investigate how different gaming motivations and the degree to which an individual satisfies three fundamental psychological needs all play a part in the development of IGD, which, in turn, undermines an individual's capacity to function psychologically.

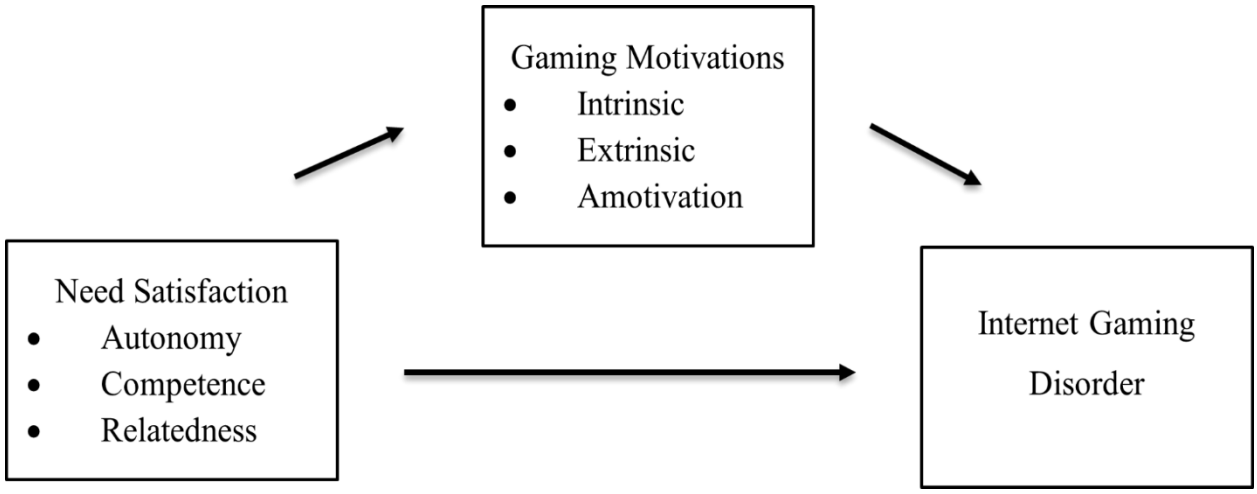


Figure 1. Conceptual framework of the present study.

Chapter III

Methodology

Research Design

Cross-sectional design was applied by the present study to understand the prediction of NS, IM, EM and AM on IGD and the mediating effects of gaming motivation (e.g., IM, EM, and AM) on the prediction of NS on IGD among MOBA gamers in Malaysia. Cross-sectional studies are observational in nature, examining the collected data from a population at a given moment, with respondents drawn from a population with evident relevance to the research question (Wang & Cheng, 2020). Furthermore, this research design is suitable to determine the prevalence of a condition or a disorder which suits for this study on determining the prediction between NS and IGD (Wang & Cheng, 2020).

Moreover, this research design allows researchers to gather a large amount of information on all the variables at one point of time which includes respondents' general gaming behaviors and patterns, such as the frequency of gaming, the time of gaming each week, and the years of gaming experience (Setia, 2016). Furthermore, this method is relatively efficient and economical to implement as this research design often utilizes self-report questionnaires for the purpose of data collection as it enables researchers to collect a significant quantity of data in a manner that is both more accessible and inexpensive (Setia, 2016; Vega et al., 2021). Due to limited time allocated for gathering the required data, it would be advantageous to hasten the procedure of this study.

The current study used quantitative research approach to gather all the data. This method allows researchers to conduct systematic research on a phenomenon by collecting measurable data and employing statistical, mathematical, or computational tools (Apuke, 2017). Self-reported online survey was created and distributed to all participants who met the criteria for data collection. According to Wu et al. (2022), their study demonstrated that

distributing surveys to a well-defined and focused population improves the online survey response rate. Quantitative research approach allows the study to be conducted more efficiently as this design enables the researchers to identify the necessary participants effectively online through the Internet and participants who fulfilled several criteria were recruited by the researchers through social media platforms such as Instagram, Facebook, and WhatsApp.

Sampling Method

Data collection in this study was carried out by using a nonprobability sampling technique as this method is well suited for research with exploratory nature (Daniel, 2011). Data collection process was challenging as the population size of MOBA games were hard to identify as MOBA gamers are identified as hard-to-reach populations due to gameplay are usually often conducted in non-public settings and anonymously (T'ng et al., 2022). According to Atkinson and Flint (2001), hard-to-reach populations are defined as the subgroups that are hard to reach due to geographical constraints, population accessibility, spatial distribution as well as the wish to not be easily contacted by others. Homogenous purposive sampling under nonprobability sampling were used to recruit participants as this sampling method allows the determination of specific quality of the research respondent via establishing inclusion criteria; while rejecting undesirable qualities of the respondents by enacting exclusion criteria that may pose a contamination risk to the data collected as well as improving the internal validity by controlling extraneous variables. The advantages of purposive sampling method are low recruiting costs, allow selected participants to have the same characteristics and traits so that research question that specific with the characteristics of the particular group can be examined in detail, eliminates all the variation in one or more sociodemographic factors (Bornstein et al., 2013; Rai & Thapa, 2015).

The steps in selecting a purposive sample in this study were (1) defined the target population which was MOBA gamers, (2) identified the targeted sample with certain inclusion and exclusion criteria (refer following subtopics for detailed informed), (3) created a plan to recruit the selected population by posting online survey in various randomly selected Facebook groups of MOBA games, (4) determined the sample size (refer following subtopics for detailed informed) and (5) selected the targeted number of population elements based on the specific inclusion criteria.

Sample Size

The target participants of this study were active MOBA gamers age ranging between 18 and 29 years old who possessed at least one year of MOBA gaming experiences in Malaysia. The sample size was calculated by using the Monte Carlo power analysis as Monte Carlo power analysis was the most recommended practice to assess on power and sample size with meditation models (Muthen & Muthen, 2002; Thoemmes et al., 2010). Each of the powers was obtained from the Monte Carlo power analysis by referring to the standard deviation and sample correlation from past studies (Hulaj et al., 2020; Liang et al., 2021; Neys et al., 2014; Mills & Allen, 2020) (see Appendix A). The setting for Monte Carlo power analysis were set to “one mediator for model”, “Set Power, Vary N for objective”, “95 for Target Power”, “100 for Minimum N ”, “500 for Maximum N” , “1 for Sample Size Steps”, “1000 for # of Replication, “20000 for Monte Carlo Draws per Rep”, “1234 for Random Seed” and “95% for Confidence Interval” to generate the sample size (see Appendix A). The sample size suggested for IM would be 142, EM would be 136 and AM would be 218. The suggested minimum sample size was calculated by averaging the three suggested sample sizes for IM, EM and AM. The averaged sample size was 165 participants, and the present study was suggested to have an additional 50% participants to deal with outliers and straight-

lining effect responses as online surveys may lead to a high number of outliers. Therefore, the minimum sample size suggested for this study was 255 MOBA gamers in Malaysia.

Participants

Participants were recruited according to the inclusion criteria which consists of (1) MOBA player, (2) at least 12 months or one year of MOBA gaming experiences, (3) Malaysian, (4) nonprofessional gamers, (5) aged between 18 and 29 years old. The MOBA games that were included in current study are DOTA 2, League of Legends, Honor of Kings, Mobile Legend and Pokémon Unite.

Location

This research was conducted in Malaysia and the research location was held on social media platforms such as MOBA gaming groups on Facebook (see Appendix D).

Instruments

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

IGDS9-SF is a brief psychometric instrument that contains nine core criteria to determine IGD in accordance with the DSM-5 (APA, 2013; Pontes & Griffiths, 2014). The primary objective of this instrument is to evaluate the severity and associated negative repercussions of the gamer's life occurring over a twelve-month period rather than diagnosing IGD.

The scale includes nine items (i.e., “Do you feel preoccupied with your gaming behavior?”, “Do you feel more irritability, anxiety or even sadness when you try to either reduce or stop your gaming activity?”, “Do you feel the need to spend increasing amount of time engaged gaming in order to achieve satisfaction or pleasure?” etc.). The nine questions

are evaluated on a 5-point Likert scale ranging from 1(*never*) to 5(*very often*) (see Appendix B).

IGD total score is calculated by summing up the scores of each item and overall score will be ranging from 9 to 45, with higher score indicating higher level of IGD symptoms. The Cronbach's alpha score for IGDS9-SF was .81 which indicates high internal reliability (Pontes & Griffiths, 2014). In current study, IGDS9-SF is found to have a very good internal reliability of Cronbach's alpha (α = .844) (see Appendix C).

Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS)

The BPNSFS is a self-report instrument with twenty-four items that assess on the satisfaction and frustration of the three psychological needs in one's life in general (i.e., autonomy, competence, and relatedness), in which there are total of eight items in each subscales (e.g., "I feel a sense of choice and freedom in the things I undertake", "I feel close and connected with other people who are important to me, "I feel I can successfully complete difficult tasks") (Bender & Gentile, 2020; Chan et al.,2014; Scerri et al., 2019) (see Appendix B).

The items are assessed using a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The higher the total score, the greater the individual's satisfaction with a certain psychological need (i.e., autonomy, competence, and relatedness). Recent study done by Mills et al. (2020), revealed that the BPNSFS scale had a relatively high reliability score, with Cronbach's alpha value of .904 to .922. In current study, BPNSFS possessed Cronbach's alpha (α = .796) which indicated a good reliability (see Appendix C).

Gaming Motivation Scale (GAMS)

GAMS was developed to evaluate on IM, integrated, identified, introjected, and external regulation, as well as AM, in accordance with SDT with the intention of understanding why players participate in game play (Lafrenière et al., 2012).

The questionnaire consists of a total twenty-four items (e.g., “Why do you play to video games?”), and a total of three subscales. The 3-item subscales assess perceived in-game autonomy (e.g., ‘‘I experience a lot of freedom in video games’’), competence (e.g., ‘‘I feel very capable and effective when playing video games’’), and relatedness (e.g., ‘‘I find the relationships I form with other players important’’). The 24-item scale is rated based on a 7-point Likert scale ranging from 1 (*do not agree at all*) to 7 (*very strongly agree*) (Lafrenière et al., 2012) (see Appendix B). The greater the overall score signifies the greater the frequency at which the motivating component is being used. Past study reported that the scale was found to be reliable, with Cronbach’s alpha ranging between the value of .75 to .89. (Lafrenière et al., 2012). In present study, GAMS obtained Cronbach’s alpha (α = .848) which demonstrated a very good reliability (see Appendix C).

Research Procedures

Online questionnaires including informed consent and the personal data collection form to secure participant’s voluntary participation were created using Qualtrics and were approved by Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman (UTAR) before the commencement of distribution. Informed consents were included in the first page of the survey to confirm that each participation happened voluntarily, and all the participants were informed that all their personal information were kept privately and confidential. Next, this survey included demographic information as well as all the instruments IGDS9-SF, BPNSFS and GAMS. The researchers shared survey poster with Qualtrics link QR code on electronic platforms such as WhatsApp, Instagram, and Facebook. Facebook groups or page included were 王者荣耀—马来西亚, DOTA 2 Malaysia ⎪Players✔, Dota 2w 大马华人玩家群(D2CM), Mobile Legends MOBA (Malaysia), Pokémon Unite [Malaysia], POKEMON UNITE MALAYSIA, [OFFICIAL COMMUNITY]

League of Legends, MOBILE LEGENDS MALAYSIA, Mobile Legend Malaysia, Malaysia League of Legends, DOTA 2 Malaysia, , Pokémon UNITE 宝可梦大集结(马来西亚), Mobile Legends- MOBA Malaya, Mobile legends 马来西亚华文群组 and Malaysia Mobile Legends (see Appendix D). After data collection, the following stage would be data analysis where the researchers examined the analysis using SPSS, the Statistical Package for Social Science. After the data collected was cleaned, normality assumption tests, descriptive statistics, multiple linear regression tests as well as Hayes PROCESS macro model 4 were carried out accordingly.

Pilot Test

Pilot study was carried out to evaluate the adequacy of researchers' planned methods and procedures before proceeding with the actual data collection (Polit & Beck, 2017). According to Hertzog (2008), the suggested sample size for pilot study with a single group is recommended being in the range of 20 to 25 participants. The present study had collected a total of 365 respondents However only 91 responses are valid for examining the reliability of the instruments. According to Hair et al (2003), alpha coefficient range 0.8 to <0.9 is considered as a very good strength of association. Each instrument was found with at least .80 reliability which allowed the actual study to proceed with fulfilling reliability standards (see Appendix C).

Data Analysis

Data Cleaning

This process was conducted to improve the quality of data collected by identifying and removing mistakes and inaccuracies. According to Ridzuan and Zainon (2019), data cleaning aimed to guarantee that the findings will not be hindered by low-quality data as well as purport to collect data that offer the most accurate representation of the population. This

step was performed prior data analysis through examining the valid data, missing data, disqualified data, and straight-lining data.

The present study compared and cross-checked the data exported from Qualtrics as well as the ones recorded in Qualtrics to examine valid data. To guarantee an accurate data analysis, Missing data were discovered and eliminated so that the statistical power of current study is enhanced which guarantees accurate data analysis, minimizes bias and misrepresentation of responses (Kang, 2013). Then, the data set is further examined so that disqualified data that violated the requirements of current is removed. Identical or nearly equivalent responses from the same rating scale that fall under the criterion of straight-lining data were also eliminated to assure the accuracy of the data analysis (Kim, 2019).

Normality Assumption Tests

Before starting the actual data analysis, the researchers conducted a normality test to examine the fitness of our sample data into a standard normal distribution. There are a few assumptions to fulfill which include skewness and kurtosis, histogram, Kolmogorov-Smirnov test (K-S test), and quantile- quantile plot (Q- Q plot).

Skewness and Kurtosis

The degree to which a distribution is slanted to the left or right is measured as its skewness whereas curve or shape of the tails of the distribution is referring to kurtosis (Bono et al., 2019; Jammalamadaka et al., 2020). According to Garson (2012), ± 2 is the acceptable range for skewness and kurtosis values to guarantee a data set's normal distribution. Additionally, according to Kim (2013), the ideal situation is when both skewness and kurtosis values are zero.

Histogram

A visual display that shows the distribution of the observed values by using a plotted graph of histogram. A normal data distribution is illustrated by a graph with a bell-shaped distribution curve (Das & Imon, 2016).

Kolmogorov- Smirnov Test (K-S test)

K- S test is applied as sample size for current study is more than 50. It is a form of empirical distribution function test that is used to compare two sets of data (Mishra et al., 2019). When the result is non- significant ($p > .05$), it indicates a distinction between sample and population normality and a violation of normality is shown (Mishra et al., 2019).

Q-Q Plot

According to Das and Imon (2016), Q- Q plot is a method that illustrates the comparison between two probability distributions through graphics. It is a visual tool for assessing the goodness- of- fit of the observed data to a theoretical distribution (Nguyen & Nguyen, 2016). The study also mentioned that a normal distribution of a data set is shown when the quantiles of observed and expected values are plotted in almost the same area on the graph.

Descriptive Statistics

The first part of descriptive statistics is the respondents' demographic variables. It encompasses the information of age, gender, and races of the participants. These demographic variables were analyzed using both percentage and frequency whereas mean and standard deviation were utilized to analyze the variable of age. Secondly, the descriptive statistics of NS, gaming motivation and IGD were examined by using percentage, frequency, median, mean, and standard deviation.

Multiple Linear Regression (MLR)

Multiple linear regression was employed to test the assumptions of investigating the linear relationship between NS and IGD.

Multivariate Outliers and Influential Cases

It is defined as a circumstance in which when two or more data sets are combined, an extreme outcome is produced (El-Masri et al, 2021). These influential cases were detectable by computing and examining Cook's distance, Centered Leverage value and Mahalanobis distance. Cook's distance measures the overall impact of a case on a model. It helped to determine influential cases in research through summing up leverage values and residual values of each case in a set of independent variables (Boussiala, 2020). Cases with Cook's distance greater than the value of 1 are considered as potentially outliers' cases (Cook & Weisberg, 1982). Additionally, the influence of outcome variable's observed value over its predicted value is measured by Centered Leverage value. Centered Leverage value is between the range of 0 to 1, with 0 indicating no influence exerts by the case while 1 indicating a complete influence exerts by the case. By using the formula of (p+1)/n, Centered Leverage value can be calculated. "p" represents the number of predictors while n represents the sample size. Furthermore, Mahalanobis distance is used to examine the cases' distance from the mean of the predictor. When a large distance is shown, outliers can be easily revealed (Steven, 1984). In a data set with 100 samples, cases with Mahalanobis distance more than 15 are potential outliers. On the other hand, for a data set with 500 samples, cases with Mahalanobis distance more than 25 are considered as potential outliers.

Independence of Errors

The assumption assumed that all the errors appeared in the cases are independent of one another and are not correlated (Williams et al., 2013). Durbin-Watson test was utilized to

reveal the existence of independent errors. When the Durbin- Watson value falls within 1 to 3, it indicates no violation of normality assumption.

Multicollinearity

Multicollinearity is utilized to describe a condition where the independent variables in the research are interfered with one another (Shrestha, 2020). This can be tested by utilizing Variance Inflation Factors (VIF) and tolerance. In terms of VIF, it was utilised for the identification of the rise in the variances of the values of the predictive variables that is induced by an increase in the standard error; whereas tolerance is referring to the degree to which the other predictors are not able to describe the variability of an independent variable (Daoud, 2017). A value between 5 to 10 for VIF as well as a value between 0.1 to 0.2 for tolerance suggest that multicollinearity does not exist between the variables (Kim, 2019). Tolerance value more than 0.10 as well as VIF value less than 10 are known indicators of a non-violated assumption.

Normality of Residual, Linearity and Homoscedasticity, Homogeneity of Variances

According to Osborne and Waters (2002), the variance's residuals are assumed to remain constant across a distinctive combination of the predictors. A scatter plot of the standardized residuals will be used to examine homogeneity of variances. This assumption is considered as no violation when the distribution of residuals is even across the horizontal zero line.

Multivariate Normality

According to Ernst and Albers (2017), this term is referring to a set of errors that are normally distributed. A scatter plot will be used to examine multivariate normality. According to Nimon (2012), this assumption shows no violation when data is distributed evenly across the horizontal zero line.

Linearity of Residuals

This assumption assumes that there is a linear relationship between the predicted values of both residuals and dependent variables (Plonsky & Ghanbar, 2018). A scatter plot will be used to examine linearity of residuals. According to Reddy and Sarma (2015), this assumption will show no violation when the distribution of residuals is even across the straight line.

Mediational Analysis

The mediating effect of gaming motivation (e.g., IM, EM, and AM) on the prediction of NS on IGD were examined using Hayes PROCESS Model 4. According to Hayes (2017), when zero is outside the 95% bootstrap confidence intervals (CI), the mediating effect is considered significant.

Chapter IV

Results

Data Cleaning

Data cleaning is carried out by removing the inconsistency and errors in a data set so that the data collected can have lesser error and can better represent of the targeted population (Ridzuan & Zainon, 2019). A total of 1265 responses were collected for this study.

Valid Data

Valid data refers to data that is correctly inputted and stored. Incorrectly inputted data may lead to severe problem in either short or even long term and it will bring effects on the variance of a continuous variables (Mullooly, 1990). Raw data from Qualtrics were downloaded and exported into SPSS SAV file, all data were manually compared and cross-checked. 712 respondents who completed the survey less than 600 seconds or more than 10000 seconds are identified and were dropped. After removing the invalid data, 553 respondents were served.

Missing Data

Data value that is missing from an instrument of interested variable will reduces the statistical power, causes bias in the estimation of parameters, reduces the representativeness of sample, and complicates the analysis of study which can lead to affecting the validity of trails and invalid conclusions (Kang, 2013). In this stage, nine respondents who had missing data were identified manually and removed, the sample size reserved were 544 respondents.

Disqualified Data

Data that are irrelevant with the context of researching will lead to inaccurate results and create issues. This study targeted MOBA gamers aged between 18-29 years in Malaysia with at least one year of gaming experience and demographic questions were included in the survey. 32 respondents were identified as not MOBA gamers, 10 respondents were not

belonging to the targeted age group (18-29 years old), five respondents with less than one year of gaming motivation and three non-Malaysian respondents were identified. At this stage, 495 respondents were retained.

Straight-lining Data

Data quality will reduce whenever respondents give identical scale response in answering a series of items in an instrument as it will deteriorate both reliability and validity of survey responses (Kim et al., 2018). In order to figure out straight-lining data, manual checking was carried out for all responses and no straight lining data was identified in this study. Therefore, 495 respondents who had completed their responses were retained as final sample size.

Normality Assumptions

Five normality indicators which include the visual displays which are histogram and Quantile-Quantile plot as well as the numerical normality assessments which are skewness, kurtosis and Kolmogrov Smirnov test were performed to assess on the normality assumption for each variable.

Skewness and Kurtosis Tests

Skewness and Kurtosis Tests were also used to examine on the normality assumption for each variable. According to George and Mallery (2010) and Hair et al. (2022), 2 to -2 is the acceptable range for skewness and kurtosis. The findings of the current study showed that there is no violation for skewness and kurtosis assumption for all variables (see Table 4.1, Appendix E).

Histogram

Histogram was used to check the normality distribution for each variable. In current study, the histogram for IGD, NS, and AM demonstrated a symmetrical bell-shaped curve

which indicates that the data were normally distributed (see Appendix E). Meanwhile, the histogram for IM and EM also showed a normally distribution but with slightly negatively skewed which indicates that the median is greater than the mean. No violation in terms of histogram indicator was found which indicates that normality assumption testing for histogram is achieved.

Kolmogorov-Smirnov (K-S) Test

K-S test was used to assess the normality as well. Gupta et al. (2019) mentioned that the null hypothesis is accepted and considered as normally distributed when a non-significant p-value ($p > 0.05$) is presented as null hypothesis in K-S test usually refer to the data taken from normal distributed population. Results showed that the *p*-value of all variables showed a significance value with $p<0.05$ which indicates that the normality assumption for K-S test was violated (see Table 4.2, Appendix E). K-S test is an empirical distribution function (EDF) that is highly sensitive to extreme values which will show low power, therefore K-S test is suggested to not be taken into serious consideration for normality testing (Ghasemi & Zahediasl, 2012; Peat & Barton, 2005; Thode, 2002).

Quantile-Quantile Plot

Q-Q plot was used to assess on the normality assumption for each variable. In current study, the Q-Q plot for each variable presented show that majority of the values located along the diagonal lines (see Appendix E). The deviations from the diagonal lines were minimal which indicates that the normality for Q-Q plot were met.

Univariate Outliers

Boxplot analyses were used to reveal univariate outliers. In the present study, 20 univariate outliers were detected (see Appendix E). All the identified cases were not excluded as it did not influence normality of distribution and damage current study (Aguinis et al., 2013; Hecht, 1991).

Summary

This study met four out of five of the normality assumption mentioned apart from K-S test. As mentioned, K-S test has low power due to its high sensitivity to extreme values and is suggested not to seriously considered for normality testing (Peat & Barton, 2005; Thode, 2002). Therefore, it can be considered as the data set was approximately normally distributed as all the normality assumptions are met except for K-S test.

Descriptive Statistics

The final sample for this study was 495 respondent which consist of 68.1% were male *(n* = 337*)* and 31.9% were female *(n* = 158*)* with an age range of 18 to 29 years old *(M* = 23.98 , *SD* = 2.715*).*Chinese respondent accounted for 68.5%, *(n* = 339*)*, 20% were Malays *(n* = 99*)*, 10.9% were Indian *(n = 60)* and 0.6% were from other religions which include Bidayuh, Kadazan Dusun as well as mixed Chinese and Bajau *(n* = 3*)*. According to Table 4.3, 47.1% of the MOBA gamers will play games 5 to 8 times per week *(n* = 233*)* and 32.3% of them usually spent around 2 to 4 hours on MOBA games weekly *(n* = 160*)*. 38.4% of them had been playing game for around 4 to 6 years (*n* =190) (see Appendix F).

The mean score for IGD symptom variable in this study is 26.16 whereby slightly more than half of the respondents had a high level of IGD symptoms. The NS variable had a mean score of 43.27 most of the respondent had a low level of NS. Meanwhile the mean score for the IM variable is 15.03 whereby majority of the respondents had a low level of IM. The mean score for EM variable is 52.99 whereby a large sum of the respondent had a low level of EM. Finally, AM variable had a mean score of 12.67 with most of the respondent having a high level of AM.

Assumptions of Multiple Linear Regression (MLR)

Independence of Errors

The results of the Durbin-Watson test, evaluating the independence of errors in the independent variables needs satisfaction and gaming motivations were presented. A Durbin-Watson value between 1 and 3 is considered indicative of no violation of the assumption and the ideal value is 2 (Champion et al., 1998). In this case, the Durbin-Watson value of 1.787 confirmed that the assumption held, signifying that the errors were independent and were not correlated with each other.

