



UNIVERSITI PUTRA MALAYSIA

***INTERRELATIONSHIPS OF CONTEXTUAL FACTORS, PERSONAL
FACTORS AND GAMING BEHAVIOUR AMONG ADOLESCENTS IN
MALAYSIA***

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MALAYSIA**

By

FAM JIA YUIN

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of
Philosophy**

March 2021

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in
fulfilment of the requirement for the degree of Doctor of Philosophy

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March 2021

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The inclusion of Internet Gaming Disorder as a potential psychiatric condition in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders had invited much research on problematic gaming behaviour. Past studies had consistently highlighted the significant role of parent-adolescent relationship in predicting problematic gaming behaviour among adolescents. However, other contextual factors and personal factors were not taken into account. Hence, it is the aim of this study to (i) describe contextual factors (mother-adolescent relationship, father-adolescent relationship, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives), and problematic gaming behaviour among adolescents, (ii) determine the relationships between contextual factors, personal factors, and problematic gaming behaviour of the respondents, (iii) determine the factors that uniquely predict problematic gaming behaviour among the respondents, and (iv) examine whether the relationships between contextual, personal factors, and problematic gaming behaviour are mediated by gaming motives.

A total of 710 adolescents were invited to participate in the current study. The final sample consists of 595 adolescents aged between 12 and 18 years old (mean = 15.36, SD = 1.27). They were located in four districts in Selangor, namely Gombak, Hulu Langat, Klang, and Petaling Perdana. The respondents were requested to complete a set of self-report questionnaire, which include respondents' background, Problem Videogame Playing Scale (Tejeiro & Bersabé, 2002), the revisited version of Inventory for Parent and Peer (Armsden & Greenberg, 1987), School Engagement Scale (Fredricks et al., 2005), Index of Peer Relation Scale (Hudson et al., 1990), Gaming Self-Esteem Beliefs Subscale from the Internet Gaming Cognition Scale (King & Delfabbro, 2016), and Online Gaming Motivation Scale (Yee et al., 2012).

Following the recommendation by Jackson et al. (2009), all hypothesized models were tested using chi-square (χ^2), non-normed fit index (TLI), comparative fit index (CFI), root mean square error of estimation (RMSEA), and relative chi-square (χ^2/df).

Descriptive analysis revealed that more than half of the adolescents reported moderate level of mother-adolescent relationship, moderate level of father-adolescent relationship, moderate level of peer relationship, moderate level of school engagement, moderate level of gaming self-esteem beliefs, moderate level of gaming motives, and low level of problematic gaming behaviour.

Pearson correlation analysis revealed that mother-adolescent relationship, father-adolescent relationship, peer relationship, gaming self-esteem beliefs, time spent gaming, and gaming motives significantly correlate with problematic gaming behaviour, but no significant relationship was found between school engagement and problematic gaming behaviour. However, mother-adolescent relationship, father-adolescent relationship, school engagement, and peer relationship did not significantly predict problematic gaming behaviour when all variables were simultaneously accounted for.

Structural equation modelling revealed gaming motives fully mediates the relationship between school engagement and problematic gaming behaviour. Additionally, gaming motives also partially mediate the relationship between gaming self-esteem beliefs, time spent gaming, and problematic gaming behaviour. The current finding highlights the significant role of gaming motives in predicting problematic gaming behaviour among adolescents. Contrary to the traditional compulsive view of problematic gaming behaviour, the current study suggests that adolescents play games for a reason. More precisely, adolescents who engage in school, reported high gaming self-esteem beliefs, and spent longer time playing games are motivated to play games. Practically, parents, educators, and social workers should be aware that adolescents are being motivated to play games.

Abstrak tesis ini yang dikemukakan kepada senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Doktor Falsafah

HUBUNGAN ANTARA FAKTOR KONTEKSTUAL, FAKTOR PERSONAL DAN TINGKAH LAKU PERMAINAN DALAM KALANGAN REMAJA DI MALAYSIA

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Kemasukan *Internet Gaming Disorder* sebagai keadaan psikiatri berpotensi dalam Manual Diagnostik dan Statistik Gangguan Mental edisi kelima telah mengundang lebih banyak penyelidikan mengenai tingkah laku permainan bermasalah dijalankan. Kajian lepas secara konsisten telah menekankan peranan penting hubungan ibu bapa-remaja dalam meramalkan tingkah laku permainan bermasalah dalam kalangan remaja. Walau bagaimanapun, faktor kontekstual dan faktor personal yang lain tidak diambil kira. Maka, kajian ini bertujuan untuk (i) memperihalkan faktor-faktor kontekstual (hubungan ibu-remaja, hubungan ayah-remaja, penglibatan sekolah, dan hubungan rakan sebaya), faktor personal (harga diri permainan game, masa yang dihabiskan untuk permainan game, dan motif permainan game), dan tingkah laku permainan bermasalah di kalangan remaja, (ii) menentukan hubungan antara faktor kontekstual, faktor personal, dan tingkah laku permainan bermasalah dalam kalangan responden, (iii) menentukan faktor yang secara unik meramal tingkah laku permainan bermasalah dalam kalangan responden, dan (iv) Memeriksa sama ada motif permainan game menjadi perantara kepada hubungan antara faktor kontekstual, faktor peribadi, dan tingkah laku permainan bermasalah.

Sebanyak 710 remaja telah mengambil bahagian dalam kajian ini. Sampel akhir terdiri daripada 595 remaja berumur antara 12 dan 18 tahun (min = 15.36, sisihan piawai = 1.27). Lokasi responden adalah empat daerah di Selangor, iaitu Gombak, Hulu Langat, Klang, dan Petaling Perdana. Responden diminta untuk melengkapkan satu set borang soal selidik, yang merangkumi maklumat latar belakang responden, *Problem Videogame Playing Scale* (Tejeiro & Bersabé, 2002), *Inventory for Parent and Peer* yang disemak semula (Armsden & Greenberg, 1987), *School Engagement Scale* (Fredricks et al., 2005), *Index of Peer Relation Scale* (Hudson et al., 1990), *Gaming Self-Esteem Beliefs*

Subscale daripada the *Internet Gaming Cognition Scale* (King & Delfabbro, 2016), dan *Online Gaming Motivation Scale* (Yee et al., 2012).

Berdasarkan cadangan oleh Jackson et al. (2009), semua model yang dihipotesiskan telah diuji menggunakan *chi-square* (χ^2), *non-normed fit index* (TLI), *comparative fit index* (CFI), *root mean square error of estimation* (RMSEA), dan *relative chi-square* (χ^2/df).

Analisis deskriptif menunjukkan bahawa lebih daripada separuh remaja melaporkan tahap sederhana dalam hubungan ibu-remaja, hubungan bapa-remaja, hubungan rakan sebaya, penglibatan sekolah, harga diri permainan game dan motif permainan game. Manakala didapati mempunyai tahap tingkah laku permainan bermasalah yang rendah.

Analisis korelasi Pearson menunjukkan bahawa hubungan ibu-remaja, hubungan ayah-remaja, hubungan rakan sebaya, harga diri permainan game, masa yang dihabiskan untuk permainan game, dan motif permainan game berkorelasi secara signifikan dengan tingkah laku permainan bermasalah, tetapi tidak ada hubungan yang signifikan antara penglibatan sekolah dengan tingkah laku permainan bermasalah. Walau bagaimanapun, hubungan ibu-remaja, hubungan ayah-remaja, hubungan sekolah dan hubungan rakan sebaya tidak meramalkan secara signifikan tingkah laku permainan bermasalah apabila semua pemboleh ubah diambil kira secara serentak.

Pemodelan persamaan struktur menunjukkan motif permainan game menjadi perantara secara penuh hubungan antara penglibatan sekolah dan tingkah laku permainan bermasalah. Selain itu, motif permainan game juga menjadi perantara secara separa hubungan antara harga diri permainan game, masa yang dihabiskan untuk permainan game, dan tingkah laku permainan bermasalah. Hasil kajian ini menunjukkan peranan penting motif permainan game dalam meramalkan tingkah laku permainan bermasalah dalam kalangan remaja. Berbeza dengan pandangan tradisional yang kompulsif mengenai tingkah laku permainan game problematik, kajian ini menunjukkan bahawa remaja bermain permainan game dengan tujuan tertentu. Lebih tepatnya, remaja yang terlibat di sekolah, dilaporkan mempunyai kepercayaan terhadap harga diri permainan game yang tinggi, dan yang menghabiskan masa lebih lama untuk bermain permainan game adalah lebih bermotivasi untuk bermain permainan game. Secara praktikal, ibu bapa, pendidik, dan pekerja sosial harus menyedari bahawa remaja adalah bermotivasi untuk bermain permainan game.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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TABLE OF CONTENTS

	ABSTRACT	Page
	ABSTRAK	i
	ACKNOWLEDGEMENTS	iii
	APPROVAL	v
	DECLARATION	vi
	LIST OF TABLES	ix
	LIST OF FIGURES	xiii
	LIST OF ABBREVIATIONS	xv
		xvi
CHAPTER		
1	INTRODUCTION	1
	1.1 Research Background	1
	1.2 Statement of Problem	4
	1.3 Research Objectives	7
	1.3.1 General Objective	7
	1.3.2 Specific Objective	7
	1.4 Hypothesis	8
	1.5 Significant of Study	9
	1.6 Theoretical Framework	11
	1.6.1 Bronfenbrenner's Process-Person-Context-Time Model	11
	1.6.2 Theory of Compensatory Internet Use	13
	1.6.3 Integration of Theories	14
	1.7 Conceptual Framework	16
	1.8 Definition of Terminology	17
	1.8.1 Adolescents	17
	1.8.2 Problematic Gaming Behaviour	18
	1.8.3 Mother-Adolescent Relationship	18
	1.8.4 Father-Adolescent Relationship	18
	1.8.5 School Engagement	19
	1.8.6 Peer Relationship	19
	1.8.7 Gaming Self-Esteem Beliefs	19
	1.8.8 Time Spent Gaming	20
	1.8.9 Gaming Motives	20
	1.9 Summary	20
2	LITERATURE REVIEW	21
	2.1 Search Strategy and Inclusion Criteria	21
	2.2 Data Extraction	21
	2.3 Study Characteristics	22
	2.4 Problematic Gaming Behaviour	23
	2.5 Problematic Gaming Behaviour among Adolescents	25
	2.6 Contextual Factors and Problematic Gaming Behaviour	27

2.6.1	Parent-Adolescent Relationship and Problematic Gaming Behaviour	27
2.6.2	School Engagement and Problematic Gaming Behaviour	30
2.6.3	Peer Relationship and Problematic Gaming Behaviour	32
2.7	Personal Factors and Problematic Gaming Behaviour	34
2.7.1	Gaming Self-Esteem Beliefs and Problematic Gaming Behaviour	34
2.7.2	Time Spent Gaming and Problematic Gaming Behaviour	36
2.7.3	Gaming Motives and Problematic Gaming Behaviour	37
2.8	Summary	40
3	METHODOLOGY	41
3.1	Research Design	41
3.2	Population and Sample	41
3.3	Sampling Procedure	42
3.4	Data Collection Procedure	43
3.5	Instrumentation	43
3.5.1	Translation of the Instruments	44
3.5.2	Problematic Gaming Behaviour	44
3.5.3	Parent-Adolescent Relationship	44
3.5.4	School Engagement	45
3.5.5	Peer Relationship	45
3.5.6	Gaming Self-Esteem Beliefs	45
3.5.7	Time Spent Gaming	46
3.5.8	Gaming Motives	46
3.5.9	Demographic Questions	47
3.6	Pilot Study	47
3.7	Reliability of the Instruments	48
3.5.10	Exploratory Data Analysis	48
3.5.11	Data Normality	48
3.8	Multicollinearity	49
3.9	Statistical Procedure	49
3.10	Summary	50
4	RESULTS AND DISCUSSION	51
4.1	Respondents' Background	51
4.2	Descriptive Analysis	53
4.3	Measurement Model	56
4.4	Regression Model	64
4.5	Structural Model	67
4.5.1	Preliminary Model	67
4.5.2	Structural Model 2	71
4.5.3	Bootstrapping	73
4.6	Summary	76

5	SUMMARY, CONCLUSION, IMPLICATION, AND RECOMMENDATION	78
5.1	Summary of the Study	78
5.2	Conclusion	81
5.3	Implication	81
	5.3.1 Theoretical Implication	81
	5.3.2 Practical Implication	82
5.4	Limitation	84
5.5	Recommendation	85
	REFERENCES	88
	APPENDICES	124
	BIODATA OF STUDENT	165
	LIST OF PUBLICATIONS	166



LIST OF TABLES

Table	Page
3.1 Pilot study	47
3.2 Reliability analysis of the scale	48
3.3 Data normality	48
3.4 Multicollinearity test	49
4.1 Respondent's background	51
4.2 Respondents' Gameplay Frequency by Game Platform	52
4.3 Respondents' Gameplay Frequency by Game Genre	53
4.4 Descriptive analysis	54
4.5 Goodness of Fit statistics of Measurement Model	57
4.6 Pearson correlation	57
4.7 Goodness of Fit statistics of Regression Model	65
4.8 Standardized and Unstandardized Coefficients for Regression Model	66
4.9 Goodness of Fit statistics of Preliminary Model	67
4.10 Standardized and Unstandardized Coefficients for Preliminary Model	69
4.11 Goodness of Fit statistics of Structural Model 2	72
4.12 Standardized and Unstandardized Coefficients for Structural Model 2	73
4.13 Bootstrapping	74
4.14 Summary of the Key Findings	76
6.1 Study characteristics	124
6.2 Family-related factors	129
6.3 School-related factors	132
6.4 Peer-related factors	135



LIST OF FIGURES

Figure	Page
1.1 Bronfenbrenner's Process-Person-Context-Time Model	11
1.2 Theory of Compensatory Internet Use	14
1.3 Integration of theories	15
1.4 Conceptual framework for the study of "Interrelationships of Contextual Factors, Personal Factors and Gaming Behaviour among Adolescents in Malaysia"	16
2.1 Flow chart of article inclusion	22
3.1 Sampling procedure for the study of "Relationships Between Contextual Factors, Personal Factors, and Problematic Gaming Behaviour among Adolescents in Selangor"	43
4.1 Measurement Model	58
4.2 Regression model	65
4.3 Preliminary Model	68
4.4 Structural Model 2	72

LIST OF ABBREVIATIONS

CFI	Comparative fit index
DSM-5	The fifth edition of Diagnostic and Statistical Manual of Mental Disorders
EDA	Exploratory data analysis
EMA	Ecological momentary assessment
FPS	First-person shooter game
IGD	Internet Gaming Disorder
IPPA	Inventory for Parent and Peer
JKEUPM	Human Subjects of Universiti Putra Malaysia
ML	Maximum likelihood estimation
MMORPG	Massively multiplayer online role playing game
PPCT Model	Process-Person-Context-Time Model
PVP Scale	Problem Videogame Playing Scale
RMSEA	Root mean square error of estimation
TLI	Non-normed fit index
VIF	Variance inflation factor

CHAPTER 1

INTRODUCTION

This chapter begins by providing some background regarding research in problematic gaming behaviour. Following that is the examination of potential problems pointed out in recent studies, which leads to the development of research questions and research objectives. Then, some key ideas were raised in several sections, which include the hypothesis, significance of study, theoretical framework, conceptual framework, and definition of terminology. A summary of the chapter is presented in the last section of the chapter.