Multicollinearity

Multicollinearity is measured by the collinearity results which includes tolerance and VIF values. According to Daoud (2017), a tolerance value greater than .10 as well as a VIF value less than 10 (Bager et al., 2017) are the indications of no violation of the assumption. With regards to these, the results reported in the table showed that all the variables exhibited low inter- correlations, and multicollinearity is not observed in the sample data (see Table 4.4, Appendix G).

Normality of Residuals, Linearity and Homoscedasticity

Referring to the scatterplot below, it shows the comparison between standard predicted value of IGD with the standard residuals (see Appendix G). The plot demonstrated an even and random distribution of residuals along the horizontal zero line. As a result, it suggested that all three assumptions which are normality of residuals, linearity and homoscedasticity are not violated.

Multivariate Outliers and Influential Cases

Case wise analysis were used to reveal the outliers existed in the data. A total of 15 cases were identified to be the outliers in the data (see Appendix G). In order to identify influential cases, Mahalanobis Distance, Leverage value and Cook's Distance were used (see

Appendix G). All outliers had Mahalanobis Distance values below 15 as well as Cook's Distance values below 1, suggesting the absence of multivariate outliers and influential cases in the sample data. However, when examining the Leverage values, it was noticed that 9 cases had Centered Leverage value that exceeded the cut- off point, .008, in this sample data. Thus, these cases show violation in the assumption of Leverage. However, all the cases can be retained since only the assumption of Leverage was violated for the mentioned cases.

Multiple Linear Regression (MLR) Analysis

The present study identified the contribution NS, EM, IM, and AM on IGD by using Multiple Linear Regression analysis. Results showed that this model is statistically significant F (4, 495) = 70.363 $p < .001$, while accounted for 36.5% of the variance (see Appendix G). Besides, NS (β= .178, $p < .001$, AM (β= .368, p <.001) and EM (β= .356, $p < .001$) were found to be significant predictors while IM (β= .041, p = .321) was a non- significant predictor of IGD (see Appendix G).

Mediational Analysis

The utilization of Hayes (2021) PROCESS Model 4 (version 4) is meant to figure out the mediating effects of EM, IM as well as AM on IGD. The present study set the number of bootstrap samples as 5, 000, while the confidence intervals was 95% according to default setting. According to Hayes (2017), if zero does not exist in the confidence interval (CI) of the indirect effect based on the bootstrap samples, it indicates a statistically supported mediation effect. Alvin and Hauser (1975) proposed two measures to calculate on the decomposition of effects in path analysis. The first measure is to calculate the ratio of indirect effect to total effect while the second measure is to calculate the ratio of direct effect to total effect with *a* representing the linkage of independent variable to mediator, *b* representing the

conditional slope linkage of mediator to outcome variable, *c* representing the total effect of independent variable to outcome variable while *c'* is the of direct effect of independent variable to outcome variable.

$$P_M = \frac{ab}{ab+c\prime} = \frac{ab}{c}$$

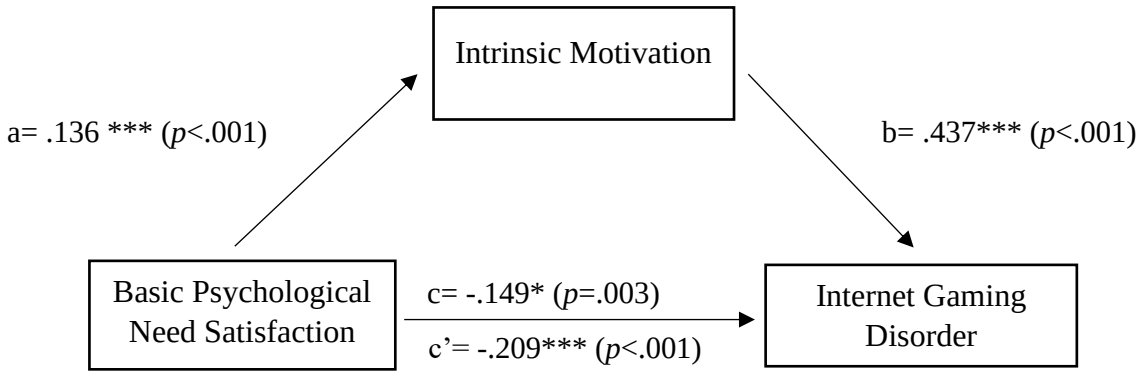
$$1 - P_M = 1 - \frac{ab}{ab+c\prime} = 1 - \frac{ab}{c}$$

NS, IM, and IGD

Referring to the results, the mediation analysis revealed that IM had a significant impact on IGD, B = .437, SE = .114, t = 3.837, p < .001, CI [.213, .660]. The direct effect of NS on IGD was statistically significant, B =-.209, SE = .0521, t =-4.009, p < .001, 95% CI [-.311, -.107]. The indirect effect of NS on IGD through IM was found to be statistically significant, B = .595, SE = .197, CI [.024, .102]. The ratio of the indirect effect to the total effect was -.399 and the ratio of the direct effect to the total effect was 1.399. Since there was no zero value between the bootstrap confidence interval, it shows that IM is a significant mediator between NS and IGD (see Appendix H). Thus, hypothesis 5 was supported.

Figure 4.22

Mediating Effect of IM on NS and IGD



Note: N = 495. Simple mediation diagram: a, b, c and c' are path coefficients representing unstandardized regression weights and *p*-value (in parentheses). The c path coefficient

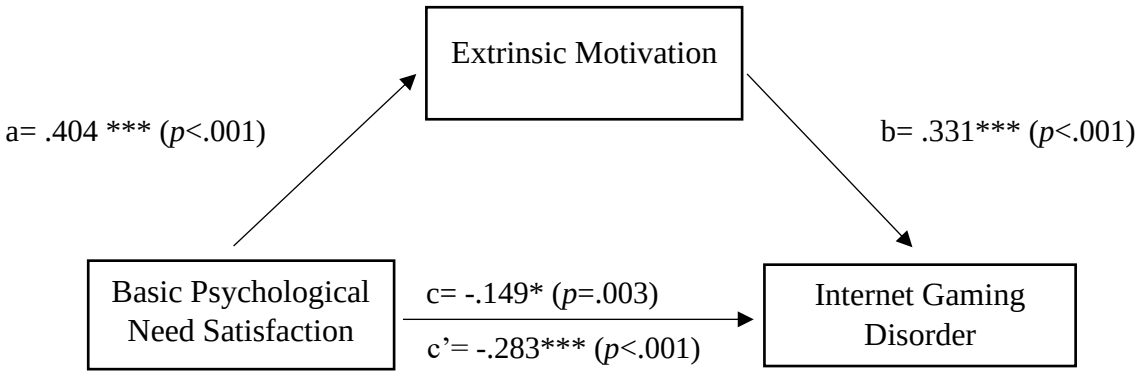
represents the total effect of NS on IGD. The c-prime path coefficient refers to the direct effect of NS on IGD. All analysed paths were significant, *$p < .05$, ***$p < .001$.

NS, EM, and IGD

Referring to the results, the mediation analysis revealed that EM had a significant impact on IGD, $B = .331$, $SE = .027$, $t = 12.306$, $p < .001$, 95% CI [.278, .383]. The direct effect of NS on IGD was statistically significant, $B = -.283$, $SE = .045$, $t = -6.222$, $p < .001$, 95% CI [-.372, -.193]. The indirect effect of NS on IGD through EM was found to be statistically significant, $B = .133$, $SE = .029$, 95% CI [.080, .193]. The ratio of the indirect effect to the total effect was -0.987. and the ratio of the direct effect to the total effect was 1.987. Since there was no zero value between the bootstrap confidence interval, it shows that EM is a significant mediator between NS and IGD (see Appendix H). Thus, hypothesis 6 was supported.

Figure 4.23

Mediating Effect of EM on NS and IGD



Note: $N = 495$. Simple mediation diagram: a, b, c and c' are path coefficients representing unstandardized regression weights and *p*-value (in parentheses). The c path coefficient

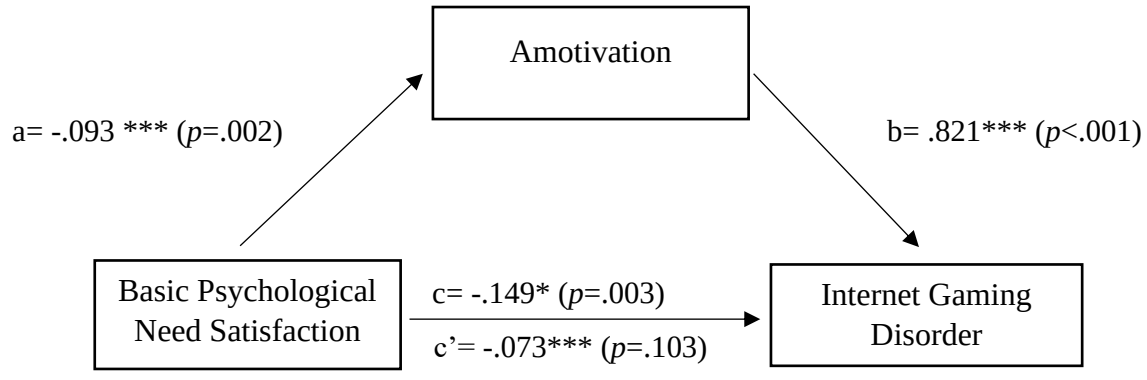
represents the total effect of NS on IGD. The c-prime path coefficient refers to the direct effect of NS on IGD. All analysed paths were significant, *p < .05, ***p < .001.

NS, AM, and IGD

Referring to the results, the mediation analysis revealed that AM had a significant effect on IGD, B = .821, SE = .067, t = 12.223, p < .001, CI [.689, .953]. The direct effect of NS on IGD was not statistically significant, B = -.073, SE = .045, t = -1.635, p > .05, 95% CI [-.161, .015]. The indirect effect of NS on IGD through AM was found to be statistically significant, B = -.076, SE = .030, 95% CI [-.135, -.019]. The ratio of the indirect effect to the total effect was .512 and the ratio of the direct effect to the total effect was .488. Since there was no zero value between the bootstrap confidence interval, it shows that AM is a significant mediator between NS and IGD (see Appendix H). Thus, hypothesis 7 was supported.

Figure 4.24

Mediating Effect of AM on NS and IGD



Note: N = 495. Simple mediation diagram: a, b, c and c' are path coefficients representing unstandardized regression weights and p-value (in parentheses). The c path coefficient

represents the total effect of NS on IGD. The c-prime path coefficient refers to the direct effect of NS on IGD. All analysed paths were significant, $*p < .05$, $***p < .001$.

Summary of Findings

Table 4.7

Summary of Results

Hypothesis	Decision
H1. NS positively predicts IGD among MOBA gamers in Malaysia.	Not Supported
H2. IM negatively predicts IGD among MOBA gamers in Malaysia.	Not Supported
H3. EM positively predicts IGD among MOBA gamers in Malaysia.	Supported
H4: AM positively predicts IGD among MOBA gamers in Malaysia.	Supported
H5. NS on IGD is mediated by IM among MOBA gamers in Malaysia.	Supported
H6. NS on IGD is mediated by EM among MOBA gamers in Malaysia.	Supported
H7. NS on IGD is mediated by AM among MOBA gamers in Malaysia.	Supported

Chapter 5

Discussion

H1: NS Positively Predicts IGD among MOBA Gamers in Malaysia

The hypothesis is not supported as NS was found to negatively predict IGD. As outlined by the SDT, individuals' endeavor to meet three psychological needs which encompass the aspects of relatedness, autonomy, and competence in their life (Deci & Ryan, 2000). According to Wan and Chiou (2006), the lack of fulfilment of basic psychological needs has the potential to extend the duration of playing game and contribute to the development of (IGD). Meanwhile, based on SDT, the basic needs impart a sense of enjoyment and IM to the activities (Deci & Ryan, 2000). The basic psychological needs, as conceptualized by SDT, can likewise be fulfilled through computer games as they are intentionally crafted to cater to these three fundamental needs of the players (Rigby & Ryan, 2011).

Previous study has revealed that NS could predict IGD, specifically, individuals who did not attain a sufficient level of satisfaction in their basic needs were found to exhibit a greater likelihood of manifesting symptoms of IGD (Weinstein et al., 2017). The same study also found a reciprocal interaction between NS and IGD in which the individuals who display symptoms of IGD demonstrated a less likelihood of achieving NS in their later life, however, this will not be discussed in present study. On the other hand, according to Bender and Gentile (2020), high level of needs satisfaction within the game environment is found to relate with high level of IGD, while high level of needs satisfaction in one's overall life is associated with low level of IGD symptoms.

H2: IM Negatively Predicts IGD among MOBA Gamers in Malaysia

The hypothesis is not supported as IM was found to predict IGD non- significantly. In

contrary, previous studies found that IM is found to be a crucial factor that leads to IGD as game addicts tend to exhibit higher IM than EM when playing games (Erol & Cirak, 2019; Wan & Chiou, 2007). As proposed by SDT (Ryan & Deci, 2000; 2017), IM is driven by enjoyable and pleasant feelings derived from engaging with players' gaming experiences. In order to explain the present findings, as highlighted in CET in which it is a theory that demonstrated the effects of external environmental factors on IM, people perceive themselves as controllers who are able to control their own behaviors (Ryan & Deci, 2000).

Studies showed that individuals who apply self- control for intrinsically motivated reasons demonstrated superior performance in the future assessment as compared to those who apply the same extend of self-control for extrinsically motivated reasons (Moller et al., 2006; Muraven, 2008). As an explanation, later research indicated the existence of elevated emotions of vitality driven by IM, in which it is a positive affective state that are crucial in contributing improved self-control outcomes (Muraven., 2008). In another words, when positive affect was elevated, there was a potential rise in the mental representation of a task where it may result in a favorable outcome. This simulation which exhibited a positive viewpoint then demonstrated an augmentation in motivation and ultimately yielded enhanced performance in one's self- control.

These findings were consistent with the SDT notion which suggested that a strong IM leads to better self- regulation (Deci & Ryan, 2000). The findings of Noels et al. (2019) further supported the statement in which it was found that the stronger one's IM, the stronger the self- perceived autonomy they possessed. For further elaboration, individuals who routinely exercised self- control could develop a habitual approach to self- control tasks, which allows them to complete the undesirable activity quicker with fewer time spent to complete their decision making (Ampel et al., 2016). In this case, the present study suggested

that by having a high IM, one's self- control can be enhanced, and gaming behaviors could be possibly controlled by the individuals themselves.

H3: EM Positively Predicts IGD among MOBA Gamers in Malaysia

The hypothesis is supported. EM pertains to factors external to the activity itself that encourage participation. Currently, four subcategories were found for EM (e.g., introjected regulation, integrated regulation, external regulation, and identified regulation) (Deci & Ryan, 2000). According to Mills et al. (2018), high level of EM to gaming experiences is associated with high level of IGD. This is because in many instances, games employ a structure of extrinsic rewards that are contingent upon performance, such as commendation, progression, recognition, or rating in order to incentivize the gamers (Kang & Tan, 2014). For further elaborations, previous research has acknowledged that certain games implement diverse reward systems (such as intermittent rewards and meta-game rewards) deliberately designed to encourage players to invest more time in the game, potentially contributing to problematic gameplay (King et al., 2009; Klemm & Pieters, 2017). The above findings are related to external regulation, which was defined as one's motivation to participate in a behavior driven by external reinforcements or rewards (Deci & Ryan, 2000).

Furthermore, in terms of introjected regulation, one often engaged in gaming behavior due to the presence of uneasiness or restlessness when they refrained from participating in playing games, in which the symptoms such as mood alteration, withdrawal and tolerance were aligned with IGD (Lafrenière et al., 2012). According to Koestner and Losier (2002), introjected regulated individuals' goals were often accompanied by sense of guilt as well as persistent efforts to maintain a delicate condition of self-esteem. Beard and Wickham (2016) suggested that the gaming setting serves as a context for individuals to obtain resources that could boost their self- affirmation, and thus, increase their self- esteem. However, they

highlighted the fact that the action of depending solely on gaming environment itself presented particular problematic issues (Beard & Wickham, 2016).

As an explanation in terms of identified regulation, the individuals often decided to play games in order to gain social status or involve in social groups as they possessed goals that were established based on strict standards and personal demands (Beard & Wickham, 2016). In the context of gaming groups, it is common for aspiring players to be required to commit to playing for the same duration as their fellow team members, should they desire to attain a core position within the team. The perceived sense of duty associated with gaming frequently leads to an escalation in the duration of time playing and the experience of distress linked to gaming, neither of which are contributing factors to the development of IGD (Snodgrass et al., 2013).

Ultimately, integrated regulation closely resembles genuine IM, as it entails individuals engaging in a game out of personal desire instead of a feeling of obligation and incorporating their gaming behaviors into their overall identity (Beard & Wickham, 2016). According to Deci and Ryan (1995) and Lafrenière et al. (2012), individuals who have complete integration perceive gaming as an aspect of their own identity or as an essential component of their lives. A possible explanation is that the exposure of individuals to avatars resembling their ideal fantasy may perhaps lead to a state of confusion over their personal identity (Dunn & Guadagno, 2012). According to Neys et al. (2014), it is conceivable that as gaming progressively integrates into an individual's sense of self, there is a higher probability of exhibiting a tendency to persist in engaging with games, thus, lead to IGD.

H4: AM Positively Predicts IGD among MOBA Gamers in Malaysia

The hypothesis is supported. AM signifies that gaming experiences are perceived as having minimal value in one’s life, leading to a lack of personal intention or motivation to

participate in them (Deci & Ryan, 2000). The finding of the present study was supported by previous research done by Mills and Allen (2020). According to Deci and Ryan (1985), the concept of AM has been found to be closely linked to learned helplessness, a psychological state in which individuals disengage from activities due to their belief in their own inadequacy and lack of control and the engagement in an activity is not solely determined by their personal volition. As reported by Mills et al. (2018), the concept of helplessness existed together with AM and could be related to which an individual is recognized of the adverse outcomes resulting from the involvement in gaming, however they are incapable to cease or effectively regulate their gaming behaviors.

Besides, the study (Mills & Allen, 2020) demonstrated that individuals with poorer levels of self-control tend to have a greater AM towards gaming behavior. According to Yu et al. (2020), individuals who have low self- control tend to face difficulties in resisting their temptations of performing gaming behaviors. On the other perspective, according to Schunk and Dibenedetto (2020), in contrast to persons who possess lower levels of self-efficacy, the ones with elevated self-efficacy are more likely to opt for participation in activities, exert increased effort, demonstrate greater perseverance, particularly in the face of challenges, and attain higher levels of achievement, in which the explanation indicated similarities between low self- efficacy and AM, with AM defined as a condition of experiencing an absence of autonomous drive to participate in any form of activity (Deci & Ryan, 1985). However, the findings also highlighted that individuals with high self- efficacy can still exhibit a lack of motivation (e.g., AM) if they do not place importance on the anticipated outcome. In order to further support the statement above, research done by Chung et al. (2020) demonstrated that individuals who possess low self- efficacy would spend more time on playing games. As such, the present study predicted that self- efficacy can be a possible factor that has impact on the prediction of AM on IGD.

H5: NS on IGD is Mediated by IM among MOBA Gamers in Malaysia

The fifth hypothesis is supported by the present study as findings shows that IM significantly mediates NS on IGD. Similar past study was found to have a mediating effect on IM between psychiatric distress and gaming disorder (Bányai et al., 2019).

NS is found to positively predict IM and the finding is supported with past studies that have similar findings, mentioning that NS positively predicted on IM which further validated that fulfilling one's NS will lead to higher level of IM (Klaeijsen et al., 2017; Pelikan et al., 2023; Walker et al., 2020). MOBA gaming requires a large number of gamers matching against one another simultaneously and almost every round they will match against other players with different standard or ranking which allows them to continuously experience the enhanced gaming experience with different opponents as well as challenging their ability to succeed (Przybylski et al., 2010). The sense of competition that gamers experience through playing MOBA games allows them to fulfill their competence, NS, and lead to a higher level of IM in playing MOBA games. Furthermore, MOBA game like Honor of King, Mobile Legend and League of Legend also provide the opportunity for gamers to choose different kinds of heroes and buying different kinds of in-game equipment which allows players to have the autonomy to choose for various kind of gaming experience by choosing a different in game character (Przybylski et al., 2010). Gamers who can have the opportunity to make in-game decisions that allow them to fulfill their autonomy NS which will increase their level of IM and have more desire to play MOBA games.

The results also further demonstrated that IM predicts on IGD. Past study by Walker et al. (2020), found that IM positively predicts IGD. However, past study by Ye et al. (2022) found to have inconsistent result as they found that IM negatively predicts on addictive behavior. However, IM may drive gamers to engage in game play even more as they will tend to satisfy their autonomy and competence need through playing MOBA games. Gamers with

high level of IM will preserve more in gaming and uncontrollable internal pressures will arise and may resemble some of the withdrawal symptoms like anxiety, irritability, or impatience when gaming is restricted from them as MOBA game provide gamers with a lot of exciting opportunities to keep on playing, experimenting new identities, and challenging other players which can fulfilled their autonomy and competence needs (Mills et al., 2017).

H6: NS on IGD is Mediated by EM among MOBA Gamers in Malaysia

The sixth hypothesis is supported by the present study as findings showed that EM significantly mediates NS on IGD. Past study on social motivation is found to have significant mediating effect on IGD (Ting et al., 2022). Social motivation helps promote social interaction between MOBA gamers whereby they will be extrinsically motivated to play MOBA games as they can interact with other players during the gameplay and actively join in game-communities for the sake of companionship which lead to long gaming hours.

Past studies with similar findings found that NS positively predicted EM which further validated that fulfilling one's NS will lead to higher level of EM (Reinecke et al., 2014). Most of the MOBA games are cooperative group game play that offers functions like chatbot, chat channels and voiceover Internet protocol communication for players to communicate and work together to win the game. This allows players to develop social bond among each other as they are able to meet players from around the world and form short- or long-term group through like having clans, guilds or factions which allows them to develop the sense of relatedness with others (Przybylski et al., 2010). Besides, the process of socializing also allows players to form a friendly relationship with others who shared the common interest and experience and some of them may even form communities to discuss on games that they are playing as well as developing in game relationship with others (Bányai et al., 2019; Carlisle et al., 2019). The bonding or socialization process with others allowed

gamers to satisfy their relatedness needs satisfaction and lead to higher EM in playing MOBA games.

EM was found to positively predict IGD, and the findings of the present study is supported by the past studies that examined EM on IGD (Cheng, 2019; Gomez et al., 2022). MOBA games contain lots of in-game achievement and progression rewards that will keep on providing gamers the sense of continuation as they will wish to complete all the levels and achievement which will motivate them to spend more time on playing and gradually lead to problematic gaming due to long hour spent (Mills et al., 2017; Rasche et al., 2017). Other than that, most of the MOBA games also do contain rewards like in-game currency, items and equipment that will motivate gamers to spend more time playing. Gamers will be rewarded after clearing the mission or challenges and their behavior will be positively reinforced and they will keep on playing just to obtain the desirable rewards so that they can progress to higher level more easily or maybe to share the achievements that they obtained with others. By rewarding gamer's gaming behaviors, MOBA games will encourage the development of IGD symptoms among gamers due to longer hours spent in gaming (Beard & Wickham, 2016).

H7: NS on IGD is Mediated by AM among MOBA Gamers in Malaysia

The results of the present study had supported the last hypothesis stating that AM significantly mediates NS on IGD. The findings of the current study were further supported by the findings in the study done by Moltafet (2020), stating that AM exerted positive indirect effect. However, findings by Mills and Allen (2020) found to be inconsistent as their study mentioned that AM is not a significant mediator.

Past studies with similar findings found that NS predicts on AM (Behzadnia et al., 2023; Cheon et al., 2016). Gamers who experience unsatisfied needs in the real world tend to

experience higher levels of AM and are less likely to engage in other activities. MOBA games allow gamers to choose the heroes or skin they like, competing against another player and connecting with others which allows them to develop the sense of autonomy, relatedness, and competence (Przybylski et al., 2010). Gamers who have low NS in the real world will lead to high levels of AM and then engage in MOBA gaming.

AM was found to predict on IGD and is supported by the study done by Ouyang (2022). High level of unsatisfied need will lead gamers to develop sense of helplessness and are not intrinsically or extrinsically to carry out any activities in real life, the amotivated gamers will keep engaging in game playing as it is the only way for them to feel satisfied which will lead to longer hour spent or other withdrawal symptom. Besides, AM may also lead gamers to have an addiction to play MOBA games as they tend to develop a strong attachment of self-esteem when engaging in game play which may lead to greater chances of IGD (Erol & Çirak, 2020). Meanwhile, amotivated gamers may also be perceived with lower self-control as they might not be able to resist themselves from the temptation in the virtual world and keep on playing the game which in the end lead to problematic gaming (Mills & Allen, 2020; Yu et al., 2020).