1.1 Research Background

Gaming is a rapidly growing hobby shared by millions of individuals globally. The advancement in technology allows gamers to play their favourite games almost anytime via various platforms based on their preference. For instance, gamers who prefer better graphic are likely to play games on home console and computer; while those who prefer mobility are likely to play games on smartphone and handheld console. Some recent games even allow gamers to sync their game accounts across multiple platforms. For instance, several recent games are compatible with both game console (Play Station 4) and handheld console (Play Station Vita). Moreover, the Nintendo Switch is a hybrid of home and handheld console which grants the gamers great flexibility. Easy access to gaming has contributed to the growth of the gamer community. The 2017 Global Games Market Report (Newzoo, 2017) estimates \$51.2 billion total game revenue in the Asia-Pacific region, which followed by \$27.0 billion in North America, and \$4.4 billion in the Latin America.

The rise of the gaming industry has invited much research efforts into this area of study. Of the numerous studies that have been conducted, adolescence is often being labelled as a vulnerable group for problematic gaming behaviour. For example, the research conducted by Mentzoni et al. (2011) found younger age groups (16-21 years old) played significantly more time than older age groups (34-40 years old). A similar case was found in Malaysia as well, whereby a recent meta-analysis performed by Chia et al. (2020) found the pooled prevalence rate of problematic gaming behaviour in seven countries in Southeast Asia (which include Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam) as 10.1%. This clearly illustrates the high engagement of problematic gaming behaviour among adolescents.

Given the high popularity of gaming among adolescents, numerous studies had been conducted to examine the potential impacts of gaming on adolescents. On one hand, research had documented a diverse set of benefits for playing games, which include cognitive, motivational, emotional, and social benefits (Granic et

al., 2014). In a study involving adults aged between 18 to 80 years old, younger adults reported cognitive benefits from playing casual video games; while older adults reported improved visuospatial abilities and reaction time (Whitbourne et al., 2013). Identically, a series of cross-sectional, longitudinal, and experimental studies demonstrated that prosocial gameplay will promote prosocial behaviour among adolescents (Gentile et al., 2009).

By contrast, there are also increasing research attention on problematic gamers, which are adolescent gamers who spend an excessive amount of time playing games. Adolescence is a stage of “storm and stress” between childhood and adulthood, whereby many changes might occur during this stage (Hall, 1904). Thus, adolescents have to learn and adapt to the changes to fully develop. The high engagement in problematic gaming behaviour at this stage might distract adolescents and lead to various developmental problems, which includes cognitive (King & Delfabbro, 2016), mental (Wichstrøm et al., 2019), and social development (Mérelle et al., 2017).

These problematic gamers are expected to spend an overly long period on gaming, which can later impair their social and psychological well-being (Mentzoni et al., 2011). A focus group discussion with Malaysian adolescents revealed some symptoms of problematic gaming behaviour, which include salience, mood modification, harm, loss of control, and physical health (Muhaimin et al., 2018). In other words, the problematic gamers remain irresistible to play games even when they realized the occurrence of social dysfunction and disruption (Karim & Chaudhri, 2012).

Until a few years ago, the fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-5) proposes internet gaming disorder (IGD) as a potential psychiatric condition that requires further scientific research before it can be officially recognized as a formal disorder (American Psychiatric Association, 2013). The DSM-5 defines IGD as “persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following (criteria) in a 12-month period” (American Psychiatric Association, 2013, p. 795). Specifically, the proposed criteria are: (i) preoccupation with Internet games, (ii) withdrawal symptoms when Internet gaming is taken away, (iii) the need to spend increasing amounts of time engaged in Internet games, (iv) unsuccessful attempts to control the participation in Internet games, (v) loss of interests in previous hobbies and entertainment, (vi) continued excessive use of Internet games despite knowledge of psychosocial problems, (vii) has deceived family members, therapists, or others regarding the amount of Internet gaming, (viii) use of Internet games to escape or relieve a negative mood, and (ix) has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in Internet games.

However, a commentary paper by Aarseth et al. (2017) questioned the inclusion of problematic gaming behaviour as IGD on three main issues, namely (a) the

quality of the research base is low, (b) the current operationalization of the construct leans too heavily on substance use and gambling criteria, and (c) there is no consensus on the symptomatology and assessment of IGD. Having considered that the IGD is categorized as a potential psychiatric condition that requires further scientific research, this study will use the term “problematic gaming behaviour”, as recommended by Männikkö et al. (2017), to avoid any *a priori* conceptualisation.

Research has indicated that excessive gameplay can cost adolescents their psychological, social, and physical health (Mentzoni et al., 2011). There are plenty of studies which had been conducted to examine the potential effects of gaming, such as more frequent sleep difficulty (King, Gradisar, et al., 2013), higher engagement in risky behaviours (Desai et al., 2010), and poorer psychosocial well-being (Lemmens et al., 2011). One study involving Malaysian youths found a significant positive relationship between problematic gaming behaviour and aggressive behaviour (Heng & Rabbani, 2020). A recent review of 72 papers revealed some comorbidities of problematic gaming behaviour, which include hyperactivity, inattentiveness, cyberbullying, depression, anxiety, and substance abuse (Field, 2019). Kamal and Wok (2020) found a significant positive relationship between problematic gaming behaviour and mental health among Malaysian students, which include depression, anxiety, and loneliness. To promote healthy development during adolescence, there is a research need to understand the problematic gaming behaviour among adolescents. Similarly, a Malaysian systematic review also supports the negative impacts of problematic gaming behaviour on physical health, which include obesity, back pain, neck pain, orthopaedic/joint-muscle, eyesight problem, hearing problem, and physical inactivity (Aziz et al., 2021). These potential negative effects of gaming have created a negative public impression on gaming (Cleary, 2019).

The negative public impression on gaming is more notable after the incident of several high-profile cases of violence due to gaming issues. One typical example is the Colorado movie theatre massacre conducted by James Holmes in 2012. James Holmes, dressed in tactical clothing, set off tear gas grenades and shot into the audience with multiple firearms during a midnight screening of the film “The Dark Knight Rises”. The massacre resulted in 12 people killed and 70 others injured. Upon further investigation on his personal life, it is noted that he was an active gamer in the online role-playing game, which is suspected as one causal factor for his aggressive behaviour. Another more recent massacre is the mosque shooting in Christchurch, New Zealand on 15 March 2019. The massacre resulted in 51 people killed and 49 others injured. The shooter live-streamed the massacre from a first-person perspective, which is identical to the camera setting of most first-person shooter games.