Implication

Theoretical Implication

In present study, the subscales under GAMS which are AM, IM and EM are separated in testing their mediational effects on the prediction of NS to IGD. It is noticed that there are very limited studies which utilise GAMS to predict IGD as well as to test its mediational effect on any predictions or associations. Furthermore, it also comes to our knowing that there are quite several kinds of gaming motivation framework, with the most well-known and widest usage framework “Yee Model of Online Gaming Motivation (Yee, 2006). As such,

present study filled in the knowledge gap and contributed to the explanation of GAMS theoretical model as well as contributed to identify the predictors of IGD in which afterwards provide an insight for future researchers another perspective for exploration.

On the other hand, an interesting finding was found in the present study. IM had found as a non-significant predictor for IGD, contrary to most of the findings of existing research (Mills & Allen, 2020; Mills et al., 2018) which showed an association between IM and IGD. However, looking from the mediating effects of IM on the prediction of NS and IGD, it was found to be a significant mediator on the predictive effect. This breakthrough successfully brought forward new notions to the explanation of IGD as well as its range of behaviors as the present study had discovered more areas of studies that are yet to be explored.

Practical Implication

The present study provides a more comprehensive understanding on the prediction of NS on IGD symptoms with gaming motivation acting as a mediator. The findings of the current study allow future researchers to have better understanding on IGD through the lens of IGD and able to better carry out similar or other research on IGD with different context, assessing on the risk and protective factors as well as to develop or examine the effectiveness of certain treatments like cognitive-behavioral therapy, motivational interviewing, and family therapy.

Next, the findings of the current study allow government to have better policies implication especially for the Ministry of Youth and Sports as they started to develop on e-sports industry recently whereby they can develop and reinforce regulations that address on gaming industry practices which can help to prevent from excessive or problematic gaming. As IM, EM and AM are significant mediators on IGD, government and stakeholder should be aware about the types of motivation that meditates on IGD and try to implement proper

policies on game developers to follow and guidelines that could help to create balanced gaming lifestyle among gamers.

Lastly, the findings of the current study also allow parents and school authorities to have more awareness on IGD so that they can approach those gamers who are at risk of IGD with a more effective method. As NS is found to negatively predicts on IGD, parents and school authorities may also put in effect to help improve youngsters NS in real life by helping them to search for things that they enjoyed doing, prepare some of the activities that may hook up their interest or maybe to guide them to seek for the passion in their life so that they can spent less time in playing any kinds of video game. Furthermore, it's crucial to teach youngsters some of the self-regulation skills like self-control, delayed gratification, self-monitoring etc., so that sometimes they can resist the urge of satisfying their needs. Awareness activities like campaigns, workshops and seminars can be organized for youngsters to learn about the aforementioned skills and let more people be aware about IGD and able to promote responsible gaming and balanced gaming habits at home or school setting.

Limitations and Recommendations

Limited Past Literature

In this current study, the proposed analysis involved gaming motivations acting as a mediator NS and the development of IGD. Nevertheless, there is a scarcity of past literature (Przybylski et al., 2010; Sheldon & Krieger, 2004), especially on the current topic. This restriction has made it nearly impossible to thoroughly investigate the underlying processes behind these predictions. Despite an in-depth investigation into NS, gaming motivation, and IGD within the limitations that are part of this study, mediating pathways involving intrinsic

and AM remain largely unexplored due to the limited number of past research accessible (Ryan & Deci, 2000).

Considering this, it is advisable to broaden the focus by including works by Scerri et al. (2019) and Bender and Gentile (2020), which both studies employed SDT framework to examine whether levels of loneliness, depression, and low self-esteem mediate the relationship between IGD behaviours and need-fulfilment deficits. By including studies that investigated the interaction between these variables using the SDT framework, the theoretical basis of the research will be enhanced. As supported by Snyder (2019), incorporating several empirical findings provides a broader view on the subject, and future studies could uncover additional information that were previously overlooked and potentially opening fresh perspectives for future research.

Limited External Validity

Despite our efforts to include Malaysians of diverse ethnicities (e.g., Malay, Chinese, Indian, and others), our survey results revealed a significant overrepresentation of Chinese (*n*=339) MOBA players compared to its counterparts such as Malay (*n*=99), Indian (*n*=54), and other ethnic groups (*n*=3). Due to the possibility that the outcomes predominantly reflect the gaming experiences, and behaviours of the Chinese ethnic group, this discrepancy raises the possibility of biased generalisation. Furthermore, cultural and diversity biases associated with a skewed sample may result in inaccurate generalisations and views of individuals who belong to different races (Färber et al., 2023), which is no different when it comes to gaming behaviours.

When considering the demographic makeup of the nation, our study's capacity to accurately portray the MOBA gaming landscape in Malaysia is further questioned. As reported by Statista (2023), Malaysia is comprised of 70.1 percent Bumiputras (which includes both Malays and the indigenous people of Peninsular Malaysia), 22.6 percent

Chinese, and 6.6 percent Indians. This uneven representation of the sample as well as the population could affect the results of the current findings, whereby it may not reflect the diverse gaming population in Malaysia, due to its limited external validity.

As a result, gathering qualitative data rather than quantitative data may be advantageous for future investigations and this can be accomplished through interviews or focused group. According to Sutton and Austin (2015), qualitative research may provide researchers with access to participants' ideas and feelings, allowing them to explore the genuine experiences of individuals. This approach could assist researchers or scholars to gain a deeper understanding of their participants' experiences in the context of gaming.

The Changing Definition of IGD and Gaming Disorder

It is important to recognise that in contemporary psychology, the definition and diagnostic standards for IGD are constantly evolving. The DSM-5 included IGD as a condition requiring further research (APA, 2013). Meanwhile, gaming disorder was recognized in 2018 release of the 11th revision of the International Classification of Diseases (ICD-11) (World Health Organization, 2023). Therefore, it is evident that the definitions of both IGD as well as gaming disorder are subject to change over time, and this may have an influence on the consistency of measures utilised across different research due to the potential diagnostic shift.

In several past studies, there seems to have different definitions of excessive gaming as well as gaming addiction (King et al., 2017; King & Delfabbro, 2013). Thus, researchers are advised to have a thorough understanding of the differences between IGD and gaming disorder in order to effectively diagnose individuals who demonstrate harmful gaming behaviours. This ensures that participants are appropriately recognised and classified in accordance with the diagnostic criteria. Likewise, it is absolutely essential for scholars keeping track of changes in the diagnostic criteria of gaming disorders. Future study should

be versatile to these changes, since they lead to a better understanding of it. By taking this approach, the validity can be enhanced while being consistent with current understandings of gaming disorders (King et al., 2010).

Social Desirability Bias

Crowne and Marlowe (1960) introduced the concept of response bias influenced by desirability, where individuals tend to provide answers that are seen as desirable rather, than accurately reflecting their true beliefs or behaviours. Previous research suggested that addictive related behaviour studies were also being influenced by the existence of the social desirability bias (Crutzen & Göritz, 2010; Davis et al., 2010). Therefore, it is plausible to hypothesise that in our study, where one of the variables is IGD, our results was also influenced by the social desirability bias, since the study participants may have responded in a way to present themselves in a favourable light, or in other words, "socially acceptable" (Krishnamurthy & Chetlapalli, 2015). According to a study (Latkin et al., 2017), social desirability response bias can result in misleading self-reports and misleading outcomes of studies. Nevertheless, according to an early study done by Tourangeau and Smith (1996), how different ways of asking questions and the context in which they are asked can unintentionally influence participants responses and induce desirability bias.

In addition, Vrij (2008) stressed the significance of employing a mixed methods approach to explore participants' experiences and behaviour in order to overcome this limitation. Researchers can better comprehend the phenomena they are researching by combining self-report measurements with observations, or interviews. This strategy not only overcomes the drawbacks of depending on self-reported data but also picks up on minute details that quantitative measurements by themselves could overlook.

Conclusion

In summary, the present study aimed to investigate the prediction of NS, IM, EM, and AM on IGD, as well as the mediational effects of IM, EM, and AM. Result found that NS, EM and AM are significant predictors for IGD. However, IM appears to be a non-significant predictor for IGD. The result of mediational analysis found that IM, EM, and AM had significant mediating effects on NS and IGD. Thus, it can be concluded that all the hypotheses except were supported H_1 and H_2.

References

Abdul Latif, R., Abdul Aziz, N., & Abdul Jalil, M. T. (2017). Impact of online games among undergraduate students. *Proceedings of the 6th International Conference on Computing & Informatics, Kuala Lumpur*, 523-532. https://docplayer.net/53012975-Impact-of-online-games-among-undergraduate-students.html

Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Best-practice recommendations for defining, identifying, and handling outliers. *Organizational Research Methods*, *16*(2), 270-301. https://doi.org/10.1177/1094428112470848

Allen, J. J., & Anderson, C. A. (2018). Satisfaction and frustration of basic psychological needs in the real world and in video games predict internet gaming disorder scores and well-being. *Computers in Human Behavior*, *84*, 220-229. https://doi.org/10.1016/j.chb.2018.02.034

Alwin, D. F., & Hauser, R. M. (1975). The decomposition of effects in path analysis. *American Sociological Review*, *40*(1), 37. https://doi.org/10.2307/2094445

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of mental disorders (5th ed.).* https://www.psychiatry.org/psychiatrists/practice/dsm

Amin, K. P., Griffiths, M. D., & Dsouza, D. D. (2020). Online gaming during the COVID-19 pandemic in India: Strategies for work-life balance. *International Journal of Mental Health and Addiction*, *20*(1), 296-302. https://doi.org/10.1007/s11469-020-00358-1

Ampel, B. C., O'Malley, E. E., & Muraven, M. (2016). Self-control and motivation:

Integration and application. In *Self-regulation and ego control* (125-141). *Academic Press*.

Anderson, E. L., Steen, E., & Stavropoulos, V. (2017). Internet use and problematic internet use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. *International Journal of Adolescence and Youth*, *22*(4), 430-454. https://doi.org/10.1080/02673843.2016.1227716

Apuke, O. D. (2017). Quantitative research methods: A synopsis approach. *Kuwait Chapter of Arabian Journal of Business and Management Review*, *6*(11), 40-47. https://doi.org/10.12816/0040336

Atkinson, R., & Flint, J. (2001). Accessing hidden and hard-to-reach populations: Snowball research strategies. *Social research update, 33*(1), 1-4. https://sru.soc.surrey.ac.uk/SRU33.html

Barr, M., & Copeland-Stewart, A. (2021). Playing video games during the COVID-19 pandemic and effects on players' well-being. *Games and Culture*, *17*(1), 122-139. https://doi.org/10.1177/15554120211017036

Bassey, A. (2020). *Online Gaming: A Successful Life? The Influence of Gaming on Development.* [Master thesis, University of South-Eastern Norway]. https://www.researchgate.net/publication/345785658_Online_Gaming_A_Successful_Life_The_Influence_of_Gaming_on_Development

Beard, C. L., & Wickham, R. E. (2016). Gaming-contingent self-worth, gaming motivation, and internet gaming disorder. *Computers in Human Behavior*, *61*, 507-515. https://doi.org/10.1016/j.chb.2016.03.046

Behzadnia, B., Mollaei Zangi, F., Rezaei, F., & Eskandarnejad, M. (2023). Predicting students' basic psychological needs, motivation, and well-being in online physical education: A semester-term longitudinal study. *International Journal of Sport and*

Exercise Psychology, 1-19. https://doi.org/10.1080/1612197x.2023.2237051

Bender, P. K., & Gentile, D. A. (2020). Internet gaming disorder: Relations between needs satisfaction in-game and in life in general. *Psychology of Popular Media*, *9*(2), 266-278. https://doi.org/10.1037/ppm0000227

Beranuy, M., Carbonell, X., & Griffiths, M. D. (2013). A qualitative analysis of online gaming addicts in treatment. *International journal of mental health and addiction*, *11*(2), 149-161. https://doi.org/10.1007/s11469-012-9405-2

Billieux, J., Thorens, G., Khazaal, Y., Zullino, D., Achab, S., & Van der Linden, M. (2015). Problematic involvement in online games: A cluster analytic approach. *Computers in Human Behavior*, *43*, 242-250. https://doi.org/10.1016/j.chb.2014.10.055

Bonnaire, C., & Baptista, D. (2019). Internet gaming disorder in male and female young adults: The role of alexithymia, depression, anxiety and gaming type. *Psychiatry Research*, *272*, 521–530. https://doi.org/10.1016/j.psychres.2018.12.158

Bono, R., Arnau, J., Alarcón, R., & Blanca, M. J. (2019). Bias, precision, and accuracy of skewness and kurtosis estimators for frequently used continuous distributions. *Symmetry*, *12*(1), 19. https://doi.org/10.3390/sym12010019

Bornstein, M. H., Jager, J., & Putnick, D. L. (2013). Sampling in developmental Science: situations, shortcomings, solutions, and standards. *Developmental Review*, *33*(4), 357-370.

https://doi.org/10.1016/j.dr.2013.08.003

Boussiala, M. (2020). Cook's Distance. http://dx.doi.org/10.13140/RG.2.2.18888.55049

Brand, M., Wegmann, E., Stark, R., Müller, A., Wölfling, K., Robbins, T. W., & Potenza, M. N. (2019). The interaction of person-affect-Cognition-Execution (I-PACE) model for addictive behaviors: Update, generalization to addictive behaviors beyond internet-use disorders, and specification of the process character of addictive behaviors. *Neuroscience & Biobehavioral Reviews*, *104*, 1-10. https://doi.org/10.1016/j.neubiorev.2019.06.032

Brunborg, G. S., Mentzoni, R. A., & Frøyland, L. R. (2014). Is video gaming, or video game addiction, associated with depression, academic achievement, heavy episodic drinking, or conduct problems? *Journal of Behavioral Addictions*, *3*(1), 27-32. https://doi.org/10.1556/jba.3.2014.002

Cardella, G. M., Hernández-Sánchez, B. R., & Sánchez-García, J. C. (2020). Basic psychological needs as a motivational competence: Examining validity and measurement invariance of Spanish BPNSF scale. *Sustainability*, *12*(13), 5422. https://doi.org/10.3390/su12135422

Carlisle, K. L., Neukrug, E., Pribesh, S., & Krahwinkel, J. (2019). Personality, motivation, and internet gaming disorder: Conceptualizing the gamer. *Journal of Addictions & Offender Counseling*, *40*(2), 107-122. https://doi.org/10.1002/jaoc.12069

Celik, N. D., Yesilyurt, F., & Celik, B. (2022). Internet gaming disorder: Life satisfaction, negative affect, basic psychological needs, and depression. *Dusunen Adam:The Journal of Psychiatry and Neurological Sciences*, *35*, 181-190.

https://doi.org/10.14744/dajpns.2022.00191

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., Duriez, B., Lens, W., Matos, L., Mouratidis, A., Ryan, R. M., Sheldon, K. M., Soenens, B., Van Petegem, S., & Verstuyf, J. (2014). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216-236. https://doi.org/10.1007/s11031-014-9450-1

Cheng, C., Cheung, M. W.-L., & Wang, H. (2018). Multinational comparison of internet gaming disorder and psychosocial problems versus well-being: Meta-analysis of 20 countries. *Computers in Human Behavior*, *88*, 153–167. https://doi.org/10.1016/j.chb.2018.06.033

Cheon, S. H., Reeve, J., & Song, Y. (2016). A teacher-focused intervention to decrease PE students' Amotivation by increasing need satisfaction and decreasing need frustration. *Journal of Sport and Exercise Psychology*, *38*(3), 217-235. https://doi.org/10.1123/jsep.2015-0236

Chung, S. J., Jang, J. H., Lee, J. Y., Choi, A., Kim, B. M., Park, M. K., Jung, M. H., & Choi, J. (2020). Self-efficacy and clinical characteristics in casual gamers compared to excessive gaming users and non-gamers in young adults. *Journal of Clinical Medicine*, *9*(9), 2720. https://doi.org/10.3390/jcm9092720

Claesdotter-Knutsson, E., André, F., & Håkansson, A. (2022). Gaming activity and possible changes in gaming behavior among young people during the COVID- 19 pandemic: Cross-sectional online survey study. *JMIR Serious Games*, *10*(1). https://doi.org/10.2196/33059

Cook, R. D. & Weisberg, S. (1982). *Residuals and influence in regression*. https://doi.org/10.1002/bimj.4710270110

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*(4), 349-354. https://doi.org/10.1037/h0047358

Crutzen, R., & Göritz, A. S. (2010). Social desirability and self-reported health risk behaviors in web-based research: Three longitudinal studies. *BMC Public Health, 10*(1). https://doi.org/10.1186/1471-2458-10-720

Cuthbert, R., Turkay, S., & Brown, R. (2020). *The Effects of Customisation on Player Experiences and Motivation in a Virtual Reality Game*. In *OZCHI'19: 31st Australian Conference on Human-Computer-Interaction* (pp. 221-232). Association for Computing Machinery, New York, United States. https://doi.org/10.1145/3369457.3369475

Daniel, J. (2011). Sampling essentials: Practical guidelines for making sampling choices. *SAGE*.

Daoud, J. I. (2017). Multicollinearity and regression analysis. *Journal of Physics: Conference Series*, 949, 1-6. https://doi.org/10.1088/1742-6596/949/1/012009

Dauriat, F. Z., Zermatten, A., Billieux, J., Thorens, G., Bondolfi, G., Zullino, D., & Khazaal, Y. (2011). Motivations to play specifically predict excessive involvement in massively multiplayer online role-playing games: Evidence from an online survey. *European Addiction Research, 17*(4), 185-189. https://doi.org/10.1159/000326070

Das, K. R. & Imon, A. H. M. R. (2016). A brief review of tests for normality. *American Journal of Theoretical and Applied Statistics, 5*(1), 5-12.

https://doi.org/10.11648/j.ajtas.20160501.12

Davis, C. G., Thake, J., & Vilhena, N. (2010). Social desirability biases in self-reported alcohol consumption and harms. *Addictive Behaviors, 35*(4), 302-311. https://doi.org/10.1016/j.addbeh.2009.11.001

De, R., Pande, N., Pal, A. (2020). Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice. *International Journal of Information Management, 55*. https://doi.org/10.1016/j.ijinfomgt.2020.10217

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum.

Deci, E. L., & Ryan, R. M. (2000). The "What" and "Why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268. https://doi.org/10.1207/s15327965pli1104_01

Dunn, R. A., & Guadagno, R. E. (2012). My avatar and me – Gender and personality predictors of avatar-self discrepancy. *Computers in Human Behavior*, *28*(1), 97-106. https://doi.org/10.1016/j.chb.2011.08.015

El-Masri, M. M., Mowbray, F. I., Fox-Wasylyshyn, S. M., & Kanters, D. (2021). Multivariate outliers: A conceptual and practical overview for the nurse and health researcher. *Canadian Journal of Nursing Research, 53*(3), 316-321. https://doi.org/10.1177/0844562120932054

Ernst, A. F., & Albers, C. J. (2017). Regression assumptions in clinical psychology research practice: A systematic review of common misconceptions. *PeerJ, 5*, 1-16. https://doi.org/10.7717/peerj.3323

Erol, O., & Cirak, N. S. (2019). Exploring the loneliness and internet addiction level of

college students based on demographic variables. *Contemporary Educational Technology*, *10*(2), 156-172. https://doi.org/10.30935/cet.554488

Fam, J. Y. (2018). Prevalence of internet gaming disorder in adolescents: A meta-analysis across three decades. *Scandinavian Journal of Psychology*, *59*(5), 524-531. https://doi.org/10.1111/sjop.12459

Färber, M., Coutinho, M., & Yuan, S. (2023). Biases in scholarly recommender systems: Impact, prevalence, and mitigation. *Scientometrics*, *128*(5), 2703-2736. https://doi.org/10.1007/s11192-023-04636-2

Garson, G. D. (2012). Testing statistical assumption. *Statistical Associates Publishing*. https://www.researchgate.net/profile/Jurandy-Penitente-Filho/post/What-is-the-best-statistical-method-to-correlate-immunohistochemestry-and-rt-pcr/attachment/59d61d9879197b807797853c/AS%3A271755204071424%401441802897825/download/assumptions.pdf

George, D., & Mallery, P. (2010). *SPSS for Windows step by step: A simple guide and reference, 17.0 update*. Prentice Hall.

Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism*, *10*(2), 486-489. https://doi.org/10.5812/ijem.3505

Global Games Market Report 2022. (2022). Newzoo. https://app2top.ru/wpcontent/uploads/2022/07/2022_Newzoo_Free_Global_Games_Market_Report.pdf

Gomez, R., Stavropoulos, V., Tullett-Prado, D., Schivinski, B., & Chen, W. (2022). Network

analyses of internet gaming disorder symptoms and their links with different types of motivation. *BMC Psychiatry*, *22*(1). https://doi.org/10.1186/s12888-022-03708-6

Griffiths, M., Davies, M. N., & Chappell, D. (2003). Online computer gaming: A comparison of adolescent and adult gamers. *Journal of Adolescence, 27*(1), 87-96. https://doi.org/10.1016/j.adolescence.2003.10.007

Gupta, A., Mishra, P., Pandey, C., Singh, U., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, *22*(1), 67. https://doi.org/10.4103/aca.aca_157_18

Hair, J. F., Babin, B., Money, A. H., & Samouel, P. (2003). *Essentials of business research methods*. John Wiley & Sons.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). The Guilford Press.

Hecht, J. B. (1991). *Least-squares linear regression and Schrodinger's cat: Perspectives on the analysis of regression residuals*. American Educational Research Association.

Hertzog, M. A. (2008). Considerations in determining sample size for pilot studies. *Research in Nursing & Health, 31*(2), 180-191. https://doi.org/10.1002/nur.20247

Hulaj, R., Nyström, M. B., Sörman, D. E., Backlund, C., Röhlcke, S., & Jonsson, B. (2020). A motivational model explaining performance in video games. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01510

Hussain, Z., Williams, G. A., & Griffiths, M. D. (2015). An exploratory study of the association between online gaming addiction and enjoyment motivations for playing

massively multiplayer online role-playing games. *Computers in Human Behavior*, *50*, 221-230. https://doi.org/10.1016/j.chb.2015.03.075

Internet and social media users in the world 2022. (2022). Statista. https://www.statista.com/statistics/617136/digital-population-worldwide/#statisticContainer

Jammalamadaka, S. R., Taufer, E., & Terdik, G. H. (2020). On multivariate skewness and kurtosis. *The Indian Journal of Statistics*, *83*(2), 1-38. https://doi.org/10.1007/s13171-020-00211-6

Johannes, N., Vuorre, M., & Przybylski, A. K. (2021). Video game play is positively correlated with well-being. *Royal Society Open Science*, 8(2). https://doi.org/10.1098/rsos.202049

Jordalen, G., Lemyre, P. N., Solstad, B. E., & Ivarsson, A. (2018). The role of self-control and motivation on exhaustion in youth athletes: A longitudinal perspective. *Frontiers in psychology*, *9*, 2449. https://doi.org/10.3389/fpsyg.2018.02449

Kang, H. (2013). The prevention and handling of the missing data. *Korean Journal of Anesthesiology*, *64*(5), 402-406. https://doi.org/10.4097/kjae.2013.64.5.40

Kang, B., & Tan, S. H. (2014). Interactive games: Intrinsic and extrinsic motivation, achievement, and satisfaction. *Journal of Management and Strategy*, *5*(4). https://doi.org/10.5430/jms.v5n4p110

Kardefelt-Winther, D. (2014). Problematizing excessive online gaming and its psychological predictors. *Computers in Human Behavior*, *31*, 118-122. https://doi.org/10.1016/j.chb.2013.10.017

Kardefelt-Winther, D. (2017). Conceptualizing internet use disorders: Addiction or coping process? *Psychiatry and Clinical Neurosciences, 71*(7), 459-466. https://doi.org/10.1111/pcn.12413

Kemp, S. (2022, February 15). *Digital 2022: Malaysia*. DataReportal. https://datareportal.com/reports/digital-2022-malaysia

Kim, H. Y. (2013). Statistical notes for clinical researchers: Assessing normal distribution (2) Using skewness and kurtosis. *Restorative Dentistry & Endodontics, 38*(1), 52-54. https://doi.org/10.5395/rde.2013.38.1.52

Kim, J. H. (2019). Multicollinearity and misleading statistical results. *Korean journal of anesthesiology, 72*(6), 558-569. https://doi.org/10.4097/kja.19087

Kim, Y., Dykema, J., Stevenson, J., Black, P., & Moberg, D. P. (2018). Straightlining: Overview of measurement, comparison of indicators, and effects in mail–web mixed-mode surveys. *Social Science Computer Review, 37*(2), 214-233. https://doi.org/10.1177/0894439317752406

King, D., & Delfabbro, P. H. (2009). Motivational differences in problem video game play. *Journal of Cybertherapy and Rehabilitation, 2*(2), 139–149. https://www.researchgate.net/publication/255786804_Motivational_differences_in_problem_video_game_play

King, D. L., & Delfabbro, P. H. (2018). Prevention and harm reduction for IGD. *Internet Gaming Disorder*, 201-241. https://doi.org/10.1016/b978-0-12-812924-1.00008-3

King, D., Delfabbro, P. H., & Griffiths, M. D. (2009). The psychological study of video game players: Methodological challenges and practical advice. *International Journal of Mental Health and Addiction, 7*(4), 555-562.

https://doi.org/10.1007/s11469-009-9198-0

King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2010). The convergence of gambling and digital media: Implications for gambling in young people. *Journal of Gambling Studies, 35*(3), 759-765. https://doi.org/10.1007/s10899-009-9153-9

King, D. L., Delfabbro, P. H., Wu, A., Doh, Y. Y., Kuss, D. J., Pallesen, S., Mentzoni, R., Carragher, N., & Sakuma, H. (2017). Treatment of internet gaming disorder: An international systematic review and consort evaluation. *Clinical Psychology Review, 54*, 123-133. https://doi.org/10.1016/j.cpr.2017.04.002

King, D. L., Haagsma, M. C., Delfabbro, P. H., Gradisar, M., & Griffiths, M. D. (2013). Toward a consensus definition of pathological video-gaming: A systematic review of psychometric assessment tools. *Clinical Psychology Review, 33*(3), 331-342. https://doi.org/10.1016/j.cpr.2013.01.002

Király, O., Urbán, R., Griffiths, M. D., Ágoston, C., Nagygyörgy, K., Kökönyei, G., & Demetrovics, Z. (2015). The mediating effect of gaming motivation between psychiatric symptoms and problematic online gaming: an online survey. *Journal of medical Internet research, 17*(4), 88. https://doi.org/10.2196/jmir.3515

Klemm, C., & Pieters, W. (2017). Game mechanics and technological mediation: An ethical perspective on the effects of MMORPG's. *Ethics and Information Technology, 19* (2), 81-93. https://doi.org/10.1007/s10676-017-9416-6

Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being highly motivated:

A closer look at introjection, identification, and intrinsic motivation. In *Handbook of self-determination research* (101–121). University of Rochester Press.

Kosa, M., & Uysal, A. (2021). The role of need satisfaction in explaining intentions to purchase and play in Pokemon go and the moderating role of prior experience. *Psychology of Popular Media, 10*(2), 187-200. https://doi.org/10.1037/ppm0000285

Krishnamurthy, S., & Chetlapalli, S. (2015). Internet addiction: Prevalence and risk factors: A cross-sectional study among college students in Bengaluru, the Silicon Valley of India. *Indian Journal of Public Health, 59*(2), 115. https://doi.org/10.4103/0019-557x.157531

Kwok, N. W., & Khoo, A. (2011). Gamers' motivations and problematic gaming. *International Journal of Cyber Behavior, Psychology and Learning, 1*(3), 34-49. https://doi.org/10.4018/ijcbpl.2011070103

Lafrenière, M. K., Verner-Filion, J., & Vallerand, R. J. (2012). Development and validation of the Gaming Motivation Scale (GAMS). *Personality and Individual Differences, 53*(7), 827–831. https://doi.org/10.1016/j.paid.2012.06.013

Latkin, C. A., Edwards, C., Davey-Rothwell, M. A., & Tobin, K. E. (2017). The relationship between social desirability bias and self-reports of health, substance use, and social network factors among urban substance users in Baltimore, Maryland. *Addictive Behaviors, 73*, 133-136. https://doi.org/10.1016/j.addbeh.2017.05.005

Legault, L. (2017). Self- determination theory. In *Encyclopedia of personality and individual differences*. Springer, Cham. https://doi.org/10.1007/978-3-319-28099-8_1162-1

Liang, Q., Yu, C., Xing, Q., Liu, Q., & Chen, P. (2021). The influence of parental knowledge and basic psychological needs satisfaction on peer victimization and internet gaming disorder among Chinese adolescents: A mediated moderation model. *International Journal of Environmental Research and Public Health*, *18*(5), 2397. https://doi.org/10.3390/ijerph18052397

Macur, M., & Pontes, H. M. (2021). Internet gaming disorder in adolescence: Investigating profiles and associated risk factors. *BMC Public Health*, *21*(1). https://doi.org/10.1186/s12889-021-11394-4

Mak, K., Lai, C., Watanabe, H., Kim, D., Bahar, N., Ramos, M., Young, K. S., Ho, R. C., Aum, N., & Cheng, C. (2014). Epidemiology of internet behaviors and addiction among adolescents in six Asian countries. *Cyberpsychology, Behavior, and Social Networking*, *17*(11), 720-728. https://doi.org/10.1089/cyber.2014.0139\

Malaysian Communications and Multimedia Commission (MCMC). (2020). *Internet Users Survey 2020*. https://www.mcmc.gov.my/en/resources/statistics/internet-users-survey#

Malaysia number of internet users. (2021). Statista. *https://www.statista.com/statistics/553752/number-of-internet-users-in-malaysia/*

Malaysia: Online gamers by age group 2020. (2020). Statista. https://www.statista.com/statistics/1117575/malaysia-age-breakdown-of-online-gamers/

Martela, F., DeHaan, C. R., & Ryan, R. M. (2016). On enhancing and diminishing energy through psychological means: Research on vitality and depletion from self-determination theory. *Self-regulation and Ego Control*, 67-85. Academic Press. https://doi.org/10.1016/b978-0-12-801850-7.00004-4

Mills, D. J., & Allen, J. J. (2020). Self-determination theory, internet gaming disorder, and the mediating role of self-control. *Computers in Human Behavior*, *105*, 106209. https://doi.org/10.1016/j.chb.2019.106209

Mills, D. J., Milyavskaya, M., Heath, N. L., & Derevensky, J. L. (2017). Gaming motivation and problematic video gaming: The role of needs frustration. *European Journal of Social Psychology*, *48*(4), 551-559. https://doi.org/10.1002/ejsp.2343

Mills, D. J., Milyavskaya, M., Mettler, J., & Heath, N. L. (2018). Exploring the pull and push underlying problem video game use: A self-determination theory approach. *Personality and Individual Differences*, *135*, 176-181. https://doi.org/10.1016/j.paid.2018.07.007

Mishra, P., Pandey, C.M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, *22*(1), 67-72. https://www.annals.in/text.asp?2019/22/1/67/250184

Moller, A. C., Deci, E. L., & Ryan, R. M. (2006). Choice and ego-depletion: The moderating role of autonomy. *Personality and Social Psychology Bulletin*, *32*(8), 1024-1036. https://doi.org/10.1177/0146167206288008

Moltafet, G. (2020). Direct and indirect effect of personality traits on hope: The mediating role of academic motivation. *International Journal of Behavioral Sciences*, *13*(4), 167-172. https://doi.org/10.30491/ijbs.2020.104920

Mullooly, J. P. (1990). The effects of data entry error: An analysis of partial verification. *Computers and Biomedical Research*, *23*(3), 259-267. https://doi.org/10.1016/0010-4809(90)90020-d

Muraven, M. (2008). Autonomous self-control is less depleting. *Journal of Research in Personality, 42*(3), 763-770. https://doi.org/10.1016/j.jrp.2007.08.002

Muthén, L. K., & Muthén, B. O. (2002). How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(4), 599-620. https://doi.org/10.1207/s15328007sem0904_8

Neys, J. L., Jansz, J., & Tan, E. S. (2014). Exploring persistence in gaming: The role of self-determination and social identity. *Computers in Human Behavior, 37*, 196-209. https://doi.org/10.1016/j.chb.2014.04.047

Ng, B. D., & Wiemer-Hastings, P. (2005). Addiction to the internet and online gaming. *CyberPsychology and Behavior, 8*(2), 110-113. https://doi.org/10.1089/cpb.2005.8.110

Nguyen, V. T. V., & Nguyen, T. H. (2016). Statistical modeling of extreme rainfall processes (SMExRain): A decision support tool for extreme rainfall frequency analyses. *Procedia Engineering, 154*, 624-630. https://doi.org/10.1016/j.proeng.2016.07.561

Nik Jaafar, N. R., Baharudin, A., Tajjudin, I., Ling, S. L., Safarudin, M. A., Sufia, D. S., Tan, Y. H., Zulkifle, N. H., & Tan, K. A. (2021). Factors correlated with internet gaming disorder among Malaysian university students. *Malaysian Journal of Medicine and Health Sciences, 17*(2), 54-62. https://www.researchgate.net/publication/350782695_Factors_Correlated_With_Internet_Gaming_Disorder_Among_Malaysian_University_Students

Nimon, K. F. (2012). Statistical assumptions of substantive analyses across the general linear model: A mini-review. *Frontiers in Psychology, 3*, 1-5.

https://doi.org/10.3389/fpsyg.2012.00322

Noels, K. A., Pelletier, L. G., Clément, R., & Vallerand, R. J. (2003). Why are you learning a second language? Motivational orientations and self-determination theory. *Language Learning*, *53*(S1), 33-64. https://doi.org/10.1111/1467-9922.53223

Online games - Worldwide | Statista market forecast. (2022). Statista. https://www.statista.com/outlook/dmo/digital-media/video-games/online-games/worldwide#revenue

Osborne, J. W., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical Assessment*, *8*(2), 1-5. https://www.researchgate.net/publication/234616195_Four_Assumptions_of_Multiple_Regression_That_Researchers_Should_Always_Test

Oudeyer, P., & Kaplan, F. (2007). What is intrinsic motivation? A typology of computational approaches. *Frontiers in Neurorobotics*, *1*. https://doi.org/10.3389/neuro.12.006.2007

Ouyang, B. W. (2022). Are smartphones addictive? Examining the cognitive-behavior model of motivation, leisure boredom, extended self, and fear of missing out on possible smartphone addiction. *Telematics and Informatics*, *71*, 101834. https://doi.org/10.1016/j.tele.2022.101834

Peat, J., & Barton, B. (2005). *Medical statistics: A guide to data analysis and critical appraisal*. Blackwell Publishing.

Plonsky, L., & Ghanbar, H. (2018). Multiple regression in L2 research: A methodological synthesis and guide to interpreting R2 values. *The Modern Language Journal*, *102*(4), 713-731. https://doi.org/10.1111/modl.12509

Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Poh, J. J., & Zain, J. (2021). *Southeast Asia Game Industry Report 2021*. MDEC. https://mdec.my/wp-content/uploads/SEA-Game-Industry-Report_Final.pdf

Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice*. Wolters Kluwer.

Pontes, H. M., & Griffiths, M. D. (2014). Assessment of Internet gaming disorder in clinical research: Past and present perspectives. *Clinical Research and Regulatory Affairs, 31*(3), 35-48. https://doi.org/10.3109/10601333.2014.962748

Przybylski, A. K., Rigby, C. S., & Ryan, R. M. (2010). A motivational model of video game engagement. *Review of General Psychology*, *14*(2), 154-166. https://doi.org/10.1037/a0019440

Rai, N., & Thapa, B. (2015). A study on purposive sampling method in research. *Kathmandu: Kathmandu School of Law*, *5*.

Reddy, P. R., & Sarma, K. L. A. P. (2015). A multiple linear regression approach for the analysis of stress factors of faculty in higher educational institutions. *International Journal of Mathematics And its Applications, 3*(4), 95-103. http://www.ijmaa.in/v3n4-a/95-103.pdf

Reer, F., & Krämer, N. C. (2020). A self-determination theory-based laboratory experiment on social aspects of playing multiplayer first-person shooter games. *Entertainment Computing*, *34*, 100353.

https://doi.org/10.1016/j.entcom.2020.100353

Reinecke, L., Vorderer, P., & Knop, K. (2014). Entertainment 2.0? The role of intrinsic and extrinsic need satisfaction for the enjoyment of Facebook use. *Journal of Communication*, *64*(3), 417-438. https://doi.org/10.1111/jcom.12099

Ridzuan, F., & Zainon, W. M. N. W. (2019). A review on data cleansing methods for big data. *Procedia Computer Science, 161*, 731-738. https://doi.org/10.1016/j.procs.2019.11.177

Rigby, C. S., & Ryan, R. M. (2011). Glued to games: How video games draw us in and hold us spellbound. *Choice Reviews Online*, *49*(01). https://doi.org/10.5860/choice.49-0099

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality*, *63*(3), 397-427. https://doi.org/10.1111/j.1467-6494.1995.tb00501.x

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychological Association, 55*(1), 68-78. https://doi:10.1037110003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion*, *30*(4), 344-360. https://doi.org/10.1007/s11031-006-9051-8

Scerri, M., Anderson, A., Stavropoulos, V., & Hu, E. (2019). Need fulfilment and internet

gaming disorder: A preliminary integrative model. *Addictive Behaviors Reports, 9*, 100144. https://doi.org/10.1016/j.abrep.2018.100144

Schimmenti, A., & Caretti, V. (2010). Psychic retreats or psychic pits?: Unbearable states of mind and technological addiction. *Psychoanalytic Psychology, 27*(2), 115-132. https://doi.org/10.1037/a0019414

Schivinski, B., Brzozowska-Woś, M., Buchanan, E. M., Griffiths, M. D., & Pontes, H. M. (2018). Psychometric assessment of the internet gaming disorder diagnostic criteria: An item response theory study. *Addictive Behaviors Reports*, *8*, 176-184. https://doi.org/10.1016/j.abrep.2018.06.004

Schunk, D. H., & Dibenedetto, M. K. (2020). Self-efficacy and human motivation. *Advances in Motivation Science*, 153-179. https://doi.org/10.1016/bs.adms.2020.10.001

Setia, M. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology, 61*(3), 261. https://doi.org/10.4103/0019-5154.182410

Sheldon, K. M., & Krieger, L. S. (2004). Does legal education have undermining effects on law students? Evaluating changes in motivation, values, and well-being. *Behavioral Sciences & the Law, 22*(2), 261-286. https://doi.org/10.1002/bsl.582

Sheldon, K. M., & Gunz, A. (2009). Psychological needs as basic motives, not just experiential requirements. *Journal of Personality, 77*(5), 1467-1492. https://psycnet.apa.org/doi/10.1016/j.chb.2019.106209

Shrestha, N. (2020). Detecting multicollinearity in regression analysis. *American Journal of Applied Mathematics and Statistics, 8*(2), 39-42.

http://dx.doi.org/10.12691/ajams-8-2-1

Snodgrass, J. G., Dengah, H. J., Lacy, M. G., & Fagan, J. (2013). A formal anthropological view of motivation models of problematic MMO play: Achievement, social, and immersion factors in the context of culture. *Transcultural Psychiatry*, *50*(2), 235-262. https://doi.org/10.1177/1363461513487666

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333-339. https://doi.org/10.1016/j.jbusres.2019.07.039

Share of population in Malaysia from 2019 to 2023, by ethnicity. (2023). Statista. https://www.statista.com/statistics/1017372/malaysia-breakdown-of-population-by-ethnicity/#:~:text=As%20of%20July%202023%2C%2070.1,are%20classified%20as%20'Other

Stevens, J. P. (1984). Outliers and influential data points in regression analysis. *Psychological Bulletin*, *95*(2), 334.

Stevens, M. W., Dorstyn, D., Delfabbro, P. H., & King, D. L. (2020). Global prevalence of gaming disorder: A systematic review and meta-analysis. *Australian &Amp; New Zealand Journal of Psychiatry*, *55*(6), 553–568. https://doi.org/10.1177/0004867420962851

Sutton, J., & Austin, Z. (2015). Qualitative research: data collection, analysis, and management. *The Canadian Journal of Hospital Pharmacy*, *68*(3). https://doi.org/10.4212/cjhp.v68i3.1456

Tamborini, R., Bowman, N. D., Eden, A., Grizzard, M., & Organ, A. (2010). Defining media enjoyment as the satisfaction of intrinsic needs. *Journal of Communication*, *60*(4), 758-777. https://doi.org/10.1111/j.1460-2466.2010.01513.x

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *9*(1),78. https://doi.org/10.1186/1479-5868-9-78

Thode, H. C. (2002). *Testing for normality*. CRC Press.

Thoemmes, F., MacKinnon, D. P., & Reiser, M. R. (2010). Power analysis for complex mediational designs using Monte Carlo methods. *Structural Equation Modeling*, *17*, 510–534.

Tiwari, S., & Garg, P. (2019). Promoting basic need satisfaction at workplace: The relevance of mindfulness in support of job performance of employees. *Jindal Journal of Business Research*, *8*(1), 1-15. https://doi.org/10.1177/2278682118785812

T'ng, S. T., Ho, K. H., & Pau, K. (2022). Need frustration, gaming motives, and internet gaming disorder in mobile multiplayer online battle arena (MOBA) games: Through the lens of self-determination theory. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-022-00825-x

T'ng, S. T., & Pau, K. (2020). Identification of avatar mediates the associations between motivations of gaming and internet gaming disorder among the Malaysian youth. *International Journal of Mental Health and Addiction*, *19*(4), 1346-1361. https://doi.org/10.1007/s11469-020-00229-9

Tourangeau, R., & Smith, T. W. (1996). Asking sensitive questions: The impact of data collection mode, question format, and question context. *Public Opinion Quarterly*, *60*(2), 275. https://doi.org/10.1086/297751

Uysal, A., & Yildirim, I. G. (2016). Self-determination theory in digital games. *Gamer Psychology and Behavior*, 123-135. https://doi.org/10.1007/978-3-319-29904-4_8

Vega, A. C., Jorge, L. M., Soto, A., Lama-Valdivia, J., & López, L. E. C. (2021). Cross-sectional studies. *Revista de la Facultad de Medicina Humana*, *21*(1), 179-185. https://doi.org/10.25176/RFMH.v21i1.3069

Vrij, A. (2008). Detecting lies and deceit: Pitfalls and opportunities. *John Wiley & Sons*.

Wan, C. S., & Chiou, W. B. (2006). Why are adolescents addicted to online gaming? An interview study in Taiwan. *CyberPsychology and Behavior*, *9*(6). https://doi.org/10.1089/cpb.2006.9.762

Walker, G. J., Yan, N., & Kono, S. (2020). Basic psychological need satisfaction and intrinsic motivation during leisure: A cross-cultural comparison. *Journal of Leisure Research*, *51*(4), 489-510. https://doi.org/10.1080/00222216.2020.1735973

Wan, C. S., & Chiou, W. B. (2007). The motivations of adolescents who are addicted to online games: a cognitive perspective. *Adolescence*, *42*(165), 179–197. https://www.researchgate.net/publication/6300553_The_motivations_of_adolescents_who_are_addicted_to_online_games_A_cognitive_perspective

Wang, X., & Cheng, Z. (2020). Cross-Sectional Studies. *Chest*, *158*(1), 65–71. https://doi.org/10.1016/j.chest.2020.03.012

Weinstein, A., Livny, A., & Weizman, A. (2017). New developments in brain research of internet and gaming disorder. *Neuroscience & Biobehavioral Reviews*, *75*, 314-330. https://doi.org/10.1016/j.neubiorev.2017.01.040

What is quantitative research? (n.d.). SIS International Market Research.

https://www.sisinternational.com/what-is-quantitative-research/

World Health Organization (WHO). (2018). *Addictive behaviours: Gaming disorder*. https://www.who.int/news-room/questions-and-answers/item/addictive-behaviours-gaming-disorder

Williams, M. N., Grajales, C. A. G., & Kurkiewicz, D. (2013). Assumptions of multiple regression: Correcting two misconceptions. *Practical Assessment, Research & Evaluation, 18*(11). https://files.eric.ed.gov/fulltext/EJ1015680.pdf

Wong, I. L., & Lam, M. P. (2016). Gaming behavior and addiction among Hong Kong adolescents. *Asian Journal of Gambling Issues and Public Health, 6*(1). https://doi.org/10.1186/s40405-016-0016-x

World Health Organization. (2023). Addictive behaviours: Gaming disorder. Questions and Answers. https://www.who.int/news-room/questions-and-answers/item/addictive-behaviours-gaming-disorder

Wu, A. M. S., Lai, M. H. C., & Yu, S. (2017). Psychological need satisfaction, gaming motives, and Internet gaming disorder. *EHPS 2017 Abstracts Booklet*.

Wu, M., Zhao, K., & Fils-Aime, F. (2022). Response rates of online surveys in published research: A meta-analysis. *Computers in Human Behavior Reports, 7*. https://doi.org/10.1016/j.chbr.2022.100206

Ye, J., Wu, Y., Wu, Y., Chen, M., & Ye, J. (2022). Effects of short video addiction on the motivation and well-being of Chinese vocational college students. *Frontiers in Public Health, 10*. https://doi.org/10.3389/fpubh.2022.847672

Yee, N. (2006). The demographics, motivations, and derived experiences of users of

massively multi-user online graphical environments. *Presence: Teleoperators and virtual environments*, *15*(3), 309-329. https://doi.org/10.1162/pres.15.3.309

Yu, Y., Mo, P. K., Zhang, J., Li, J., & Lau, J. T. (2020). Impulsivity, self-control, interpersonal influences, and maladaptive cognitions as factors of internet gaming disorder among adolescents in China: Cross-sectional mediation study (Preprint). https://doi.org/10.2196/preprints.26810

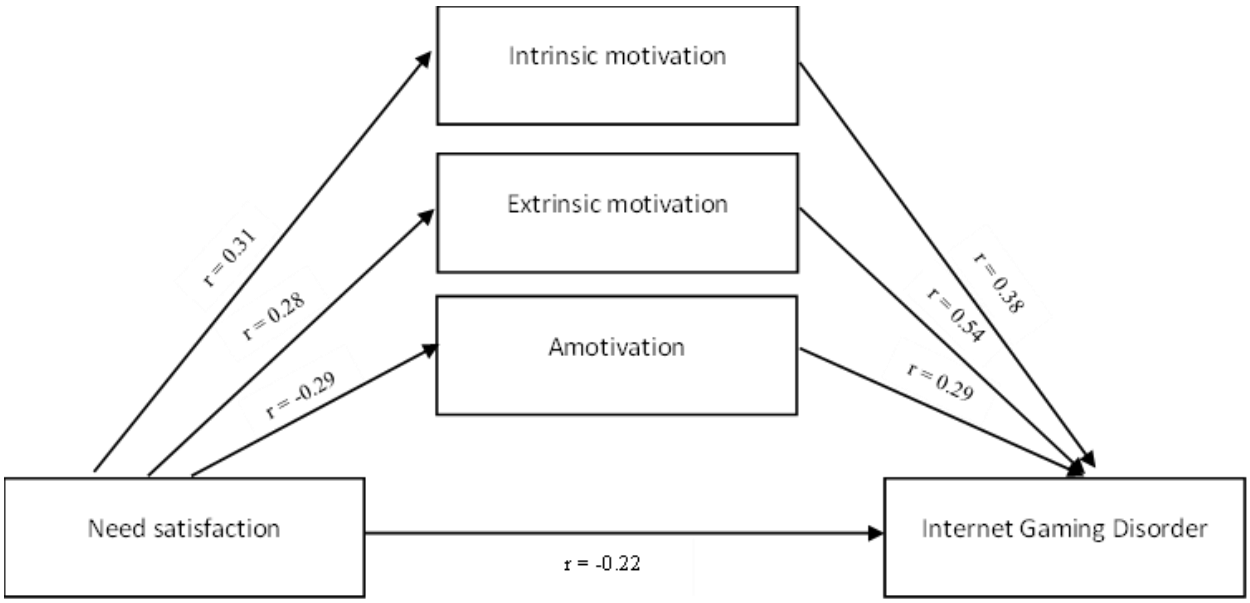
Zul Kamal, N. S., & Wok, S. (2020). The impact of online gaming addiction on mental health among iium students. *International Journal of Heritage, Art and Multimedia*, *3*(11). https://doi.org/10.35631/ijham.311001

Appendix A

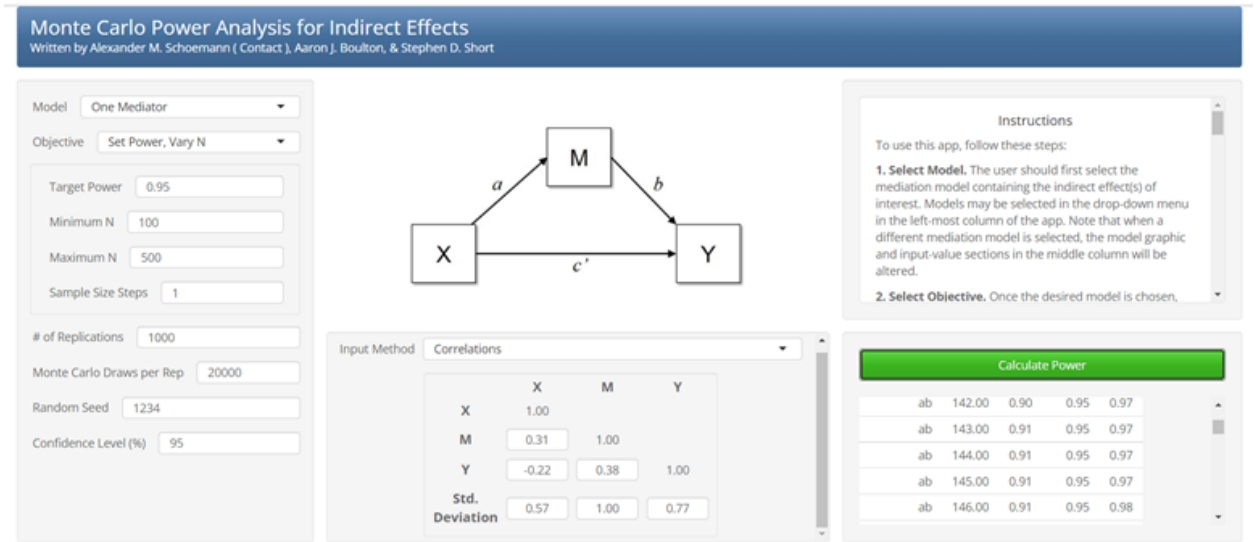
Sample Size Calculation

Figure 1: *Correlation between NS on Gaming Motivation, Gaming Motivation on IGD and NS on IGD.*