Such cases will create a public perception that playing games, especially violent games, will lead to violence. The positive relationship between gaming and aggressive behaviour has been well-documented in research, whereby playing games will increase one’s likeliness to be aggressive (Prescott et al., 2018; Zhu et al., 2018). To explain the relationship, Greitemeyer and McLatchie (2011)

conducted two experiments to examine the effects of playing violent, prosocial, and neutral games on aggressive behaviour. As hypothesized by the researchers, it is found that playing violent video games will increase dehumanization, which in turn evoked aggressive behaviour. Moreover, such relationships were not found for participants who played prosocial and neutral games, which further evidence the detrimental impacts of violent games on gamers.

Additionally, several Malaysian newspaper reported the potential negative impacts of problematic gaming, which include suicidal ideation (Berita Harian Online, 2019), poorer health (Khalil, 2021), and aggressive behaviour (Roslan, 2018). The news had created higher awareness towards problematic gaming behaviour within the Malaysian context.

1.2 Statement of Problem

At this point, the current study has identified three main research gaps that are worth tackling. First, a valid and tested model to explain the development of problematic gaming behaviour is needed to develop a better understanding of the phenomenon, then effective interventions can be formulated.

In search of the current literature, numerous studies have been conducted to identify factors contributing to problematic gaming behaviour, which include family factors (Schneider et al., 2017), environmental and social factors (Wong & Lam, 2016), cognitive factors (King & Delfabbro, 2014), gaming motives (Bong, 2019; A. M. Wu et al., 2016; Xu et al., 2012), psychosocial well-being (Lemmens et al., 2011), and personal characteristics (Müller et al., 2014). For instance, in a sample of 824 adolescents, King and Delfabbro (2016) found significant relationships between gaming cognitions (overvaluing of game rewards, maladaptive and inflexible gaming rules, gaming-based self-esteem, and gaming to gain social acceptance) and problematic gaming symptoms.

Even though problematic gaming behaviour was found to significantly correlates with most of the aforementioned variables, this direct effect approach was criticized for its limited theoretical contribution (Kardefelt-Winther, 2014a, 2014b). The correlations between most psychological variables are likely to be significant when assessing separately. But, the significant relationships might be quickly diminished when controlling variables were accounted for, which is the result of the suppression effect (Zhao et al., 2010). For instance, while there are plenty of studies that found a significant relationship between loneliness and problematic gaming behaviour (Lemmens et al., 2011; Seay & Kraut, 2007; van Rooij et al., 2014), Kardefelt-Winther (2014c) found the relationship lost significance when the motivation for gameplay (escapism and achievement) were controlled. Similar findings were found in the Malaysian context as well. As shown in the research conducted by Jaafar et al. (2021), problematic gaming behaviour was found to significantly correlates with several variables (i.e., age, gender,

academic performance, depression, anxiety, and stress). However, only age, gender, and stress remain as significant predictors of problematic gaming behaviour when all variables were accounted for in the regression model (Jaafar et al., 2021). Given the weakness of the direct effect approach, there is a need for a theoretical model that can simultaneously account for multiple relevant predictors of problematic gaming behaviour among adolescents.

Overall, the lack of a theoretical base for problematic gaming behaviour can lead to some problems, which are: (i) inflating prevalence rate, (ii) stigmatization of normal gamers, and (iii) ineffective intervention. Having considered adolescents as a vulnerable group towards problematic gaming behaviour, a theoretical model which explains the development of problematic gaming behaviour among adolescents is needed.

Referring to the existing theoretical models, the theory of compensatory internet use (Kardefelt-Winther, 2014a) appears to be a valid model in fulfilling the research need. In short, the theory of compensatory internet use proposes that individuals are motivated to engage in a long period of gaming due to certain negative life situations. In the longer term, individuals will become increasingly reliant on gaming, which will ultimately result in problematic gaming behaviour. To be more specific, the current study refers to Bronfenbrenner's Process-Person-Context-Time Model (Bronfenbrenner & Morris, 2006) to identify potential negative life situations that are specifically significant to adolescents. As Bronfenbrenner suggests the microsystem as the most influential environment for adolescents, the current study put the main focus on family (mother-adolescent relationship and father-adolescent relationship), school (school engagement), and peer (peer relationship) contexts. In light of this, it is hypothesized that adolescents that encountered disruption in their microsystem are more motivated to play games than their counterparts. In other words, the current study hypothesized that adolescents who perceive less warmth with parents, disengage from school, and a weak relationship with peers are more motivated to engage in problematic gaming behaviour than their counterparts. Additionally, as self-esteem (Colwell & Payne, 2000; van Rooij et al., 2011; Wong & Lam, 2016) and time spent gaming (Lee & Kim, 2017; van Rooij et al., 2011) has empirically been raised as predictor of problematic gaming behaviour among adolescents, there are reasons to include gaming self-esteem beliefs and time spent gaming into the model as well. Therefore, it is the aim of the current study to examine the theory of compensatory internet use and Bronfenbrenner's Process-Person-Context-Time Model in the Malaysian context.

Second, some possible life situations which can increase the risk of problematic gaming behaviour among adolescents is not properly addressed. While there are plenty of supports for the significant role of family context, the supports for school and peer contexts are relatively weak. In the school context, many of the studies put the main focus on the academic aspect of school (Hawi et al., 2018), while fewer efforts had been placed on the non-academic aspect of the school. A similar case was found in peer context as well, research which focuses on the quality of peer relationship remain scarce. Rather than examining the quality of

peer relationship, research has mainly focused on other facets of peer relationship, such as the number of friends (Gallimberti et al., 2016), deviant peer affiliation (Su et al., 2018), and peer influence (J. Y. W. Wu et al., 2016). Additionally, most studies placed the main focus on family context, while ignoring the potential role of school and peer contexts. Hence, there is a great need to simultaneously examine family, school, and peer contexts in problematic gaming behaviour among adolescents. In light of this consideration, the theory of compensatory internet use and Bronfenbrenner's Process-Person-Context-Time Model should serve well to simultaneously account for the multiple contextual and personal factors of problematic gaming behaviour.

Third, many of the previous studies have put the main focus on examining problematic gaming behaviour among online games players, such as massively multiplayer online role-playing game (MMORPG) and first-person shooter game (FPS) player (Na et al., 2017). For example, Muhaimin et al. (2018) conducted a focus group discussion that involves Malaysian adolescents that play massively multiplayer online games only. There are comparably few studies which had been conducted to compare the impact of different game genres on problematic gaming behaviour (Na et al., 2017). This is due to MMORPG is expected to have higher addictive potential than other game genres, given that MMORPG (a) serves as an environment for socializing, (b) provides a permanent virtual world that is continuously emerging, and (c) contains an advancement system which allows players to continuously develop (Cole & Griffiths, 2007; Kuss & Griffiths, 2012). Thus, it is suggested that playing online games will put adolescents at greater risk to engage in problematic gaming behaviour (Bonnaire & Phan, 2017; Wang et al., 2014).

However, due to the development in the gaming industry, many recent offline games also possess such characteristics as MMORPG. For instance, *Detroit: Become Human* utilizes an interactive storytelling method that allows players to actively interact with the game characters (an environment for socializing); *Final Fantasy XV* regularly provides new updates and playable contents since first released in 2016, and the game world continues to grow until 2019 (a permanent virtual world which is continuously emerging); *Diablo 3* will randomly generate better and more powerful gears even after the players had completed the game (an advancement system which allows players to continuously develop). These additional features of recent games allow the players to enjoy the benefits of online game without actually going online, while the influence of these categories of games on problematic gaming behaviour remains almost untouched (Na et al., 2017). As noted in a recent study conducted by Männikkö et al. (2017), problematic gaming behaviour is significantly associated with games that contain role-playing, progression, action, and strategy component. The Internet is merely a medium to play games (King & Delfabbro, 2013; Király, Griffiths, et al., 2015; Starcevic, 2013). People are using the Internet to play games, but not being addicted to the Internet itself. In light of this, offline games may be equally addictive as online games. There is a need to examine problematic gaming behaviour among players of other game genres, which include offline games (Gentile et al., 2017). In light of this, the current study involved adolescents who played online or offline games.