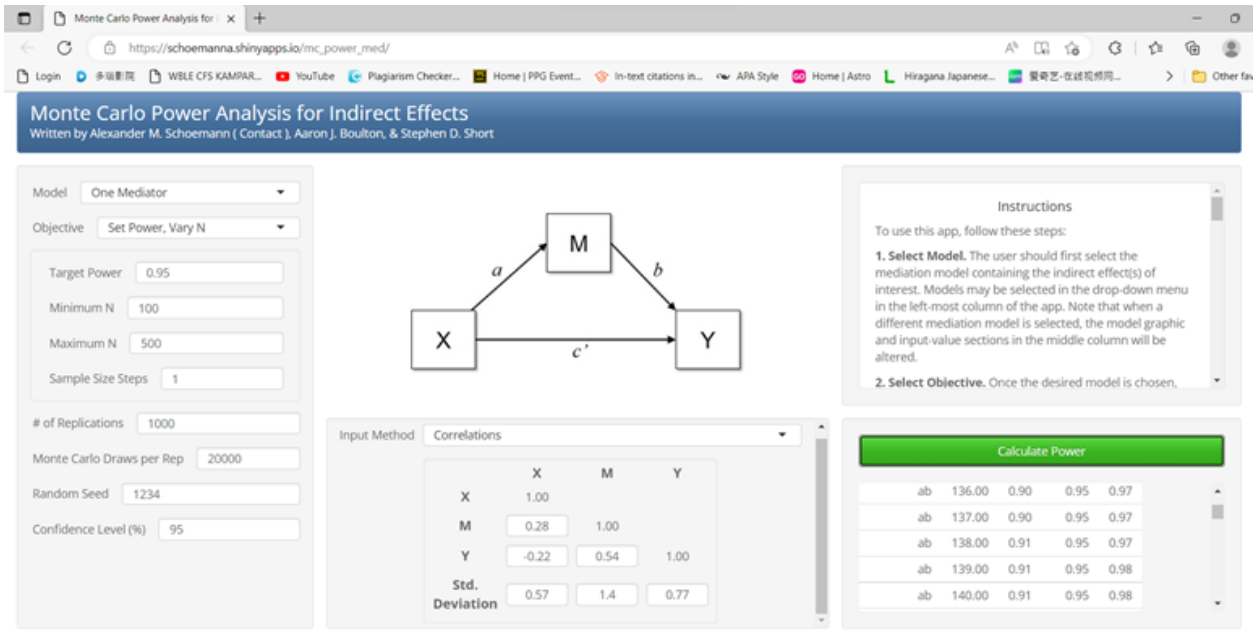
Sample size calculation



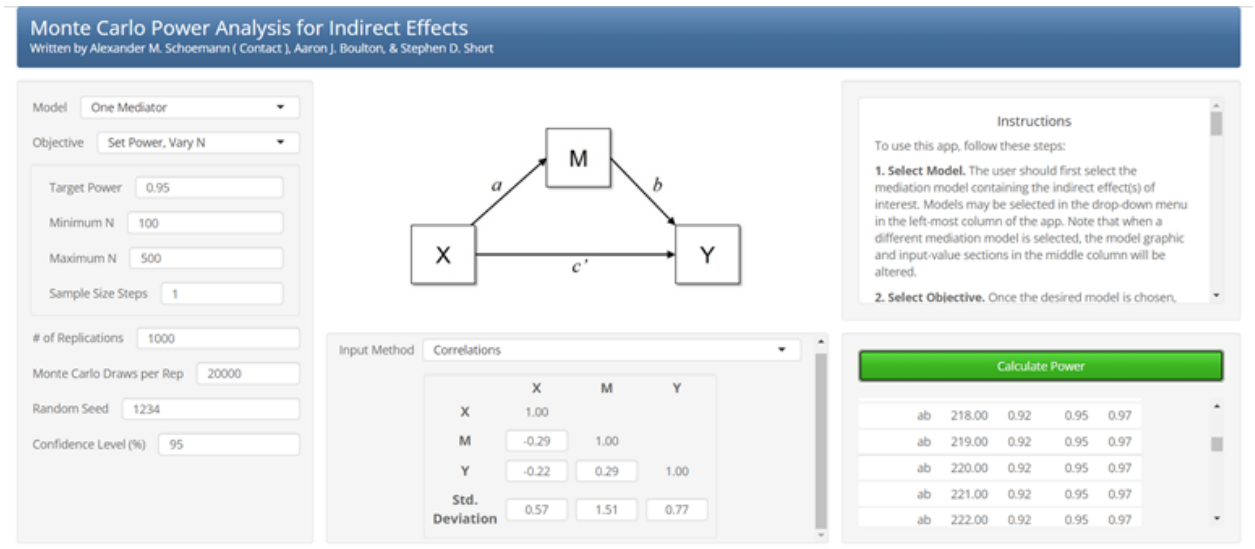
Appendix A1: *Suggested sample size calculation for IM*



Appendix A2: *Suggested sample size calculation for EM*



Appendix A3: *Suggested sample size calculation for AM*



Appendix B

Questionnaire

Consent Introduction

This research study is being conducted to examine "Basic Psychological Needs, Gaming Motivations, Internet Gaming Disorder, and Psychological Distress: Through the Lens of Self-Determination Theory". Your participation in this survey is highly appreciated.

Procedures

The questionnaire consists of six sections, which are Section A, Section B, Section C, Section D and Section E. You are required to complete ALL the sections. This survey will take approximately 15 to 20 minutes to complete.

Potential Risks and Benefits

There are no foreseeable physical or non-physical risks from your participation in this study. Your participation will help us get more information and learn more about the relationships between the selected key variables of the study.

Participation

Participation in this study is completely voluntary. If you decide not to participate there will not be any negative consequences. Please be aware that if you decide to participate, you may stop participating at any time. Your participation in this study is entirely voluntary and withdrawal from this study is allowed at any time. All data will be handled with strict confidentiality and anonymity in accordance with the Personal Data Protection Act (PDPA) 2010 for academic purposes only. UTAR Notice on Personal Data and Protection Statement can be found at: https://www2.utar.edu.my/PrivacyNotice_English.jsp

Confidentiality

Your responses are completely anonymous and all information will be kept in confidential. The information given will only be used for academic purposes.

Contact

If you have any questions, or would like a copy of this consent letter, please contact me at tngst@utar.edu.my.

Please ensure that you have fulfilled the following criteria:

- Age between 18 and 29 years old
- Have experience playing MOBA games (DOTA 2, League of Legends, Mobile Legends etc)
- At least 12 months experience in playing MOBA games

End of Block: Consent

Start of Block: Demographic

Q1 Age

_____

Q2 Sex

- Male (1)
- Female (2)

Q3 Relationship Status

- Single (1)
- Married (2)
- In relationship (3)
- Separated/Divorced (4)

Q4 Race

- ○ Malay (1)
- ○ Chinese (2)
- ○ India (3)
- ○ Others: (4) _____

Q5 Employment Status

- ○ Employed (1)
- ○ Unemployed (2)
- ○ Others (e.g., Student) (3)

_____

Q6 Are you a Multiplayer Online Battle Area (MOBA) gamer?

- ○ Yes (1)
- ○ No (2)

Q7 Educational Level

- ○ Secondary School/Pre-U (1)
- ○ Diploma (2)
- ○ Bachelor Degree (3)
- ○ Postgraduate Degree (4)

Q8 Gaming Frequency (per week)

- ○ 0 – 1 time (1)
- ○ 2 – 4 times (2)
- ○ 5 – 8 times (3)
- ○ 9 times and above (4)

Q9 Gaming Duration (per week)

- ○ 1 hour and below (1)
- ○ 2 to 4 hours (2)
- ○ 5 to 7 hours (3)
- ○ 8 to 10 hours (4)
- ○ 11 hours and above (5)

Q10 Gaming Experience (in years)

- ○ < 1 year (1)
- ○ 1 to 3 years (2)
- ○ 4 to 6 years (3)
- ○ 7 to 9 years (4)
- ○ 10 years and above (5)

Q11 Starting Age of Playing Internet Games

_____

End of Block: Demographic

Start of Block: Internet Gaming Disorder Scale- Short-Form (IGDS9-SF)

IGD 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 has been 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.

1 Never 2 Rarely 3 Sometimes 4 Often 5 Very often

	1 Never (1)	2 Rarely (2)	3 Sometimes (3)	4 Often (4)	5 Very Often (5)
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?). (IGD_1)	○	○	○	○	○
Do you feel more irritability, anxiety or even sadness when you try to either reduce or stop your gaming activity? (IGD_2)	○	○	○	○	○
Do you feel the need to spend increasing amount of time engaged gaming in order to achieve satisfaction or pleasure? (IGD_3)	○	○	○	○	○
Do you systematically fail when trying to control or cease your gaming activity? (IGD_4)	○	○	○	○	○
Have you lost interests in previous hobbies and other entertainment activities as a result of your engagement with the game? (IGD_5)	○	○	○	○	○

Have you continued your gaming activity despite knowing it was causing problems between you and other people? (IGD_6)	○	○	○	○
Have you deceived any of your family members, therapists or others because the amount of your gaming activity? (IGD_7)	○	○	○	○
Do you play in order to temporarily escape or relieve a negative mood (e.g., helplessness, guilt, anxiety)? (IGD_8)	○	○	○	○
Have you jeopardized or lost an important relationship, job or an educational or career opportunity because of your gaming activity? (IGD_9)	○	○	○	○

End of Block: Internet Gaming Disorder Scale- Short-Form (IGDS9-SF)

Start of Block: Basic Psychological need Satisfaction and Frustration Scale (BPNSF)

BPNSF Instruction:

Below we ask you about the kind of experiences you actually have in your life. Please read each of the following items carefully. You can choose from 1 to 5 to indicate the degree to which the statement is true for you at this point in your life.

1 Completely Disagree 2 Disagree 3 Neutral 4 Agree 5 Completely Agree

Autonomy Satisfaction

	1 Completely Disagree (1)	2 Disagree (2)	3 Neutral (3)	4 Agree (4)	5 Completely Agree (5)
I feel a sense of choice and freedom in the things I undertake. (AS_1)	○	○	○	○	○
I feel that my decisions reflect what I really want. (AS_2)	○	○	○	○	○
I feel my choices express who I really am. (AS_3)	○	○	○	○	○
I feel I have been doing what really interests me. (AS_4)	○	○	○	○	○

X→ X→

RS Relatedness Satisfaction

	1 Completely Disagree (1)	2 Disagree (2)	3 Neutral (3)	4 Agree (4)	5 Completely Agree (5)
I feel that the people I care about also care about me. (RS_1)	○	○	○	○	○
I feel connected with people who care for me, and for whom I care. (RS_2)	○	○	○	○	○
I feel close and connected with other people who are important to me. (RS_3)	○	○	○	○	○
I experience a warm feeling with the people I spend time with. (RS_4)	○	○	○	○	○

X→ X→

CS Competence Satisfaction

	1 Completely Disagree (1)	2 Disagree (2)	3 Neutral (3)	4 Agree (4)	5 Completely Agree (5)
I feel confident that I can do things well. (CS_1)	○	○	○	○	○
I feel capable at what I do. (CS_2)	○	○	○	○	○
I feel competent to achieve my goals. (CS_3)	○	○	○	○	○
I feel I can successfully complete difficult tasks. (CS_4)	○	○	○	○	○

GAMS Instruction:

These questions will ask you about the type of gaming motivation that you have in your gaming behavior. Please read each of the following items carefully. You can choose from 1 to 7 to indicate the degree to which the statement that you agree at this point in your daily life.

1 Do not agree at all 2 Strongly not agree 3 Do not agree 4 Neutral 5 Agree 6 Strongly agree 7 Very strongly agree

	1 Do not agree at all (1)	2 Strongly not agree (2)	3 Do not agree (3)	4 Neutral (4)	5 Agree (5)	6 Strongly agree (6)	7 Very strongly agree (7)
Because it is stimulating to play. (GAMS_1)	○	○	○	○	○	○	○
For the pleasure of trying/experiencing new game options (e.g., classes, characters, teams, races, equipment). (GAMS_2)	○	○	○	○	○	○	○
For the feeling of efficacy I experience when I play. (GAMS_3)	○	○	○	○	○	○	○
Because it is an extension of me. (GAMS_4)	○	○	○	○	○	○	○
Because it is an integral part of my life. (GAMS_5)	○	○	○	○	○	○	○
Because it is aligned with my personal values. (GAMS_6)	○	○	○	○	○	○	○

Because it is a good way to develop important aspects of myself. (GAMS_7)	○	○	○	○	○	○	○
Because it is a good way to develop social and intellectual abilities that are useful to me. (GAMS_8)	○	○	○	○	○	○	○
Because it has personal significance to me. (GAMS_9)	○	○	○	○	○	○	○
Because I feel that I must play regularly. (GAMS_10)	○	○	○	○	○	○	○
Because I must play to feel good about myself. (GAMS_11)	○	○	○	○	○	○	○
Because otherwise I would feel bad about myself. (GAMS_12)	○	○	○	○	○	○	○
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). (GAMS_13)	○	○	○	○	○	○	○

For the prestige of being a good player. (GAMS_14)	○	○	○	○	○	○	○
To gain in-game awards and trophies or character/avatar's levels and experiences points. (GAMS_15)	○	○	○	○	○	○	○
It is not clear anymore; I sometimes ask myself if it is good for me. (GAMS_16)	○	○	○	○	○	○	○
I used to have good reasons, but now I am asking myself if I should continue. (GAMS_17)	○	○	○	○	○	○	○
Honestly, I don't know; I have the impression that I'm wasting my time. (GAMS_18)	○	○	○	○	○	○	○

End of Block: Gaming Motivation Scale (GAMS)

Q25
Please insert your **Touch 'n Go** contact number, **RM5 token of appreciation** will be awarded*
*Note: only applicable for those who spent at least **10 minutes** completing this survey.

_____

End of Block: Block 6

Appendix C

Reliability of Instruments

Table 1: *Reliability of instruments in actual study*

Variable	Number of items	Cronbach's alpha
Internet Gaming Disorder Scale-Short Form	9	.844
Basic Psychological Need Satisfaction and Frustration Scale	12	.796
Gaming Motivation Scale	18	.848

Table 2: *Reliability of instruments in pilot study*

Variable	Number of items	Cronbach's alpha
Internet Gaming Disorder Scale-Short Form	9	.802
Basic Psychological Need Satisfaction and Frustration Scale	12	.853
Gaming Motivation Scale	18	.822