Overall, many of the existing studies suffer from some extent of methodological deficits. Specifically, one line of research had utilized a direct effect approach in examining problematic gaming behaviour, which limits the theoretical contribution of the studies. Another line of the study failed to properly address potential correlates of problematic gaming behaviour among adolescents. The other line of research had focused solely on online gamers, which limits the generalizability of the findings to the adolescent population. Hence, it is the aim of this study to strengthen the theoretical background of problematic gaming behaviour. The current study focuses on adolescents, mainly due to they are expected to be most vulnerable towards problematic gaming behaviour. Four research questions were addressed in this present study:

1. What are the levels of contextual factors (mother-adolescent relationship, father-adolescent, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives), and problematic gaming behaviour among adolescents?
2. Are there any significant relationships between contextual factors (mother-adolescent relationship, father-adolescent, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives), and problematic gaming behaviour of the adolescents?
3. Do contextual factors (mother-adolescent relationship, father-adolescent, school engagement, and peer relationship) and personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives) predict problematic gaming behaviour among adolescents?
4. Are the relationships between contextual factors (mother-adolescent relationship, father-adolescent, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs and time spent gaming), and problematic gaming behaviour mediated by gaming motives?

1.3 Research Objective

1.3.1 General Objective

This study aims to examine the mediating role of gaming motives in the relationships between contextual factors (mother-adolescent relationship, father-adolescent, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives), and problematic gaming behaviour among adolescents.

1.3.2 Specific Objective

1. To describe contextual factors (mother-adolescent relationship, father-adolescent relationship, school engagement, and peer relationship),

- personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives), and problematic gaming behaviour among adolescents.
2. To determine the relationships between contextual factors (mother-adolescent relationship, father-adolescent relationship, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives), and problematic gaming behaviour of the respondents.
 3. To determine the factors that uniquely predict problematic gaming behaviour among the respondents.
 4. To examine whether the relationships between contextual factors (mother-adolescent relationship, father-adolescent, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs and time spent gaming), and problematic gaming behaviour are mediated by gaming motives.

1.4 Hypothesis

Based on the specific objectives, the present study proposed the following alternative hypothesis:

H_{a1}: There is a significant relationship between mother-adolescent relationship and problematic gaming behaviour among adolescents.

H_{a2}: There is a significant relationship between father-adolescent relationship and problematic gaming behaviour among adolescents.

H_{a3}: There is a significant relationship between school engagement and problematic gaming behaviour among adolescents.

H_{a4}: There is a significant relationship between peer relationship and problematic gaming behaviour among adolescents.

H_{a5}: There is a significant relationship between gaming motives and problematic gaming behaviour among adolescents.

H_{a6}: There is a significant relationship between gaming self-esteem beliefs and problematic gaming behaviour among adolescents.

H_{a7}: There is a significant relationship between time spent gaming and problematic gaming behaviour among adolescents.

Ha8: Mother-adolescent relationship, father-adolescent relationship, school engagement, peer relationship, gaming self-esteem beliefs, time spent gaming, and gaming motives significantly predict problematic gaming behaviour among adolescents.

Ha9: Gaming motives mediates the relationships between contextual factors (mother-adolescent relationship, father-adolescent, school engagement, and peer relationship), personal factors (gaming self-esteem beliefs and time spent gaming), and problematic gaming behaviour.

1.5 Significance of Study

The findings of the current study will support the theoretical base in problematic gaming behaviour. As for current, the inclusion of IGD in DSM-5 has been criticized for the lack of a solid theoretical base. Many of the current studies utilized a direct effect approach in examining the correlates of problematic gaming behaviour, which limit the theoretical contribution to IGD. The premature inclusion of IGD without a strong theoretical base might result in more severe problems, such as inflating the prevalence rate, stigmatizing normal gamers, and ineffective interventions. Thus, the current study will help to strengthen the theoretical base of problematic gaming behaviour before it can be officially recognized as a formal disorder. Following the theoretical reasoning from the theory of compensatory internet use and Bronfenbrenner's Process-Person-Context-Time Model, the current study will employ a compensatory perspective to simultaneously examine the influential power of contextual and personal factors towards problematic gaming behaviour among adolescents.

On the other hand, research on problematic gaming behaviour among adolescents is developing in Malaysia. Much existing research was conducted in Western countries, such as Canada (Turner et al., 2012), Finland (Männikkö et al., 2017), Germany (Wartberg et al., 2020), and Norway (Wittek et al., 2016). With no doubt, these Western findings might not be applicable in the Malaysian context due to wide cultural differences. While it is undeniable that there are some studies been conducted in Eastern countries, such as China (Liang et al., 2019), Japan (Kawabe et al., 2019), and Korea (Hong et al., 2019), but cultural differences still exist between Malaysia and these Eastern countries. For instance, many cultural factors that might affect the problematic gaming behaviour among adolescents, such as pricing of games, socio-economic status, availability of games, and coverage of the Internet. Failure to acknowledge these cultural differences can lead to false decisions. Although there is an increasing research interest in Malaysia, a bigger proportion of the recent studies were conducted among university students (Heng & Rabbani, 2020; Jaafar et al., 2021) and targeted at other forms of behavioural addictions, such as Internet addiction (Chan et al., 2021; Rosliza et al., 2018) and social media addiction (Moghavvemi et al., 2017). Similar findings were found in a meta-analysis involving Malaysian studies by Chia et al. (2020), in which the majority of the Malaysian studies

targeted internet addiction and university students. Therefore, the current study aimed to enrich the literature in the Malaysian context.

Practically, the findings of the current study will potentially help parents to understand their role in the prevention of problematic gaming behaviour among adolescent-aged children. Indeed, family dysfunction has frequently been raised as a risk factor for children's behavioural problems, which include problematic gaming behaviour. While complaints of adolescent-aged children's engagement in problematic gaming behaviour are not uncommon among parents, many of the parents might not even aware of their role in this issue. Therefore, this study will serve as a guide for parents to understand their role in monitoring problematic gaming behaviour among adolescents. For example, the current findings should serve as support for related authorities, such as the Malaysian Ministry of Health (2021), in designing more effective parenting guideline to monitor problematic gaming behaviour among adolescent-aged children. On the other hands, the current findings should also supplement the parenting support and guidance offered by local counselling centres, such as KIN & KIDS Marriage, Family and Child Therapy Center.

In addition, this study might serve as a guideline for counsellors as well. The current findings should support the counsellors in the development and refinement of interventions, such as Gaming Addition Therapy from the International Psychology Centre (2014). Based on the current findings, counsellors might have a better understanding of the factors that motivate adolescents to engage in overly long gaming sessions. For instance, having known that adolescents play games to escape from certain negative life situations, counsellors might be able to plan for more effective intervention to solve the core problem, rather than forcing the adolescents to shorten their gaming sessions. This will directly help adolescents to cope with their problems and reduce problematic gaming behaviour.

Last but not least, the current findings can be useful for educators as well. The findings of this study can help educators to make an informed decision in developing new programs. For example, the educators can implement ideas from the current study in planning programs to enhance the family relationship, engage adolescents in school, and encourage positive peer relationship. These functional and positive contextual factors might build adolescents to be more resilient against problematic gaming behaviour. Additionally, the findings of the current study could be additional resources for educators to create awareness about problematic gaming behaviour. For instance, Universiti Putra Malaysia (2020) published an article to introduce the concept of problematic gaming behaviour, as well as ways to reduce the risk of problematic gaming behaviour.

1.6 Theoretical Framework

This section will describe the theoretical framework of the current study, which consists of Bronfenbrenner's Process-Person-Context-Time (PPCT) Model and theory of compensatory Internet use. The following sections will discuss the two theories in greater details and followed by a brief discussion on theory integration.

1.6.1 Bronfenbrenner's Process-Person-Context-Time Model

Bronfenbrenner is best known for his Bioecological Theory of Human Development, which conceptualized complex layers of environment that have strong effects on an individual's development (Bronfenbrenner, 1979). Bronfenbrenner proposed four facets of development, namely process, person, context, and time (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006). A graphical presentation of the Process-Person-Context-Time Model is illustrated in Figure 1.1.

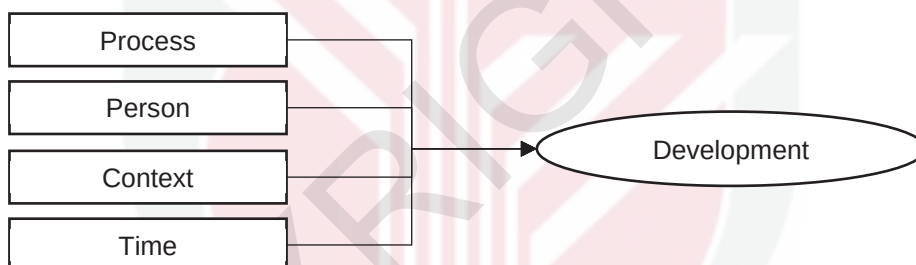


Figure 1.1 : Bronfenbrenner's Process-Person-Context-Time Model

The “process” facet refers to the interactions between the individual and the immediate external environment. To stress the importance of the significant role of proximal processes as engines of development, Bronfenbrenner and Morris (2006) indicated that “the interaction must occur on a fairly regular basis over extended periods. Such enduring forms of interaction in the immediate environment are referred to as proximal processes” (p.797). In other words, for the proximal processes to be developmentally effective, the individual must actively engage in the person-environment interaction regularly. For instance, the interaction between parents and children should play a significant role in development, given that adolescents spent a huge amount of time with their parents.

While there are studies that criticize Bronfenbrenner's theory for overemphasizing environmental factors and discounting the role of the individual in his or her development (Bronfenbrenner, 1989), Bronfenbrenner had incorporated the “person” facet into the PPCT model. Overall, the person refers

to the biological and genetic aspects of the individuals (e.g. age and gender), as well as psychological cognition (e.g. attitudes and belief). Bronfenbrenner and Morris (2006) claim that these individual characteristics can be either developmentally generative or developmentally disruptive. Bronfenbrenner had put the major focus on individual characteristics that can affect involvement in proximal processes. In light of this, self-esteem may be a noteworthy individual characteristic that can shape development among adolescents, given that adolescents with low self-esteem are likely to distance themselves from others (Martyn-Nemeth et al., 2009).

The “context” facet reflects the core concept of Bioecological Theory of Human Development, which proposed the four systems surrounding an individual, namely microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1979). The microsystem is the closest environment in which the individuals have direct contact. The most influential microsystem for adolescents is often being referred to as family, school, and peer context. Breakdown in these contexts is expected to have the greatest impact on adolescents.

Mesosystem is a system comprising connections between individuals' immediate environments and surrounding. An example of the mesosystem is parental involvement in school. The two-way interactions between family and school contexts may have developmental impacts on adolescents. For instance, parental involvement in the peer context can help to prevent adolescents from joining bad influences. Similarly, parental involvement in school activities might help adolescents to develop better.

Exosystem refers to external environmental settings in which the individuals do not directly involve. Different from microsystem and mesosystem which have a direct influence on one's development, exosystem is expected to have a distal influence on the individuals. An example of the exosystem for adolescents is parents' career. Although adolescents do not involve in parents' career, parents' career does influence how adolescents develop. Parents who are too busy for their career might have lower interaction and less support to their adolescent-aged children, which will lead the adolescents to play more games to seek social support and form a warm relationship with other players.

Macrosystem is a large cultural context in the individuals' environment. Examples of macrosystem are culture, values, norms, laws, national economy, political culture, and subculture. For instance, adolescents' development is generally shaped by social norm and cultural factors. Hence, the prevalence rate of problematic gaming behaviour tends to differ by countries, with Asian countries tend to report higher estimates of prevalence than other regions (Fam, 2018).

Last but not least, the “time” facet encompasses the dimension of time. As mentioned in the previous section, research has documented the age difference in problematic gaming behaviour, where adolescence was found to be the most

vulnerable stage to engage in problematic gaming behaviour (Mentzoni et al., 2011). Similarly, American Psychiatric Association (2013) also claim problematic gaming behaviour to be most prevalent among adolescents aged between 12 and 20 years old. Besides chronological age, time also refers to timing, such as the total time adolescents invested in gaming. According to DSM-5 (American Psychiatric Association, 2013), adolescents with problematic gaming behaviour are likely to “devote 8-10 hours or more per day to this activity and at least 30 hours per week” (p. 796). On the other hand, the American Academy of Pediatrics (2001) classified children and adolescents that spend more than two hours per day on screen as “excessive screen use”.

In a review of studies that base their works on Bronfenbrenner’s theory, it was found that only four out of 25 studies used the mature form of the theory (Tudge et al., 2009). Rather than seeing Bronfenbrenner’s theory exclusively on contextual factors, future research is suggested to examine the PPCT model as a whole, with the primary focus on proximal processes. Tudge et al. (2009) further suggest that “a study involving the PPCT model should focus on proximal processes, showing how they are influenced both by characteristics of the developing individual and by the context in which they occur and showing how they are implicated in relevant developmental outcomes” (p. 207).

1.6.2 Theory of Compensatory Internet Use

The proposal inclusion of IGD in DSM-5 has received some criticisms in recent years (Griffiths et al., 2016; Kuss et al., 2017), with one critical issue frequently been raised is the lack of theoretical base (Aarseth et al., 2017; Kardefelt-Winther, 2014c; Starcevic, 2017). With no surprise, many of the existing papers did not provide theoretical reasoning on the tested hypotheses when examining the potential correlates of problematic gaming behaviour (e.g., Dullur & Hay, 2017; Kim et al., 2018; Na et al., 2017). This portrays the need for a stronger theoretical base in problematic gaming behaviour.