Appendix D

Screenshots of Facebook MOBA Groups

Figure D1: *王者荣耀—马来西亚*

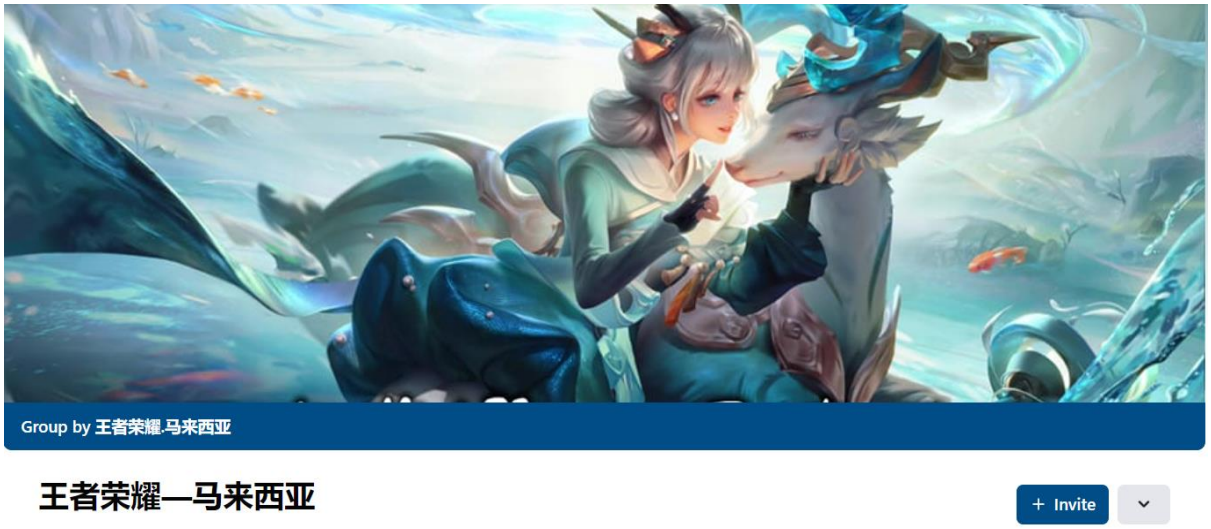


Figure D2: *DOTA 2 Malaysia | Players* ✔

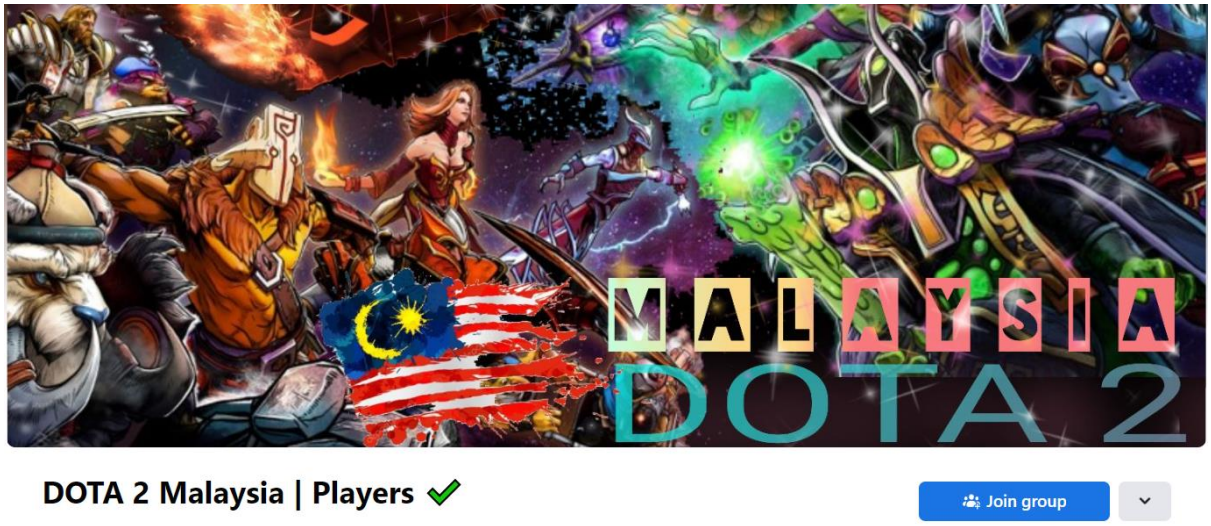


Figure D3: *Dota 2 大马华人玩家群(D2CM)*

Figure D4: *Mobile Legends MOBA (Malaysia)*

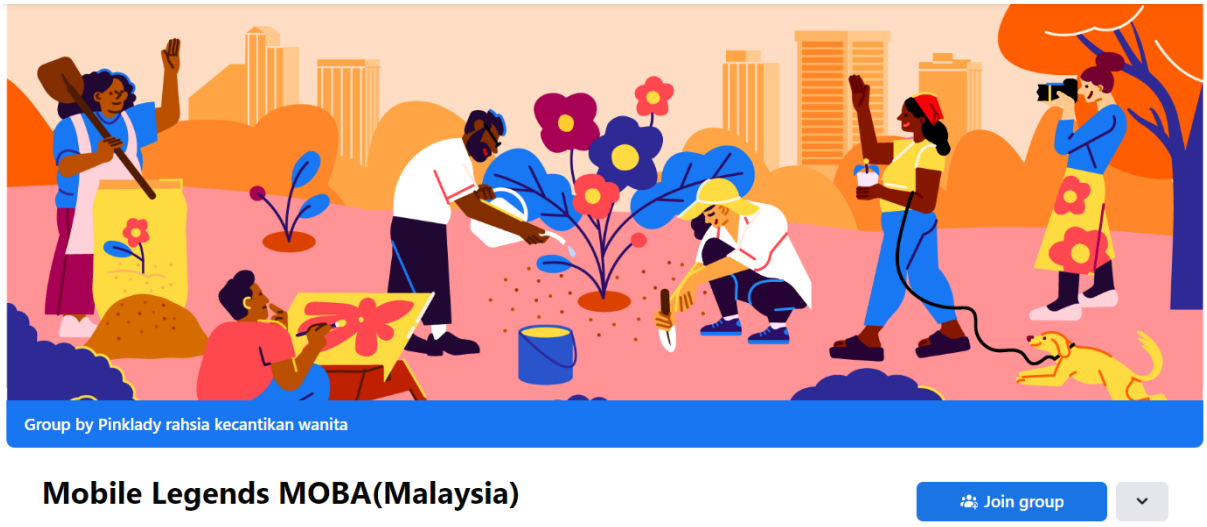


Figure D5: *Pokémon Unite [Malaysia]*

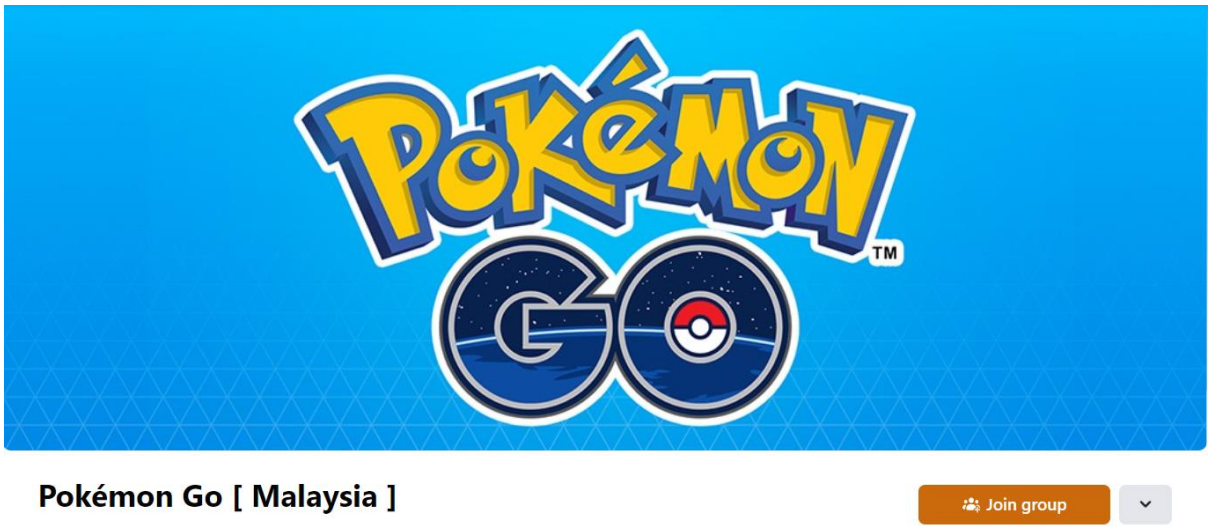


Figure D6: *POKEMON UNITE MALAYSIA*

Figure D7: *Mobile Legends Malaysia*

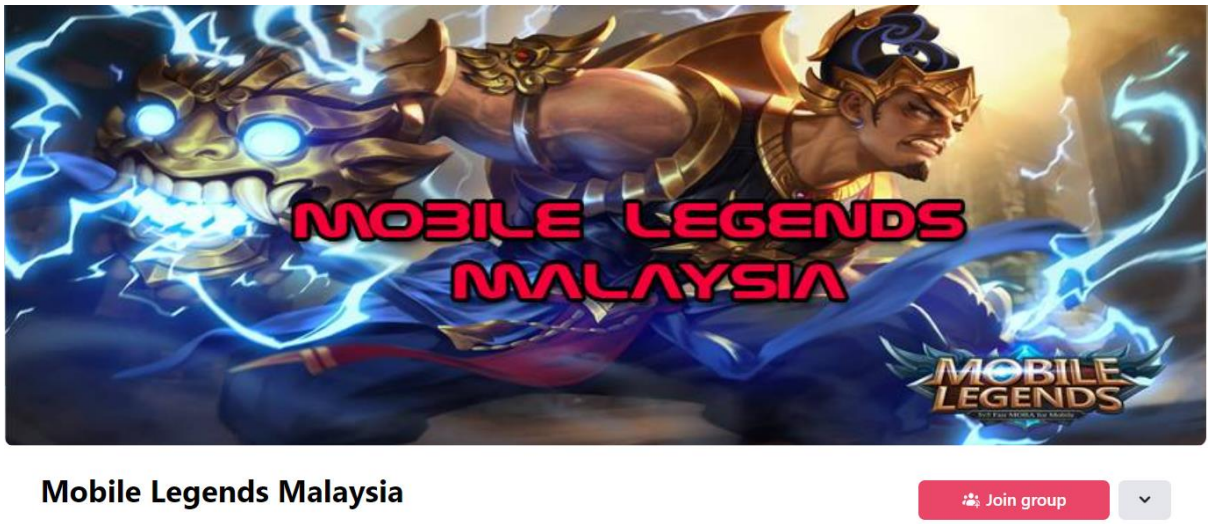


Figure D8: *[OFFICIAL COMMUNITY] League of Legends*

Figure D9: *Malaysia League of Legends*

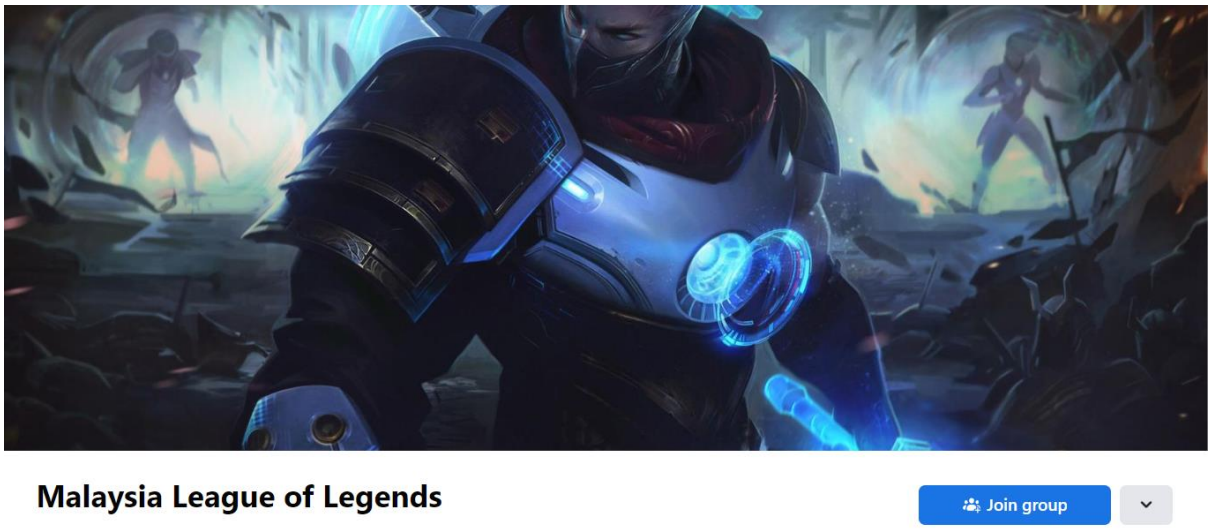


Figure D10: *MOBILE LEGENDS MALAYSIA*

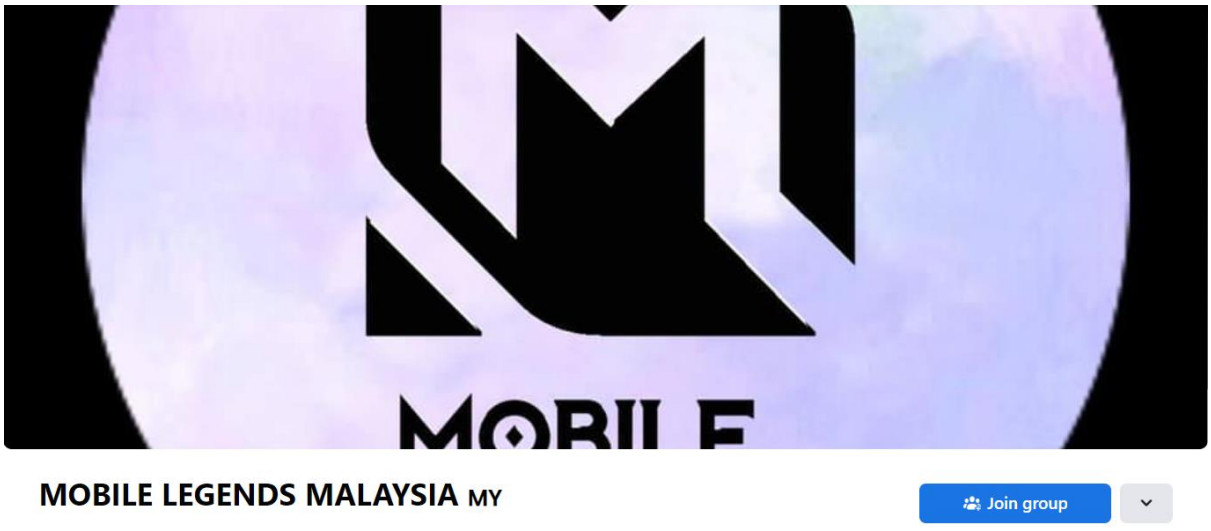


Figure D11: *Dota 2 Malaysia*

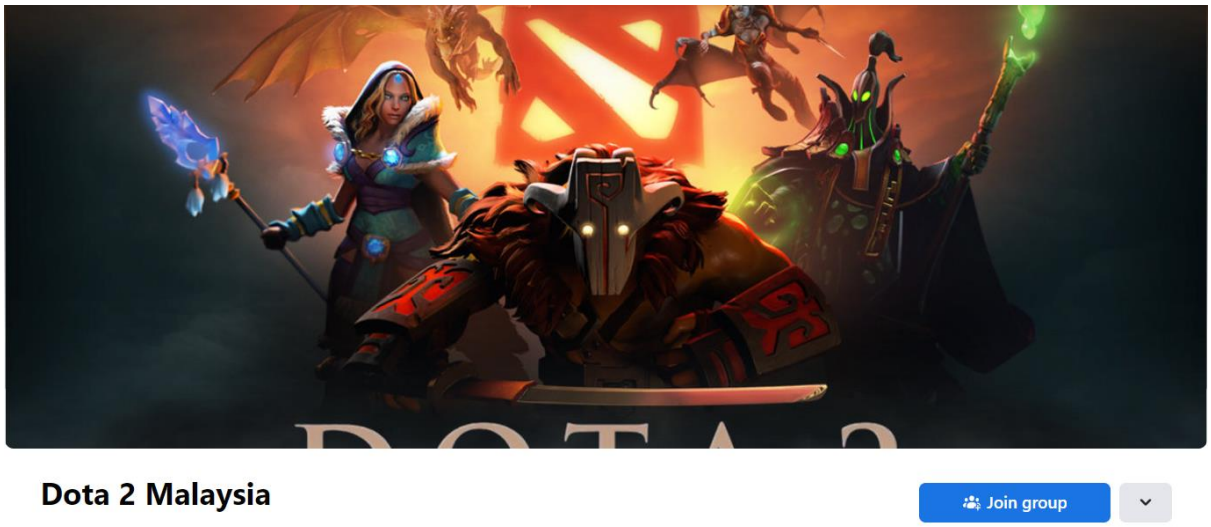


Figure D12: *Malaysia Mobile Legends*

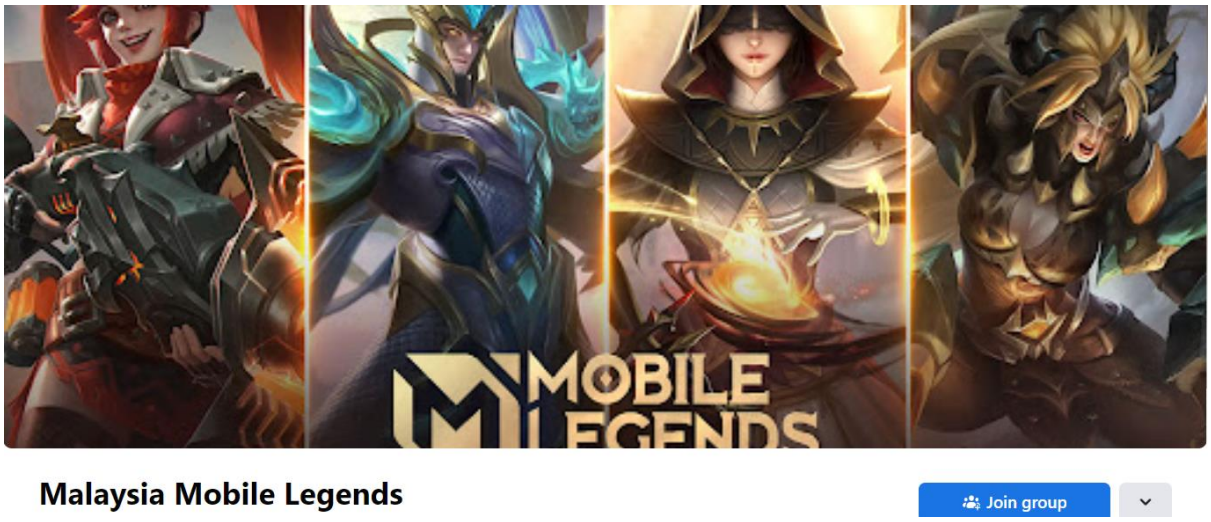


Figure D13: *Pokémon UNITE 宝可梦大集结(马来西亚)*

Figure D14: *Mobile Legends - MOBA Malaya*

Figure D15: *Mobile legends 马来西亚华文群组*

Appendix E

SPSS Output: Normality Assumptions

Table 4.1: *Skewness and Kurtosis*

Variable	Skewness	Kurtosis
Internet Gaming Disorder	-.161	-.637
Need Satisfaction	.061	.166
Intrinsic Motivation	.279	1.401
Extrinsic Motivation	.091	.548
Amotivation	-.551	.239

Figure 4.1: *Histogram for IGD*

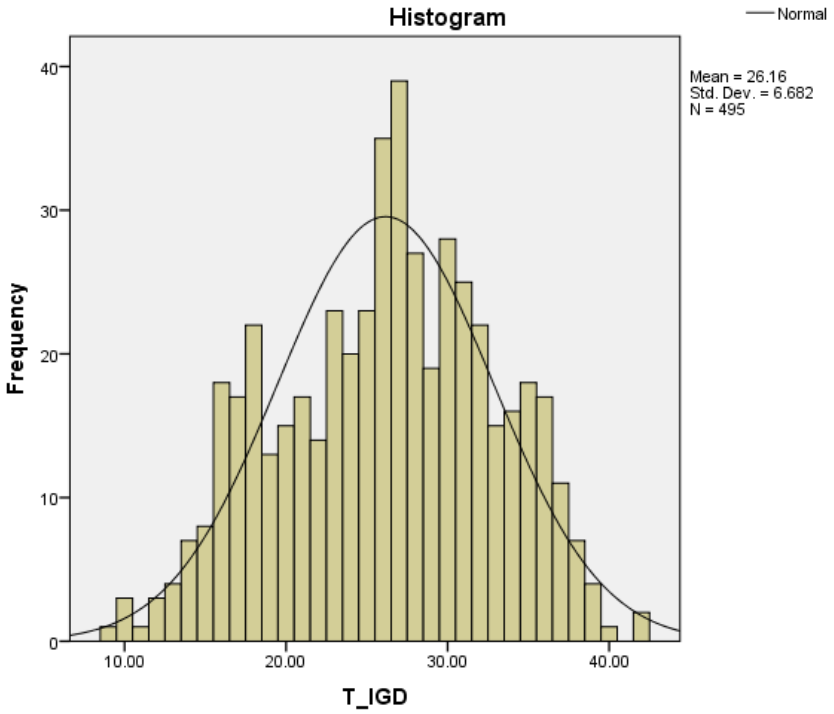


Figure 4.2: *Histogram for BPNS*

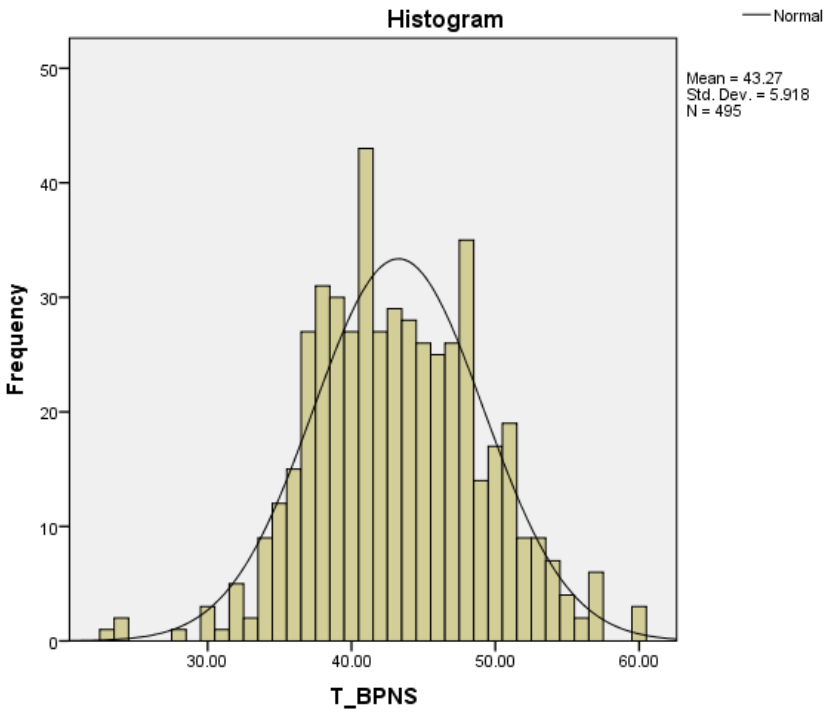


Figure 4.3: *Histogram for IM*

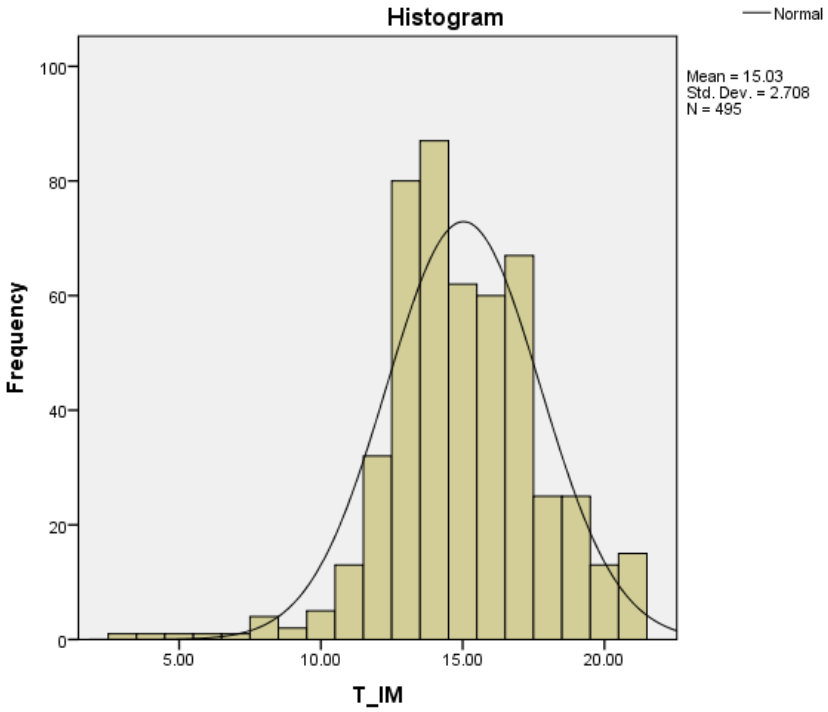


Figure 4.4: *Histogram for EM*

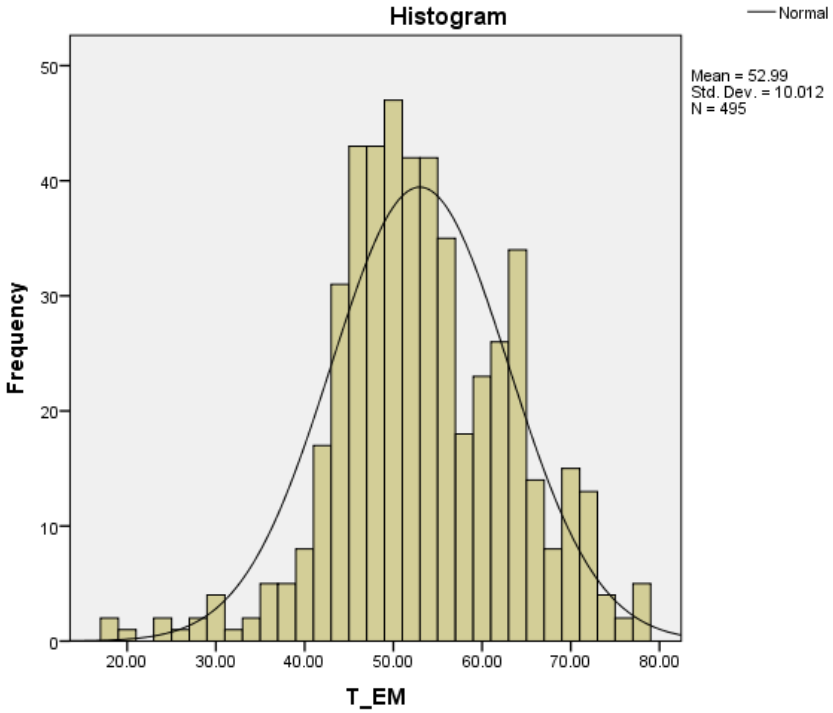


Figure 4.5: *Histogram for AM*

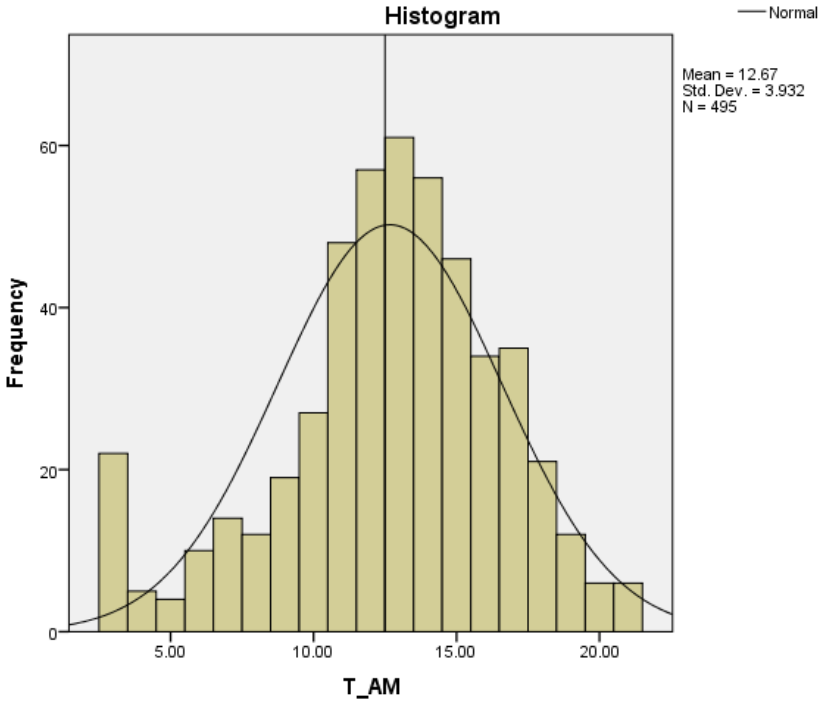


Table 4.2: *Kolmogorov-Smirnov (K-S) Test*

Variable	Significant value
Internet Gaming Disorder	.000
Need Satisfaction	.000
Intrinsic Motivation	.000
Extrinsic Motivation	.000
Amotivation	.000