In response to this issue, Kardefelt-Winther (2014a) proposed the Theory of Compensatory Internet Use as an attempt to explain the development of problematic gaming behaviour (a graphical presentation of Theory of Compensatory Internet Use is illustrated in Figure 1.2). This theory is derived partly from Young (1998) which suggest people engage in Internet activities for compensatory purposes. Traditionally, many studies tend to examine the negative aspects of problematic gaming behaviour (Anderson et al., 2004), while seeing it as a compulsive act of loss of control (van Rooij et al., 2010). Contrary to this compulsive perspective which views problematic gaming behaviour as loss of control over one’s behaviour, this theory takes a compensatory perspective which argues that people consciously go online with a specific motive, regardless of the motive is good or bad in nature. In other words, people go online because the Internet can fulfil their unmet needs. This argument is supported by numerous studies which found a significant relationship between

gaming motives and problematic gaming behaviour (Caplan et al., 2009; Kuss et al., 2012; Li et al., 2011).

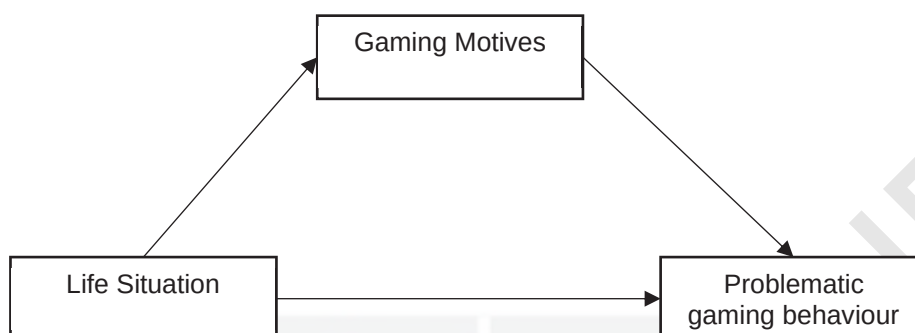


Figure 1.2 : Theory of Compensatory Internet Use

Kardefelt-Winther (2014a) further proposed that “negative life situations can give rise to a motivation to go online to alleviate negative feelings” (p. 352). That is, some gamers will engage in online gaming to escape from real-life problems. For illustration, if an individual experience a lack of social stimulation in real life, the individual might play online games and join online communities to meet this unmet need. In the short run, the individual might be able to make a few friends and socialized through online games. However, in the long run, the individual might become dependent on online games for social needs, making them unable to leave the virtual world and make offline friends. Indeed, Kaczmarek and Drażkowski (2014) demonstrated that massively MMORPG players who play for escapism purpose are likely to spend more time on gaming. At the same time, these escapist gamers tend to report increased online support and decrease offline social support.

To test his hypothesis, Kardefelt-Winther (2014c) examined the mediating role of motivations (escapism, achievement, and social interaction) in the relationship between stress and excessive online gaming. As hypothesized, the result revealed that a high level of stress is associated with escapism motivation, which will ultimately encourage excessive online gaming. The potential mediating role of gaming motives in the relationship between negative life situations and problematic gaming behaviour is also supported in some other Internet settings, such as excessive Internet use (Li et al., 2016; Ohno, 2016).

1.6.3 Integration of Theories

The present study refers to Bronfenbrenner’s PPCT Model and Theory of Compensatory Internet Use to explain the problematic gaming behaviour among adolescents. A graphical presentation for the integration of theories was displayed in Figure 1.3.

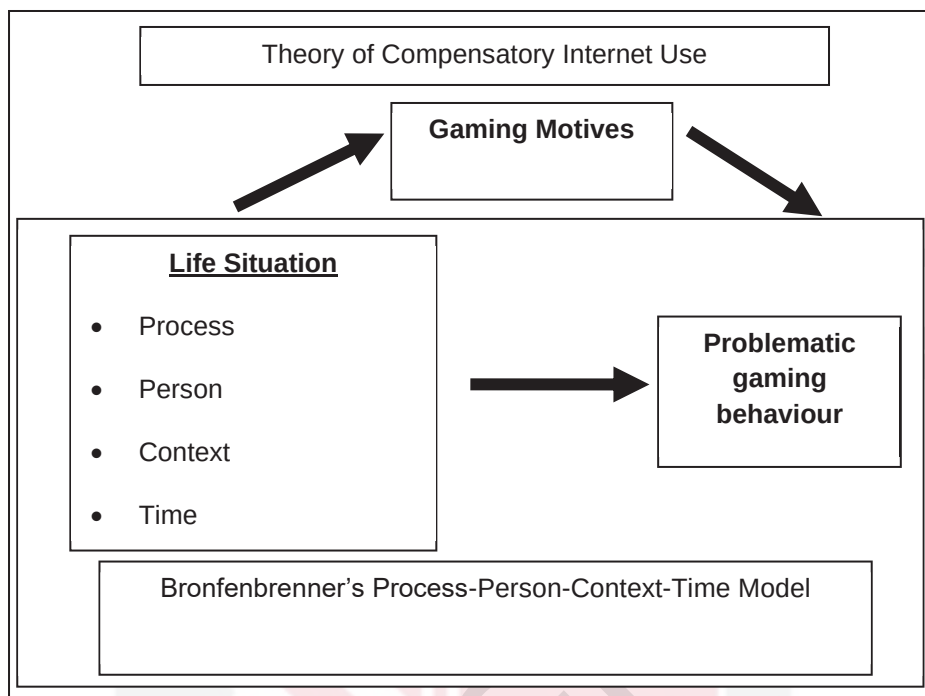


Figure 1.3 : Integration of Theories

Following the theory of compensatory Internet use, adolescents are motivated to play games to achieve unmet needs resulted from life situations. Following the definition provided by Yee (2006b), gamers play games for three main reasons, which are achievement, social, and immersion. In light of this, it is possible that adolescents play games to counter academic failure (achievement) and dysfunctional relationships with significant others (social), or as a mode to escape from real-life problems (immersion). Over time, adolescents will become increasingly dependent on gaming and engage in problematic gaming behaviour.

However, the theory of compensatory Internet use did not specify the life situations that should be included. Kardefelt-Winther (2014a) proposed some general life situations, such as lack of social stimulation and temporary school- or work-related stress. To identify the life situations that are specific to adolescents, the current study further refers to Bronfenbrenner's PPCT model. Having considered the significant role of proximal processes in shaping the development among adolescents, the current study will put the main focus on the interaction between the adolescents and their family (mother-adolescent relationship and father-adolescent relationship), school (school engagement), and peer context (peer relationship). Additionally, the current study also acknowledged the role of the person, context, and time factor in this developmental stage. Hence, the current study also incorporates gaming self-esteem beliefs (person) and time spent on gaming (time) into the model.

Overall, the current study will include the family, school, and peer contexts of adolescents. Specifically, the current study will examine how contextual factors (mother-adolescent relationship, father-adolescent relationship, school engagement, and peer relationship) and personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives) will influence problematic gaming behaviour among adolescents.

1.7 Conceptual Framework

The conceptual framework of this study is adapted from the ideas of Bronfenbrenner's PPCT model and Theory of Compensatory Internet Use. Figure 1.4 is a graphical presentation of the conceptual framework for the present study. The dependent variable of the current study is problematic gaming behaviour. Based on the theoretical framework, the independent variables of the current study include contextual factors (mother-adolescent relationship, father-adolescent relationship, school engagement, and peer relationship) and personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives). Additionally, gaming motives is hypothesized as a mediator between the relationship of contextual factors, personal factors, and problematic gaming behaviour.