Figure 4.6: *Q-Q Plot for IGD*

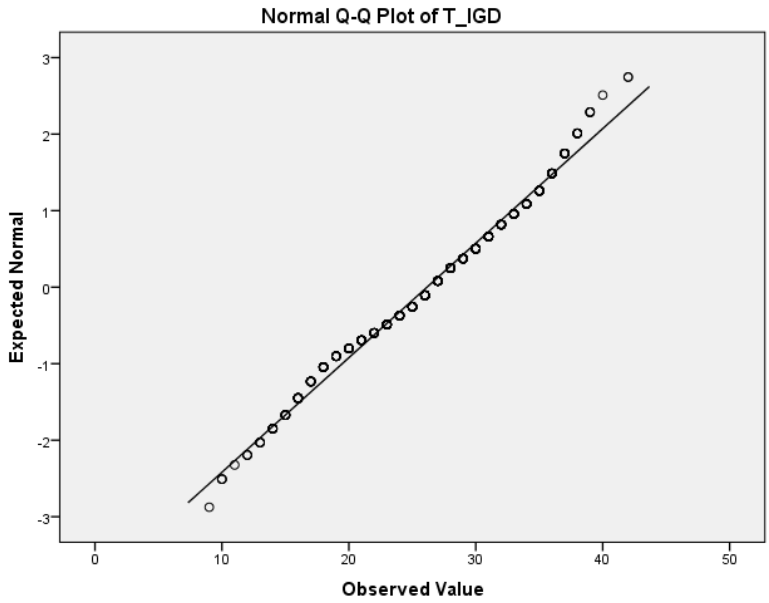


Figure 4.7: *Q-Q Plot for BPNS*

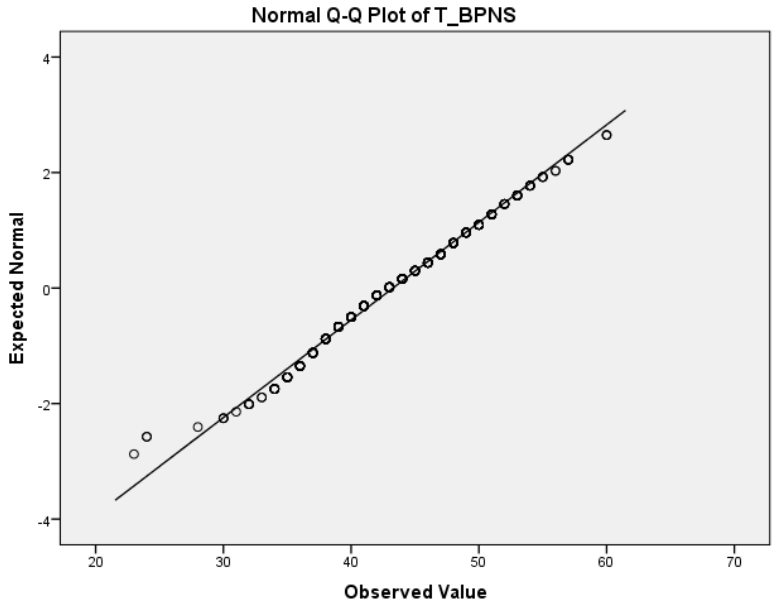


Figure 4.8: *Q-Q Plot for IM*

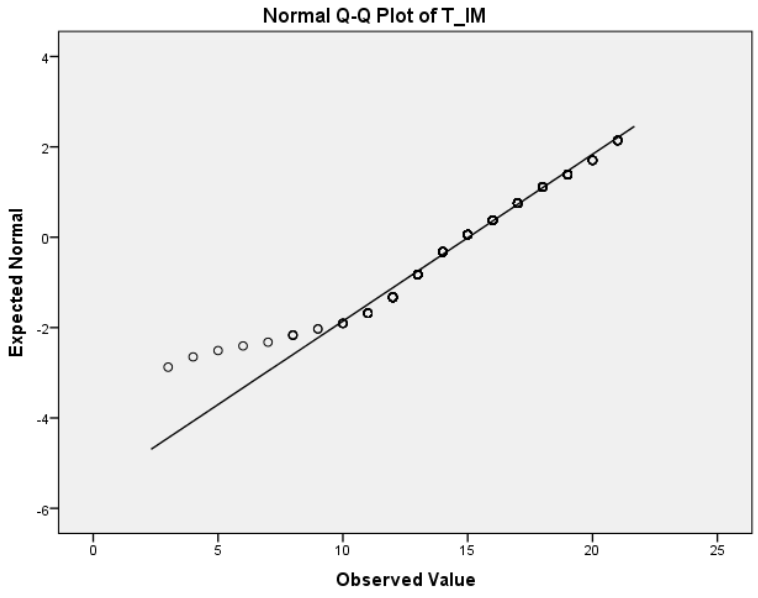


Figure 4.9: *Q-Q Plot for EM*

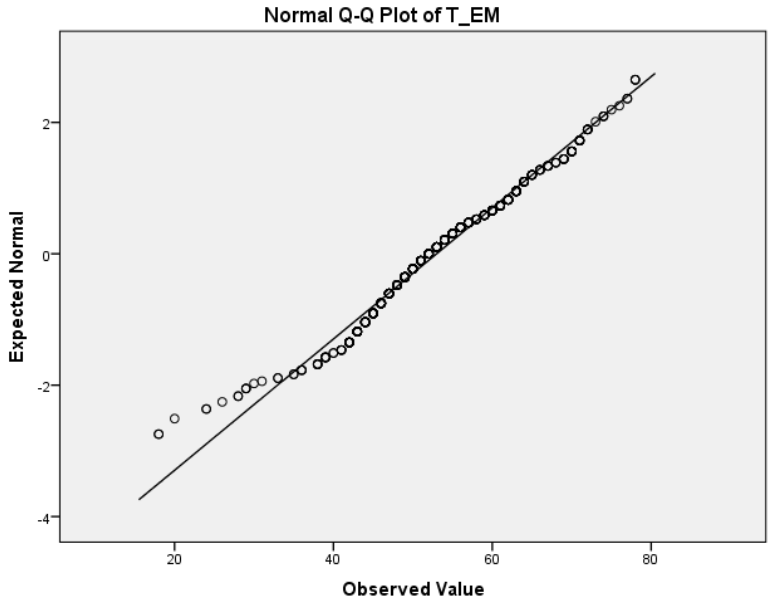


Figure 4.10: *Q-Q Plot for AM*

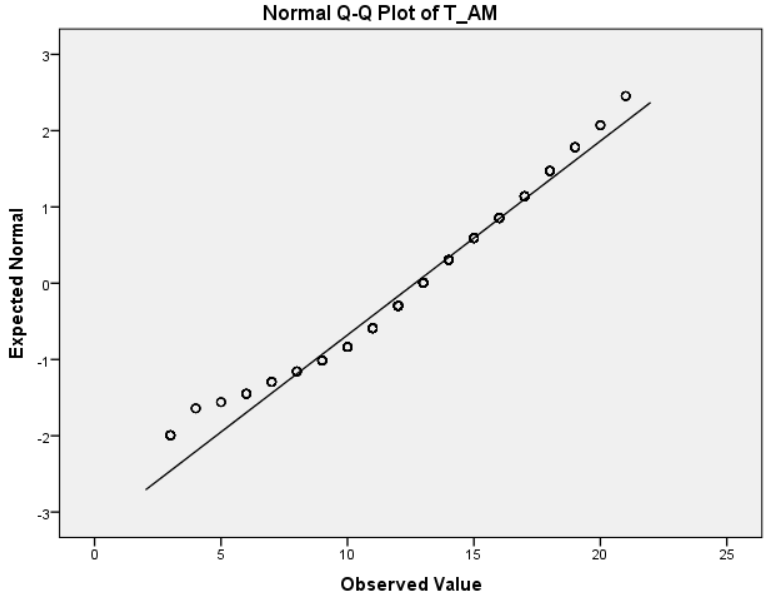


Figure 4.11: *Boxplot for IGD*

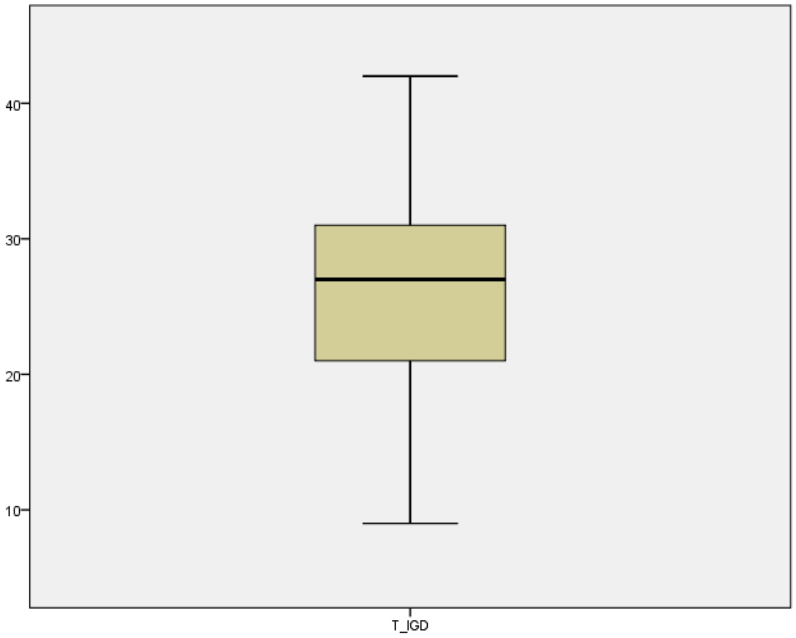


Figure 4.12: *Boxplot with Outliers for BPNS*

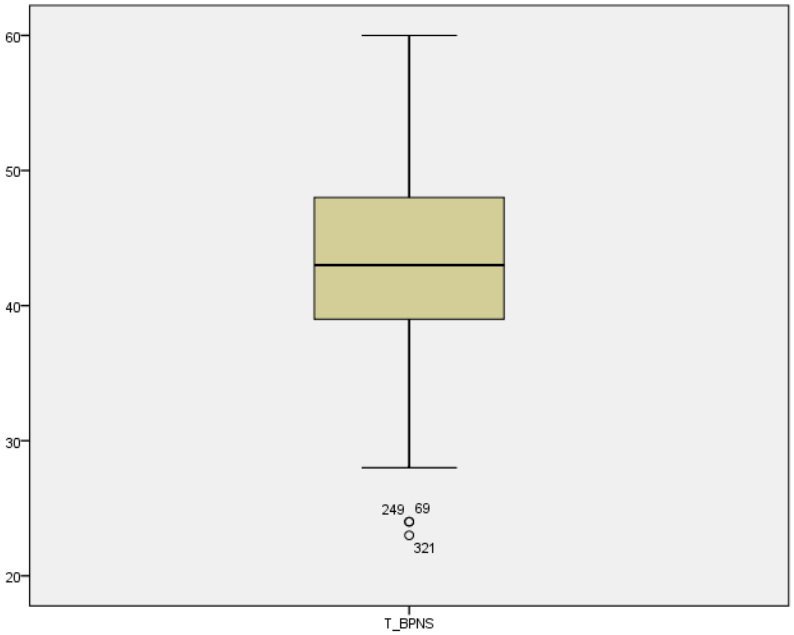


Figure 4.13: *Boxplot with Outliers for IM*

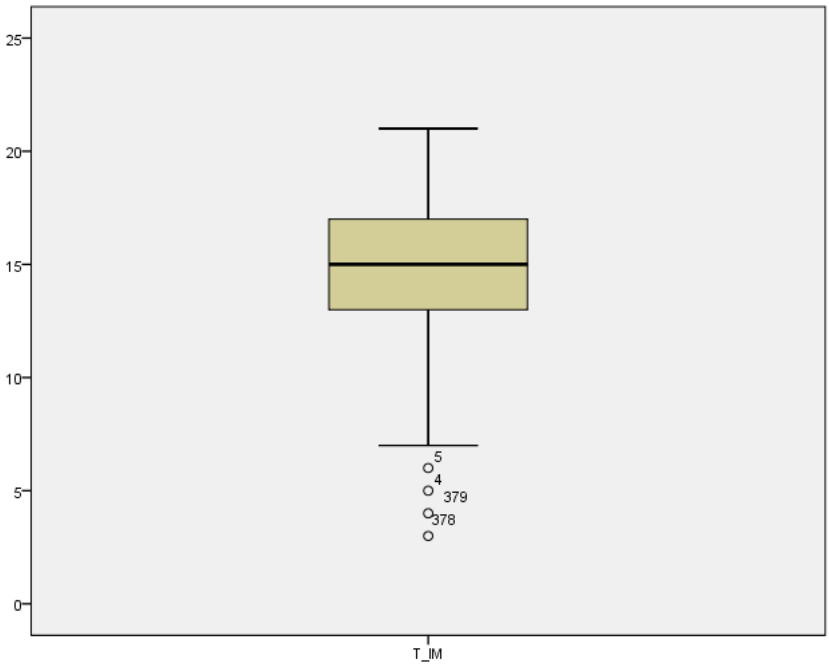


Figure 4.14: *Boxplot with Outliers for EM*

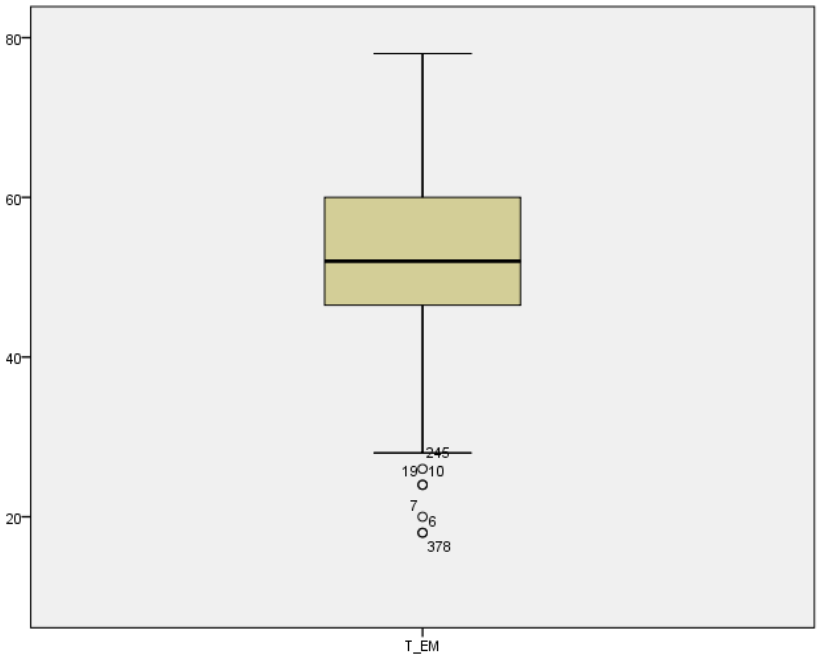
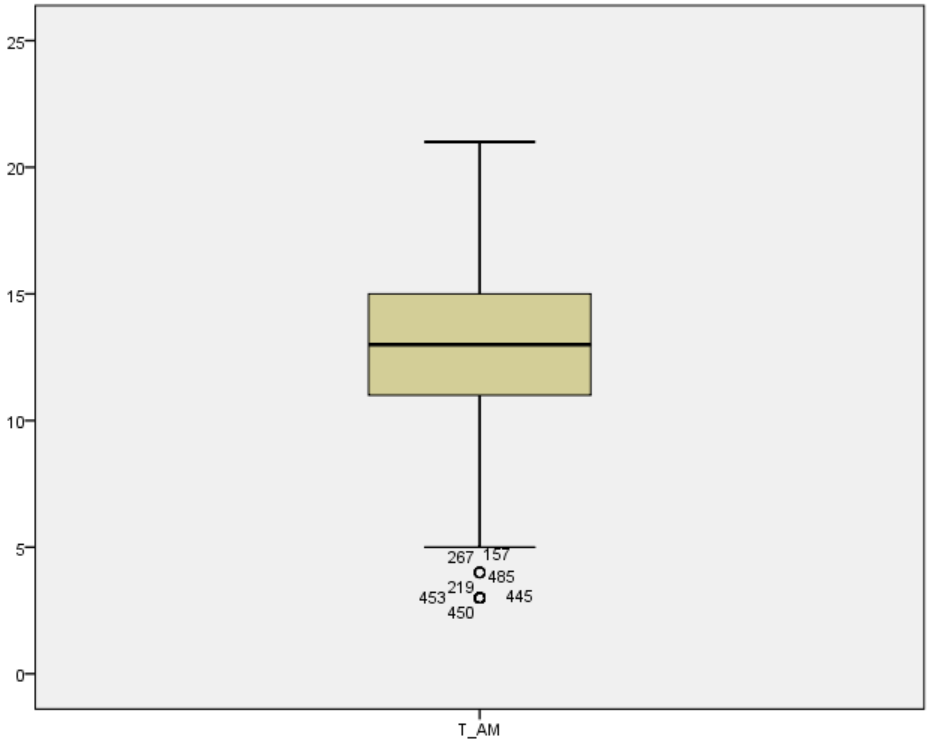


Figure 4.15: *Boxplot with Outliers for AM*



Appendix F

SPSS Output: Descriptive Statistics

Table 4.3: *Frequency Distribution of Participants Demographic Variables and Main Variables*

Variable	*n*	*%*	*M*	*SD*
Age			23.98	2.715
Sex				
Male	337	68.1		
Female	158	31.9		
Relationship Status				
Single	312	63.0		
Married	69	13.9		
In relationship	114	23.0		
Race				
Malay	99	20		
Chinese	339	68.5		
Indian	54	10.9		
Others	3	0.6		
Employment Status				
Employed	333	67.3		
Unemployed	19	3.8		
Others	143	28.9		
Educational level				
Secondary School/Pre-U	89	18.0		
Diploma	173	34.9		

Bachelor's degree	214	43.2		
Postgraduate Degree	19	3.8		
Are you a Multiplayer Online Battle Area (MOBA) gamer?				
Yes	495	100		
No				
Gaming Frequency (per week)				
0-1 time	7	1.4		
2-4 times	156	31.5		
5-8 times	233	47.1		
9 times and above	99	20.0		
Gaming Duration (per week)				
1 hour and below	11	2.2		
2 to 4 hours	160	32.3		
5 to 7 hours	141	28.5		
8 to 10 hours	109	22.0		
11 hours and above	74	14.9		
Gaming Experience (in years)				
1 year and below				
1 to 3 years	63	12.7		
4 to 6 years	190	38.4		
7 to 9 years	117	23.6		
Internet Gaming Disorder			26.16	6.68
Low (≤ 26.16)	244	49.3		
High (>26.16)	251	50.7		

Need Satisfaction			43.27	5.92
Low (≤ 43.27)	265	53.5		
High (>43.27)	230	46.5		
Intrinsic Motivation			15.03	2.71
Low (≤ 15.03)	290	58.6		
High (>15.03)	205	41.4		
Extrinsic Motivation			52.99	10.01
Low (≤ 52.99)	256	51.7		
High (>52.99)	239	48.3		
Amotivation			12.67	3.93
Low (≤ 12.67)	218	44.0		
High (>12.67)	277	56.0		

Appendix G

SPSS Output: Multiple Linear Regression

Table 4.4: *Coefficients among Variables*

	Collinearity Statistics	
Variables	Tolerance	VIF
Needs Satisfaction	.864	1.157
Extrinsic Motivation	.703	1.423
Intrinsic Motivation	.762	1.313
Amotivation	.854	1.170

a. Dependent Variable: Total_IGD

Figure 4.17: *Scatterplot Showed Normality of Residual, and Linearity of Residual Homoscedasticity, among Variables*

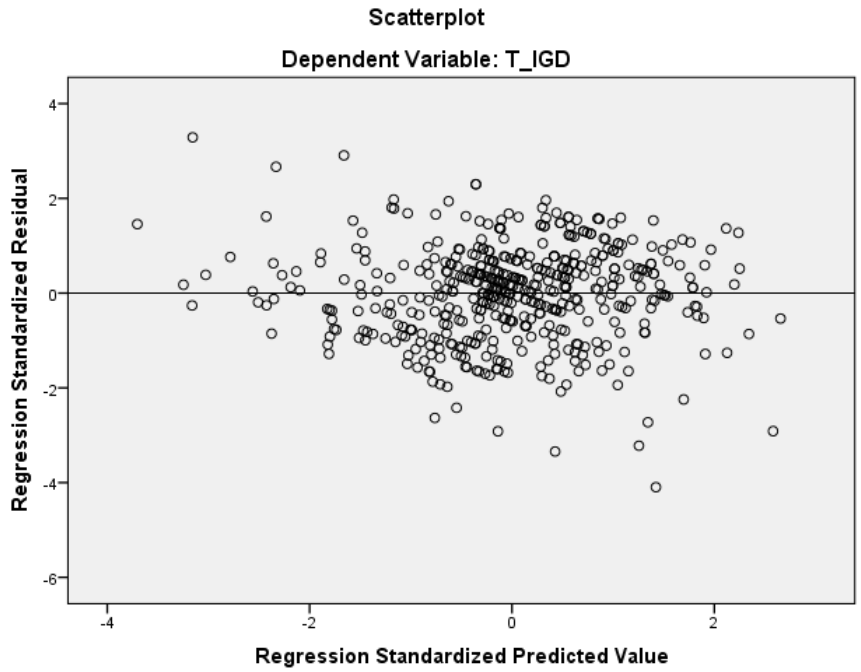


Table 4.5: *The Casewise Diagnostics for IGD*

		Case Number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
Group_IC	1	6	8.261	.03303	.01672
	2	26	2.886	.01188	.00584
	3	61	11.112	.05345	.02249
	4	112	14.373	.07167	.02910
	5	136	5.909	.03216	.01196
	6	193	2.209	.00912	.00447
	7	199	7.483	.03005	.01515
	8	223	3.585	.01609	.00726
	9	233	2.596	.00866	.00526
	10	271	10.256	.02406	.02076
	11	299	6.009	.01260	.01216
	12	339	1.127	.00458	.00228
	13	340	1.127	.00458	.00228
	14	352	7.166	.02429	.01451
	15	388	4.205	.03610	.00851
	Total N		15	15	15

Figure 4.18: *Case summaries*

Case Summaries[a]

		Mahalanobis Distance	Cook's Distance	Centered Leverage Value
VAR0000 1	1	13.60346	.00014	.02754
	2	3.16562	.00342	.00641
	3	3.16562	.00342	.00641
	4	24.97520	.00077	.05056
	5	15.71391	.00099	.03181
	6	14.71339	.01440	.02978
	7	1.23340	.00125	.00250
	8	13.46603	.00042	.02726
	9	13.80636	.00465	.02795
	10	3.30199	.00001	.00668
	11	1.71788	.00304	.00348
	12	7.85789	.00219	.01591
	13	2.66412	.00007	.00539
	14	2.09528	.00028	.00424
	15	1.60789	.00010	.00325
	16	.59120	.00038	.00120
	17	1.72716	.00025	.00350

	18	11.09020	.00076	.02245
	19	5.78199	.00800	.01170
	20	1.78832	.00000	.00362
	21	9.43700	.00125	.01910
	22	4.15014	.00001	.00840
	23	1.02042	.00000	.00207
	24	1.02070	.00000	.00207
	25	.63078	.00030	.00128
	26	1.33588	.00008	.00270
	27	1.42849	.00000	.00289
	28	.88176	.00036	.00178
	29	.75971	.00067	.00154
	30	4.06074	.00073	.00822
	31	2.04375	.00008	.00414
	32	1.15447	.00010	.00234
	33	2.70652	.00408	.00548
	34	2.06935	.00067	.00419
	35	1.15839	.00075	.00234
	36	1.14880	.00011	.00233
	37	1.77327	.00004	.00359
	38	3.10614	.00008	.00629
	39	1.38381	.00003	.00280
	40	3.47638	.00315	.00704

	41	1.54002	.00063	.00312
	42	1.54002	.00063	.00312
	43	.93295	.00121	.00189
	44	9.45614	.00049	.01914
	45	4.61105	.00104	.00933
	46	5.88448	.00004	.01191
	47	1.46331	.00152	.00296
	48	1.46331	.00152	.00296
	49	9.62243	.00105	.01948
	50	1.79818	.00013	.00364
	51	.89120	.00028	.00180
	52	25.04900	.00874	.05071
	53	.86936	.00000	.00176
	54	1.29669	.00005	.00262
	55	1.36545	.00013	.00276
	56	1.36046	.00020	.00275
	57	1.21131	.00000	.00245
	58	1.31257	.00001	.00266
	59	.77120	.00005	.00156
	60	.40902	.00050	.00083
	61	1.20521	.00001	.00244
	62	2.18157	.00119	.00442
	63	1.00139	.00032	.00203

	64	1.32361	.00000	.00268
	65	.42179	.00000	.00085
	66	4.90057	.00584	.00992
	67	14.62779	.00240	.02961
	68	.84213	.00065	.00170
	69	2.20569	.00259	.00446
	70	12.29032	.00331	.02488
	71	1.07584	.00002	.00218
	72	1.22654	.00010	.00248
	73	.43269	.00010	.00088
	74	13.38016	.00019	.02709
	75	2.57487	.00327	.00521
	76	1.78750	.00024	.00362
	77	.97284	.00001	.00197
	78	.40125	.00001	.00081
	79	1.32610	.00015	.00268
	80	.83254	.00034	.00169
	81	1.78284	.00073	.00361
	82	.60813	.00003	.00123
	83	1.26378	.00008	.00256
	84	1.09369	.00060	.00221
	85	2.36321	.00000	.00478
	86	.35176	.00018	.00071

	87	1.38000	.00010	.00279
	88	1.37330	.00000	.00278
	89	.49174	.00002	.00100
	90	5.48402	.00155	.01110
	91	.78677	.00048	.00159
	92	.70504	.00001	.00143
	93	3.29440	.00235	.00667
	94	2.43181	.00014	.00492
	95	1.77754	.00038	.00360
	96	1.77754	.00038	.00360
	97	1.90574	.00127	.00386
	98	1.04772	.00018	.00212
	99	1.35972	.00018	.00275
	100	1.73892	.00136	.00352
	101	10.54416	.00525	.02134
	102	3.83957	.00039	.00777
	103	8.21047	.01054	.01662
	104	.37183	.00135	.00075
	105	1.88395	.00324	.00381
	106	2.30835	.00282	.00467
	107	5.45797	.00550	.01105
	108	2.14272	.00353	.00434
	109	.55537	.00006	.00112

	110	10.60422	.00195	.02147
	111	4.00913	.00174	.00812
	112	2.87327	.00016	.00582
	113	8.10066	.00073	.01640
	114	4.56470	.00272	.00924
	115	2.40151	.00320	.00486
	116	2.19911	.00220	.00445
	117	1.87064	.00055	.00379
	118	7.55766	.00590	.01530
	119	4.18217	.00059	.00847
	120	2.18730	.00028	.00443
	121	2.31358	.00156	.00468
	122	1.32267	.00365	.00268
	123	1.68972	.00015	.00342
	124	7.02554	.00565	.01422
	125	4.51469	.00242	.00914
	126	.62822	.00094	.00127
	127	5.52087	.00045	.01118
	128	5.43571	.00059	.01100
	129	.23598	.00036	.00048
	130	1.00867	.00002	.00204
	131	5.50843	.00045	.01115
	132	7.75099	.00018	.01569

	133	2.26007	.00287	.00458
	134	1.27074	.00003	.00257
	135	5.65658	.00141	.01145
	136	.64740	.00089	.00131
	137	6.50199	.00036	.01316
	138	3.60627	.00027	.00730
	139	3.60627	.00027	.00730
	140	6.03957	.00690	.01223
	141	5.89616	.00300	.01194
	142	.87637	.00087	.00177
	143	5.24195	.00265	.01061
	144	1.80199	.00307	.00365
	145	1.47675	.00042	.00299
	146	.68369	.00001	.00138
	147	2.19596	.00000	.00445
	148	.52918	.00031	.00107
	149	2.14603	.00115	.00434
	150	3.24576	.00027	.00657
	151	.30626	.00017	.00062
	152	.76757	.00021	.00155
	153	7.19991	.00265	.01457
	154	3.07101	.00169	.00622
	155	6.58777	.00094	.01334

	156	2.15530	.00028	.00436
	157	13.90712	.00002	.02815
	158	1.41376	.00368	.00286
	159	5.79332	.00135	.01173
	160	6.27211	.00076	.01270
	161	2.56619	.00207	.00519
	162	2.60753	.00037	.00528
	163	3.25016	.00029	.00658
	164	3.17090	.00102	.00642
	165	6.64030	.00526	.01344
	166	4.26817	.00023	.00864
	167	3.34062	.00173	.00676
	168	2.68213	.00332	.00543
	169	2.68213	.00332	.00543
	170	1.45488	.00009	.00295
	171	2.76090	.00005	.00559
	172	3.43137	.00191	.00695
	173	4.68124	.00108	.00948
	174	4.74588	.00256	.00961
	175	1.47474	.00061	.00299
	176	1.47474	.00061	.00299
	177	5.01752	.00088	.01016
	178	10.38661	.01222	.02103