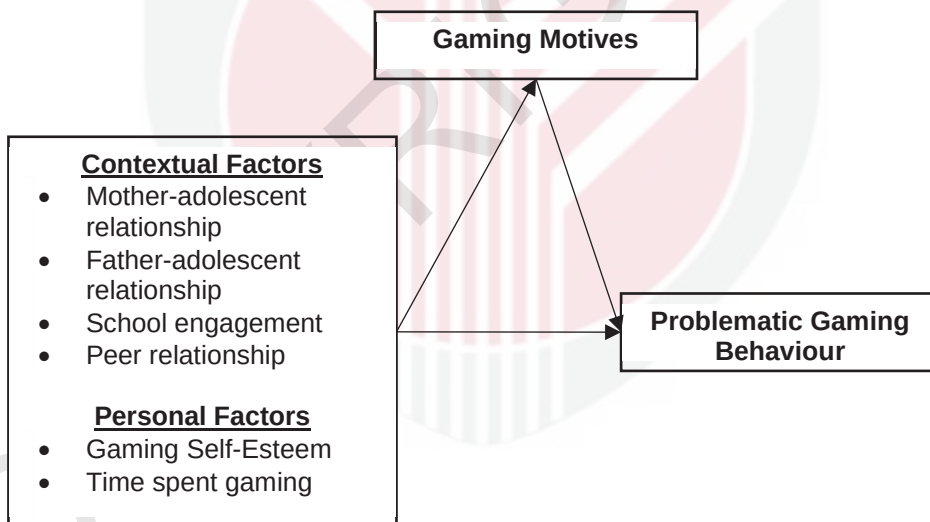


Figure 1.4 : Conceptual framework for the study of “Interrelationships of Contextual Factors, Personal Factors And Gaming Behaviour Among Adolescents in Malaysia”

The current study hypothesized that adolescents who experienced disruption in contextual factors (mother-adolescent relationship, father-adolescent relationship, engagement, and peer relationship) and personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives) are likely to engage

in problematic gaming behaviour. More precisely, the contextual factors include family (mother-adolescent relationship and father-adolescent relationship), school (school engagement), and peer (peer relationship) contexts. The gaming motives include social, immersion, and achievement as proposed by Yee (2006b).

Moreover, the current study also develops a structural model in an attempt to explain problematic gaming behaviour among adolescents. The structural model hypothesizes a mediating role of gaming motives in the relationships between contextual factors, personal factor, and problematic gaming behaviour. In other words, it is hypothesized that adolescents who experienced a weak relationship with parents, disengagement from school, dysfunctional peer relationship, high gaming self-esteem belief, and spent long hours on gaming are likely to be motivated to play games. Regardless of the motives are good or bad, the gaming motives are hypothesized to increase the risk for adolescents to engage in problematic gaming behaviour. This is due to the gaming motives will increase their dependency on gaming to relieve from life situations. For instance, adolescents who faced difficulty in making friends might play games for social purposes (a positive purpose which might be detrimental). As previous studies have found reduced social functioning in family and peer relations due to increased gaming sessions (Carlisle & Carrington, 2015), it is plausible that adolescents will become more dependent on gaming to fulfil their social needs, which can ultimately result in problematic gaming behaviour.

1.8 Definition of Terminology

This study involves certain terminologies which are of importance. These terms will be conceptually and operationally defined in the following sections.

1.8.1 Adolescent

Conceptual Definition:

Adolescent refers to individuals aged between 10 and 19 years old (World Health Organization, 2012).

Operational Definition:

Adolescent refers to students enrolled in Malaysian public secondary schools aged between 12 to 18 years old.

1.8.2 Problematic gaming behaviour

Conceptual Definition:

Problematic gaming behaviour refers to the persistent use of the Internet for gaming purpose which leads to clinically significant impairment or distress (American Psychiatric Association, 2013).

Operational Definition:

Problematic gaming behaviour refers to adolescent's score on the Problem videogame Playing Scale (Tejeiro & Bersabé, 2002), where a higher total score indicates more severe problematic gaming behaviour (total score ranges between 0 and 45).

1.8.3 Mother-adolescent relationship

Conceptual Definition:

Mother-adolescent relationship refers to adolescents' perception of the relationship with mother, which consists of behaviours, feelings, and expectations (Furman & Buhrmester, 1992).

Operational Definition:

Mother-adolescent relationship refers to adolescent's total score on the Inventory for Parent and Peer Attachment (Armsden & Greenberg, 1987), where a higher total score indicates a more positive mother-adolescent relationship (total score ranges between 5 and 125).

1.8.4 Father-adolescent relationship

Conceptual Definition:

Father-adolescent relationship refers to the quality of fathering and involvement in adolescent's daily lives (Bronte-Tinkew et al., 2006).

Operational Definition:

Father-adolescent relationship refers to adolescent's total score on the Inventory for Parent and Peer Attachment (Armsden & Greenberg, 1987), where a higher total score indicates a more positive father-adolescent relationship (total score ranges between 5 and 125).

1.8.5 School engagement

Conceptual Definition:

School engagement refers to students' motivation, involvement, and commitment to learning at school (Fredricks et al., 2004).

Operational Definition:

School engagement refers to adolescent's total score on School Engagement Scale (Fredricks et al., 2005), where a higher total score indicates higher behavioural, emotional, and cognitive engagement in school (total score ranges between 19 and 95).

1.8.6 Peer relationship

Conceptual Definition:

Peer relationship refers to the perception of the relationship with an informal social group who interact and share similar interests and values (Furman & Buhrmester, 1992).

Operational Definition:

Peer relationship refers to adolescent's total score on the Index of Peer Relation Scale (Hudson et al., 1990), where a higher total score indicates more problem with peers (total score ranges between 0 and 100).

1.8.7 Gaming Self-Esteem Beliefs

Conceptual Definition:

Self-esteem refers to one's perception and evaluation of oneself in relation to their environment and other individuals (Kernis, 2003). In the same vein, gaming self-esteem beliefs refers to one's perception and evaluation of oneself in the gaming context.

Operational Definition:

Gaming self-esteem beliefs refers to adolescent's total score on the Gaming Self-Esteem Beliefs Subscale from the Internet Gaming Cognition Scale (King & Delfabbro, 2016), where a higher total score indicates higher gaming self-esteem beliefs (total score ranges between 0 and 14).

1.8.8 Time Spent Gaming

Conceptual Definition:

Time spent gaming refers to the average time adolescents spent playing video games on weekdays and weekends (Hellström et al., 2012).

Operational Definition:

Time spent gaming refers to the total hour adolescents spent playing video games per week, with a higher total indicates longer time spent gaming.

1.8.9 Gaming motives

Conceptual Definition:

Gaming motives refer to drivers that tempt individuals to play games (Abdul Razak et al., 2017).

Operational Definition:

Gaming motives refer to adolescent's score on Online Gaming Motivation Scale (Yee et al., 2012), where a higher score indicates higher relative motivation to play games (total score ranges between 5 and 60).

1.9 Summary

Gaming is a famous and well-accepted leisure activity for adolescents. The inclusion of IGD in DSM-5 and concerns about gamers have spurred many researchers to investigate potential correlates of problematic gaming behaviour. The present study integrated the concepts of Theory of Compensatory Internet Use and Bronfenbrenner's Process-Person-Context-Time Model to explain problematic gaming behaviour among adolescents. More precisely, this study examines how contextual (mother-adolescent relationship, father-adolescent relationship, school engagement, and peer relationship) and personal factors (gaming self-esteem beliefs, time spent gaming, and gaming motives) can contribute to the development of problematic gaming behaviour among adolescents. Moreover, this study hypothesized gaming motives as a mediator in the relationships between contextual factors, personal factors, and problematic gaming behaviour among adolescents.

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