	179	3.68179	.00020	.00745
	180	3.11882	.00266	.00631
	181	3.11882	.00266	.00631
	182	6.50799	.00218	.01317
	183	3.01423	.00001	.00610
	184	1.57795	.00000	.00319
	185	2.82350	.00297	.00572
	186	8.75441	.00326	.01772
	187	2.59244	.00052	.00525
	188	3.71269	.00012	.00752
	189	2.13674	.00049	.00433
	190	2.13674	.00049	.00433
	191	12.01230	.01452	.02432
	192	.99890	.00230	.00202
	193	5.82110	.00030	.01178
	194	2.44291	.00067	.00495
	195	4.91614	.00216	.00995
	196	10.29405	.00428	.02084
	197	2.37757	.00057	.00481
	198	6.12153	.00508	.01239
	199	3.72465	.00003	.00754
	200	3.72465	.00003	.00754
	201	2.29887	.00109	.00465

	202	2.29887	.00109	.00465
	203	3.60528	.00004	.00730
	204	4.03408	.00015	.00817
	205	7.00765	.00139	.01419
	206	2.33018	.00100	.00472
	207	3.31059	.00154	.00670
	208	1.48322	.00002	.00300
	209	1.48322	.00002	.00300
	210	2.15574	.00212	.00436
	211	4.05125	.00146	.00820
	212	10.90533	.00706	.02208
	213	8.86843	.00172	.01795
	214	6.19097	.00025	.01253
	215	19.83383	.03409	.04015
	216	3.49353	.00051	.00707
	217	.54032	.00017	.00109
	218	9.29883	.00498	.01882
	219	5.86329	.00122	.01187
	220	3.20792	.00530	.00649
	221	3.81860	.00148	.00773
	222	4.81745	.00696	.00975
	223	5.42549	.00047	.01098
	224	6.91872	.00775	.01401

	225	1.11413	.00010	.00226
	226	6.02620	.00176	.01220
	227	3.89688	.00000	.00789
	228	2.33000	.00062	.00472
	229	2.33345	.00064	.00472
	230	4.71847	.00000	.00955
	231	4.69001	.00012	.00949
	232	.51966	.00015	.00105
	233	1.20871	.00012	.00245
	234	3.82106	.00487	.00773
	235	1.11672	.00002	.00226
	236	.55350	.00015	.00112
	237	1.38353	.00018	.00280
	238	.92529	.00103	.00187
	239	8.70717	.00127	.01763
	240	.77946	.00001	.00158
	241	2.45688	.00008	.00497
	242	2.87696	.00001	.00582
	243	11.34780	.00000	.02297
	244	3.69353	.00499	.00748
	245	1.33147	.00008	.00270
	246	4.54356	.00746	.00920
	247	2.12045	.00150	.00429

	248	3.37223	.00041	.00683
	249	2.00285	.00339	.00405
	250	2.11805	.00013	.00429
	251	1.34582	.00005	.00272
	252	1.13785	.00223	.00230
	253	3.76587	.00020	.00762
	254	.91071	.00215	.00184
	255	3.27193	.00021	.00662
	256	1.50385	.00035	.00304
	257	.92552	.00101	.00187
	258	1.43161	.00172	.00290
	259	3.24755	.00611	.00657
	260	.45140	.00028	.00091
	261	11.42660	.00362	.02313
	262	.47689	.00226	.00097
	263	8.73712	.00059	.01769
	264	2.81200	.00013	.00569
	265	8.16898	.00001	.01654
	266	.98561	.00187	.00200
	267	2.85431	.00141	.00578
	268	2.04613	.00041	.00414
	269	1.27682	.00240	.00258
	270	4.94620	.00965	.01001

	271	1.12625	.00174	.00228
	272	2.30835	.00252	.00467
	273	6.19559	.00487	.01254
	274	8.18619	.00241	.01657
	275	.67033	.00010	.00136
	276	1.92636	.00382	.00390
	277	1.68897	.00031	.00342
	278	13.62930	.00143	.02759
	279	2.85229	.00174	.00577
	280	2.85229	.00174	.00577
	281	4.53839	.00166	.00919
	282	1.88637	.00145	.00382
	283	1.37230	.00125	.00278
	284	2.69028	.00282	.00545
	285	.86267	.00017	.00175
	286	7.56271	.00301	.01531
	287	3.52177	.00385	.00713
	288	4.17182	.00000	.00844
	289	4.93079	.00017	.00998
	290	.49903	.00000	.00101
	291	6.32675	.00390	.01281
	292	2.05358	.00016	.00416
	293	8.89883	.00663	.01801

	294	1.11374	.00013	.00225
	295	.98159	.00013	.00199
	296	.74566	.00007	.00151
	297	10.05277	.00098	.02035
	298	7.97584	.00014	.01615
	299	.21078	.00109	.00043
	300	.62533	.00005	.00127
	301	.27310	.00003	.00055
	302	4.91735	.00007	.00995
	303	2.61202	.00035	.00529
	304	6.02268	.00754	.01219
	305	6.02268	.00754	.01219
	306	2.87588	.00110	.00582
	307	2.76487	.00009	.00560
	308	2.16457	.00131	.00438
	309	13.23572	.00080	.02679
	310	1.08633	.00122	.00220
	311	2.73090	.00380	.00553
	312	2.73090	.00380	.00553
	313	3.03291	.00406	.00614
	314	1.55815	.00003	.00315
	315	26.55367	.00435	.05375
	316	2.24669	.00237	.00455

	317	.51626	.00003	.00105
	318	10.17087	.00401	.02059
	319	3.34546	.00504	.00677
	320	.82944	.00044	.00168
	321	7.82466	.00065	.01584
	322	2.68680	.00006	.00544
	323	2.82736	.00173	.00572
	324	.78978	.00220	.00160
	325	7.44484	.00000	.01507
	326	1.60917	.00086	.00326
	327	.95743	.00038	.00194
	328	2.39554	.00097	.00485
	329	4.37577	.00028	.00886
	330	1.52317	.00213	.00308
	331	4.88468	.00028	.00989
	332	2.53217	.00020	.00513
	333	.70862	.00148	.00143
	334	2.82737	.00003	.00572
	335	4.58120	.00381	.00927
	336	14.84494	.00436	.03005
	337	3.07016	.00022	.00621
	338	2.36013	.00447	.00478
	339	2.95954	.00003	.00599

	340	8.27629	.00732	.01675
	341	3.69352	.00020	.00748
	342	1.36329	.00072	.00276
	343	1.30592	.00010	.00264
	344	8.52874	.00712	.01726
	345	10.77308	.00010	.02181
	346	7.27045	.00010	.01472
	347	1.19487	.00166	.00242
	348	2.58530	.00106	.00523
	349	3.37409	.00147	.00683
	350	4.16783	.00002	.00844
	351	8.42290	.00066	.01705
	352	8.42290	.00066	.01705
	353	4.31096	.00103	.00873
	354	7.92951	.00987	.01605
	355	3.36690	.00062	.00682
	356	13.53346	.01491	.02740
	357	3.50001	.00004	.00709
	358	2.17105	.00165	.00439
	359	6.66118	.00038	.01348
	360	1.41919	.00036	.00287
	361	3.86776	.00048	.00783
	362	3.48723	.00005	.00706

	363	3.33215	.00112	.00675
	364	3.33215	.00112	.00675
	365	17.56610	.00103	.03556
	366	23.66528	.00001	.04791
	367	35.81416	.00366	.07250
	368	2.89365	.00014	.00586
	369	1.04094	.00095	.00211
	370	.38930	.00010	.00079
	371	.28298	.00003	.00057
	372	1.35368	.00058	.00274
	373	1.31154	.00110	.00265
	374	1.44102	.00046	.00292
	375	.59679	.00004	.00121
	376	.65162	.00007	.00132
	377	.69021	.00054	.00140
	378	1.13983	.00039	.00231
	379	1.19751	.00030	.00242
	380	1.71647	.00022	.00347
	381	.88466	.00029	.00179
	382	.65630	.00005	.00133
	383	4.33244	.00062	.00877
	384	1.16827	.00071	.00236
	385	3.29000	.00174	.00666

	386	6.76276	.00005	.01369
	387	.66519	.00000	.00135
	388	1.35893	.00010	.00275
	389	.64092	.00021	.00130
	390	1.35844	.00237	.00275
	391	2.07149	.00002	.00419
	392	.24141	.00004	.00049
	393	.83301	.00011	.00169
	394	7.46627	.00001	.01511
	395	1.45629	.00003	.00295
	396	1.02138	.00070	.00207
	397	1.12054	.00012	.00227
	398	.95316	.00009	.00193
	399	11.49289	.00823	.02326
	400	1.24108	.00088	.00251
	401	.88305	.00221	.00179
	402	4.86182	.00278	.00984
	403	3.77581	.00254	.00764
	404	6.83211	.01067	.01383
	405	2.51423	.00099	.00509
	406	1.25593	.00055	.00254
	407	1.01203	.00018	.00205
	408	2.34318	.00010	.00474

	409	2.59904	.00305	.00526
	410	1.62131	.00009	.00328
	411	4.44370	.00004	.00900
	412	4.44370	.00004	.00900
	413	8.35946	.00001	.01692
	414	9.20128	.00013	.01863
	415	.84564	.00041	.00171
	416	2.65786	.00000	.00538
	417	7.23793	.00005	.01465
	418	3.77351	.00296	.00764
	419	.22897	.00001	.00046
	420	1.91543	.00141	.00388
	421	2.71566	.00204	.00550
	422	1.94972	.00471	.00395
	423	4.38073	.00327	.00887
	424	8.38400	.00672	.01697
	425	4.40731	.00188	.00892
	426	1.53827	.00391	.00311
	427	9.86723	.00132	.01997
	428	5.59565	.00005	.01133
	429	9.73436	.00918	.01971
	430	18.54504	.00105	.03754
	431	4.44617	.00350	.00900

	432	19.30288	.00712	.03907
	433	12.78320	.00095	.02588
	434	1.36395	.00026	.00276
	435	1.36395	.00026	.00276
	436	9.22757	.00115	.01868
	437	10.85261	.00339	.02197
	438	7.04838	.00010	.01427
	439	2.21443	.00024	.00448
	440	11.45905	.00075	.02320
	441	1.09988	.00023	.00223
	442	.70302	.00007	.00142
	443	2.00256	.00050	.00405
	444	.69021	.00034	.00140
	445	.69021	.00034	.00140
	446	2.13791	.00070	.00433
	447	.92642	.00001	.00188
	448	4.76392	.00225	.00964
	449	1.04950	.00023	.00212
	450	2.04063	.00007	.00413
	451	3.94264	.00122	.00798
	452	1.47350	.00000	.00298
	453	.81389	.00027	.00165
	454	.74901	.00000	.00152

	455	1.12855	.00005	.00228
	456	.47951	.00000	.00097
	457	5.44084	.00001	.01101
	458	.67322	.00025	.00136
	459	.36202	.00007	.00073
	460	.68244	.00000	.00138
	461	1.71785	.00065	.00348
	462	1.51464	.00002	.00307
	463	1.64365	.00128	.00333
	464	.39074	.00000	.00079
	465	1.68276	.00000	.00341
	466	.80862	.00000	.00164
	467	1.11047	.00017	.00225
	468	2.53747	.00394	.00514
	469	2.63397	.00338	.00533
	470	.25405	.00001	.00051
	471	5.27947	.00423	.01069
	472	8.19755	.00032	.01659
	473	2.61643	.00072	.00530
	474	10.44863	.01224	.02115
	475	4.47320	.00081	.00906
	476	3.51014	.00000	.00711
	477	7.10915	.00011	.01439

	478		12.01828	.01036	.02433
	479		4.27400	.00093	.00865
	480		2.36554	.00333	.00479
	Total	N	480	480	480
1	1		14.37308	.07167	.02910
	2		2.20935	.00912	.00447
	3		3.58509	.01609	.00726
	4		2.59616	.00866	.00526
	5		10.25554	.02406	.02076
	6		2.88556	.01188	.00584
	7		8.26124	.03303	.01672
	8		6.00933	.01260	.01216
	9		11.11200	.05345	.02249
	10		1.12697	.00458	.00228
	11		1.12697	.00458	.00228
	12		7.16597	.02429	.01451
	13		7.48306	.03005	.01515
	14		4.20544	.03610	.00851
	15		5.90886	.03216	.01196
	Total	N	15	15	15
Total	N		495	495	495

(continued)

a. Limited to first 500 cases.

Table 4.6: *Predictors of IGD among Malaysian Youth*

Dependent Variable	Predictor Variable	β	*t*	F	Sig.
IGD	NS	-.178***	-4.593	70.363	<.001
	EM	.356***	8.291		<.001
	IM	.041	.994		.321
	AM	.368***	9.455		<.001

Note. N= 495. IGD= Internet gaming disorder; NS= Need Satisfaction; EM= Extrinsic Motivation; IM= Intrinsic Motivation; AM= Amotivation.

***p < .001

Appendix H

SPSS Output: Mediational Analysis

Figure 4.19: *Mediation Analysis of IM on Prediction of NS on IGD*

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 4.2 beta
***************

          Written by Andrew F. Hayes, Ph.D.
www.afhayes.com
    Documentation available in Hayes (2022).
www.guilford.com/p/hayes3

**************************************************************************
************
Model  : 4
    Y  : T_IGD
    X  : T_BPNS
    M  : T_IM

Sample
Size:  495

**************************************************************************
************
```

GAMING MOTIVATIONS MEDIATE PREDICTION OF NS ON IGD

```
OUTCOME VARIABLE:

 T_IM


Model Summary

          R       R-sq        MSE          F        df1

df2          p

      .2980      .0888     6.6976    48.0314     1.0000

493.0000      .0000


Model

              coeff         se          t          p

LLCI       ULCI

constant     9.1280      .8593    10.6231      .0000

7.4398    10.8163

T_BPNS        .1364      .0197

6.9305      .0000      .0977      .1750


**************************************************************

************

OUTCOME VARIABLE:

 T_IGD


Model Summary

          R       R-sq        MSE          F        df1

df2          p
```

```
      .2145      .0460    42.7616    11.8681     2.0000
492.0000      .0000

Model
              coeff         se          t          p
LLCI       ULCI
constant    28.6293     2.4069    11.8948      .0000
23.9003    33.3583
T_BPNS       -.2088      .0521    -4.0089      .0001
-.3111     -.1065
T_IM          .4367      .1138
3.8373      .0001      .2131      .6603

************************** TOTAL EFFECT MODEL
****************************
OUTCOME VARIABLE:
 T_IGD

Model Summary
          R       R-sq        MSE          F        df1
df2          p
      .1322      .0175    43.9520     8.7676     1.0000
493.0000      .0032

Model
```

```
             coeff         se          t          p
LLCI       ULCI
constant    32.6153     2.2012    14.8172      .0000
28.2905    36.9402
T_BPNS       -.1492      .0504    -2.9610      .0032
-.2483     -.0502


************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y
**************

Total effect of X on Y
     Effect         se          t          p       LLCI
ULCI
     -.1492      .0504    -2.9610      .0032     -.2483
-.0502

Direct effect of X on Y
     Effect         se          t          p       LLCI
ULCI
     -.2088      .0521    -4.0089      .0001     -.3111
-.1065

Indirect effect(s) of X on Y:
         Effect     BootSE   BootLLCI   BootULCI
T_IM      .0595      .0197      .0242      .1017
```

```
********************** ANALYSIS NOTES AND ERRORS
************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap
confidence intervals:
  5000

------ END MATRIX -----
```

Figure 4.20: *Mediation Analysis for EM on Prediction of NS on IGD*

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 4.2 beta
***************

          Written by Andrew F. Hayes, Ph.D.
www.afhayes.com
    Documentation available in Hayes (2022).
www.guilford.com/p/hayes3

**************************************************************************
************
Model  : 4
    Y  : T_IGD
    X  : T_BPNS
    M  : T_EM

Sample
Size:  495

**************************************************************************
************
OUTCOME VARIABLE:
 T_EM
```

```
Model Summary
          R       R-sq        MSE          F        df1
df2          p
      .2387      .0570    94.7185    29.7797     1.0000
493.0000      .0000

Model
              coeff         se          t          p
LLCI       ULCI
constant    35.5145     3.2313    10.9906      .0000
29.1656    41.8634
T_BPNS        .4038      .0740
5.4571      .0000      .2584      .5491

************************************************************
************
OUTCOME VARIABLE:
 T_IGD

Model Summary
          R       R-sq        MSE          F        df1
df2          p
      .4987      .2487    33.6761    81.4384     2.0000
492.0000      .0000
```

GAMING MOTIVATIONS MEDIATE PREDICTION OF NS ON IGD

Model

	coeff	se	t	p	LLCI	ULCI
constant	20.8788	2.1499	9.7116	.0000	16.6548	25.1029
T_BPNS	-.2827	.0454	-6.2220	.0000	-.3719	-.1934
T_EM	.3305	.0269	12.3058	.0000	.2777	.3832

********** TOTAL EFFECT MODEL **********

OUTCOME VARIABLE:

T_IGD

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1322	.0175	43.9520	8.7676	1.0000	493.0000	.0032

Model

	coeff	se	t	p	LLCI	ULCI
constant	32.6153	2.2012	14.8172	.0000	28.2905	36.9402

```
T_BPNS       -.1492      .0504    -2.9610      .0032
-.2483     -.0502


************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y
**************

Total effect of X on Y
     Effect         se          t          p       LLCI
ULCI
     -.1492      .0504    -2.9610      .0032     -.2483
-.0502

Direct effect of X on Y
     Effect         se          t          p       LLCI
ULCI
     -.2827      .0454    -6.2220      .0000     -.3719
-.1934

Indirect effect(s) of X on Y:
         Effect     BootSE   BootLLCI   BootULCI
T_EM      .1334      .0285      .0802      .1936

*********************** ANALYSIS NOTES AND ERRORS
************************
```

```
Level of confidence for all confidence intervals in output:

  95.0000


Number of bootstrap samples for percentile bootstrap

confidence intervals:

  5000


------ END MATRIX -----
```

Figure 4.21: *Mediation Analysis for AM on Prediction of NS on IGD*

```
Run MATRIX procedure:


*************** PROCESS Procedure for SPSS Version 4.2 beta
***************

          Written by Andrew F. Hayes, Ph.D.
www.afhayes.com
    Documentation available in Hayes (2022).
www.guilford.com/p/hayes3

**************************************************************************
************
Model  : 4
    Y  : T_IGD
    X  : T_BPNS
    M  : T_AM

Sample
Size:  495

**************************************************************************
************
OUTCOME VARIABLE:
 T_AM
```

GAMING MOTIVATIONS MEDIATE PREDICTION OF NS ON IGD

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1398	.0196	15.1892	9.8341	1.0000	493.0000	.0018

Model

	coeff	se	t	p	LLCI	ULCI
constant	16.6892	1.2940	12.8974	.0000	14.1468	19.2317
T_BPNS	-.0929	.0296	-3.1359	.0018	-.1511	-.0347

****

OUTCOME VARIABLE:

T_IGD

Model Summary

R	R-sq	MSE	F	df1	df2	p
.4963	.2463	33.7823	80.4095	2.0000	492.0000	.0000

Model

```
              coeff         se          t          p
LLCI       ULCI
constant    18.9134     2.2317     8.4747      .0000
14.5285    23.2983
T_BPNS       -.0730      .0446    -1.6348      .1027
-.1606      .0147
T_AM          .8210      .0672
12.2234      .0000      .6890      .9530

************************** TOTAL EFFECT MODEL
****************************
OUTCOME VARIABLE:
 T_IGD

Model Summary
          R       R-sq        MSE          F        df1
df2          p
      .1322      .0175    43.9520     8.7676     1.0000
493.0000      .0032

Model
              coeff         se          t          p
LLCI       ULCI
constant    32.6153     2.2012    14.8172      .0000
28.2905    36.9402
```

```
T_BPNS       -.1492      .0504    -2.9610      .0032
-.2483     -.0502


************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y
**************

Total effect of X on Y
     Effect         se          t          p       LLCI
ULCI
     -.1492      .0504    -2.9610      .0032     -.2483
-.0502

Direct effect of X on Y
     Effect         se          t          p       LLCI
ULCI
     -.0730      .0446    -1.6348      .1027
-.1606      .0147

Indirect effect(s) of X on Y:
         Effect     BootSE   BootLLCI   BootULCI
T_AM     -.0763      .0304     -.1360     -.0164

*********************** ANALYSIS NOTES AND ERRORS
************************
```

```
Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap
confidence intervals:
  5000

------ END MATRIX -----
```

\

Appendix I

Ethical Clearance Letter

UNIVERSITI TUNKU ABDUL RAHMAN DU012(A)
Wholly owned by UTAR Education Foundation Co. No. 578227-M

Re: U/SERC/193/2022

28 September 2022

Dr T'ng Soo Ting
Department of Psychology and Counselling
Faculty of Arts and Social Science
Universiti Tunku Abdul Rahman
Jalan Universiti, Bandar Baru Barat
31900 Kampar, Perak

Dear Dr T'ng,

Ethical Approval For Research Project/Protocol

We refer to your application for ethical approval for your research project and are pleased to inform you that your application has been approved under Expedited Review.

The details of your research project are as follows:

Research Title	Basic Psychological Needs, Gaming Motivations, Internet Gaming Disorder, and Psychological Distress: Through the Lens of Self-Determination Theory
Investigator(s)	Dr T'ng Soo Ting Dr Siah Poh Chua Dr Pragash a/l Muthu Rajan Mr Ho Khee Hoong Dr Pau Kee (UPSI)
Research Area	Social Sciences
Research Location	Malaysia
No of Participants	670 participants (Age: 18 - 29)
Research Costs	UTAR Research Fund 2022 Cycle 1
Approval Validity	28 September 2022 - 27 September 2023

The conduct of this research is subject to the following:

(1) The participants' informed consent be obtained prior to the commencement of the research,

(2) Confidentiality of participants' personal data must be maintained; and

(3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

(4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

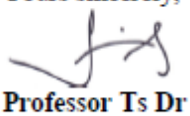
Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia
Tel: (605) 468 8888 Fax: (605) 466 1313
Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia
Tel: (603) 9086 0288 Fax: (603) 9019 8868
Website: www.utar.edu.my

Should you collect personal data of participants in your study, please have the participants sign the attached Personal Data Protection Statement for your records.

The University wishes you all the best in your research.

Thank you.

Yours sincerely,



Professor Ts Dr Faidz bin Abd Rahman
Chairman
UTAR Scientific and Ethical Review Committee

c.c Dean, Faculty of Arts and Social Science
Director, Institute of Postgraduate Studies and Research

Appendix J

Personal Data Protection Letter

PERSONAL DATA PROTECTION NOTICE

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:

   a) Name
   b) Identity card
   c) Place of Birth
   d) Address
   e) Education History
   f) Employment History
   g) Medical History
   h) Blood type
   i) Race
   j) Religion
   k) Photo
   l) Personal Information and Associated Research Data

2. The purposes for which your personal data may be used are inclusive but not limited to:

   a) For assessment of any application to UTAR
   b) For processing any benefits and services
   c) For communication purposes
   d) For advertorial and news
   e) For general administration and record purposes
   f) For enhancing the value of education
   g) For educational and related purposes consequential to UTAR
   h) For replying any responds to complaints and enquiries
   i) For the purpose of our corporate governance
   j) For the purposes of conducting research/ collaboration

3. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

4. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

5. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

6. By submitting or providing your personal data to UTAR, you had consented and agreed for your personal data to be used in accordance to the terms and conditions in the Notice and our relevant policy.

7. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

8. You may access and update your personal data by writing to us at_____.

Acknowledgment of Notice

[ ] I have been notified and that I hereby understood, consented and agreed per UTAR above notice.

[ ] I disagree, my personal data will not be processed.

.....
Name:
Date:

Appendix K

Turnitin Originality Report of FYP1

FYP 1

ORIGINALITY REPORT

15%	10%	10%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.ncbi.nlm.nih.gov Internet Source	3%
2	Johnie J. Allen, Craig A. Anderson. "Satisfaction and frustration of basic psychological needs in the real world and in video games predict internet gaming disorder scores and well-being", Computers in Human Behavior, 2018 Publication	2%
3	hdl.handle.net Internet Source	1%
4	www.researchgate.net Internet Source	1%
5	etheses.bham.ac.uk Internet Source	1%
6	Devin J. Mills, Johnie J. Allen. "Self-determination theory, internet gaming disorder, and the mediating role of self-control", Computers in Human Behavior, 2020 Publication	<1%
7	link.springer.com	

Appendix L

Turnitin Originality Report of FYP2

FYP 2- RESUBMISSION

ORIGINALITY REPORT

12%	10%	7%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	eprints.utar.edu.my Internet Source	2%
2	www.zora.uzh.ch Internet Source	1%
3	LafreniÃ¨re, Marc-AndrÃ© K., JÃ©rÃ©mie Verner-Filion, and Robert J. Vallerand. "Development and validation of the Gaming Motivation Scale (GAMS)", Personality and Individual Differences, 2012. Publication	1%
4	www.researchgate.net Internet Source	1%
5	rcastoragev2.blob.core.windows.net Internet Source	1%
6	Submitted to University of Liverpool Student Paper	<1%
7	core.ac.uk Internet Source	<1%
8	topsecretapiaccess.dovepress.com Internet Source	