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FLOW EXPERIENCE, STRESS, AND MINDFULNESS AS PREDICTORS OF INTERNET ADDICTION AMONG UNIVERSITY STUDENTS IN MALAYSIA

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A RESEARCH PROJECT SUBMITTED IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
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Flow Experience, Stress, and Mindfulness as Predictors of Internet Addiction among University Students in Malaysia

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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 April 2022.

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AVINAASH A/L THIRUSELVAM

LIM SHU JING

APPROVAL FORM

This research paper attached hereto, entitled “Flow experience, stress, and mindfulness as predictors of Internet addiction among university students in Malaysia” prepared and submitted by Avinaash A/L Thiruselvam, and Lim Shu Jing in partial fulfillment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

_____ Date: 4th April 2022

Supervisor

(Dr. Grace T’ng Soo Ting)

Abstract

Internet addiction (IA) is identified as technological addiction of frequent Internet use in conjunction with behavioural responses linked to co-morbid disorders. Internet addiction is also referred to as Problematic Internet Use (PIU), computer addiction, Internet dependency compulsive Internet use and pathological Internet use. However, there are limited studies on the predictive effects of (a) flow experience; (b) stress; (c) mindfulness on Internet addiction among university students in Malaysia. Therefore, the current study aimed to investigate the predictive effects of (a) flow experience; (b) stress; (c) mindfulness on Internet addiction among university students in Malaysia. There were 182 target participants who were recruited to participate in the cross-sectional study through the online survey method that utilised purposive sampling. Though, only 122 of the responses received was used for data analysis. The selected participants had specific criteria to be fulfilled which were (a) Malaysian university students; (b) participants that who have provided consent that also fall under the first criteria. The results yielded shows that only mindfulness as a negative predictor to Internet addiction as the significant hypothesis, while flow experience and stress were non-significant predictors to Internet addiction. In conclusion, the finding from this study has provided understanding in the predictive factors of Internet addiction among university students in the Malaysian context to develop deeper understanding on the topic which is vital in helping to develop intervention programmes.

Keywords: Internet addiction, flow experience, stress, mindfulness, university student, Malaysia

Declaration

We declare that the material contained in this paper is the end 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.

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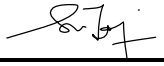
Signed : 

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Abbreviations	
IA	Internet Addiction
PIU	Pathological Internet Use / Problematic Internet Use
IOS-Qs	Internet Overuse Screening Questionnaire (Short-Form)
FSS	Flow Short Scale
PSS	Perceived Stress Scale
MAAS	Mindful Attention Awareness Scale
DSM-5	Diagnostic and Statistical Manual of Mental Disorders
COVID-19	Coronavirus Disease 2019
Q-Q plot	Quantile-Quantile plot
MLR	Multiple Linear Regression
Wi-Fi	Wireless Fidelity
UTAR	Universiti Tunku Abdul Rahman
TARC	Tunku Abdul Rahman University College
VIF	Variance Inflation Factors
SPSS	Statistical Package of Social Science

Chapter I

Introduction

Background of Study

The Internet is a thrilling new medium that is advancing into a fundamental piece of day-to-day existence from one side of the planet to the other (Kurniasanti et al., 2019; Mihajlov & Vejmelka, 2017; Nalwa et al., 2003). Researchers are looking into the impact of advances in computer technology (e.g., the Internet) and whether some people are overusing it (Nichols & Nicky, 2004; Pontes et al., 2015). However, when viewed through the crystal of addictive behaviours, Internet Addiction is recent and is a rapidly developing clinical predicament (Saville et al., 2010). The first instance of Internet Addiction as a serious proposal was conducted in 1996 by modifications to the DSM-5 criteria for morbid gambling (Young, 1996), though Internet addiction still has not had its diagnostic criteria included in the DSM-5 (Kurniasanti et al., 2019). Frequent Internet use is viewed as a type of technological addiction that contacts an enormous extent of behavioural reactions (Mihajlov & Vejmelka, 2017). The concept of Internet addiction is established in behavioural addiction, and therefore is the same as old as behavioural patterns and biological causations to substance dependence (Kurniasanti et al., 2019). In the literature, there are multiple labels to Internet addiction such as problematic Internet use (PIU) (Davis, 2001), computer addiction, Internet dependency (Dowling & Quirk, 2009), compulsive Internet use, and pathological Internet use (Caplan, 2002).

In the context of addictive behaviour, Internet addiction looks to be a widespread problem that should be included in the DSM-5. The diagnosis is a compulsive-impulsive spectrum disease that incorporates online and/or offline computer usage (Cho et al., 2014; Dell'Osso et al., 2006; Hollander, 2008; Yazdi et al., 2020) and has at least three subtypes: excessive gaming; sexual preoccupations; and e-mail or text messaging, according to the

definition. The following four elements are present in all variants which are excessive use, withdrawal, tolerance, and negative consequences (Block, 2008; Shaw & Black, 2008). A study by Shaw and Black (2008) suggests that addiction and its symptoms are prevalent, and are linked to co-morbid psychiatric disorders.

The Internet has been promoted as a debut instructive device making schools to coordinate Internet administrations among their homeroom surroundings (Young, 2004). Students seem, by all accounts, to be generally unable to avoid fostering a reliance on the Internet. The Internet's vows to bring about progress in students' capabilities in education, and it becomes fundamental in specific courses whereby reviews have prompted the utilisation of the Internet on campuses, therefore, making students defenceless to obsessive Internet use (Nalwa et al., 2003; Shao et al., 2018; Young, 2004). Several concerns have risen with the high of Internet addiction among students which include low academic performances (Yusuf et al., 2020), lack of physical activity, fatigue, physical pain (Dol, 2016), and depressive tendencies (Majumdar & Basu, 2020). University students as Internet users are the major users of the Internet comprising 88% compared to other groups, which also means there is a higher addiction rate among these users (Chor et al., 2020; Norliah et al., 2017).

The present study suggests flow experience as a predictor of Internet addiction whereby flow experience or optimal experience, developed by Csikszentmihalyi (1975), is the all-encompassing impression that individuals feel when they act with all-out inclusion. When an individual is in the flow state they become assimilated in their movement. Flow is described by a limiting of the focal point of mindfulness, loss of hesitance; a responsiveness to clear objectives and unambiguous input; and a feeling of command over the climate (Csikszentmihalyi, 1975; Culbertson et al., 2014; Kasa & Hassan, 2013; Liu & Chang, 2016). Flow is additionally described by an elevated feeling of perkiness (Liu & Chang, 2016; Privette & Bundrick, 1987; Trivedi & Teichert, 2017; Webster & Martocchio, 1992). Flow in

research has been seen in the usage of exercises going from sports, games, music, leisure activities, diversion, and human-Internet collaborations (Skadberg & Kimmel, 2004). The examination of the predictive factor of Internet addiction being flow is that flow is able to be a key characteristic of Internet consumer behaviour and therefore used as a predictor (Rettie, 2001). Within the studies of adolescents' flow experience and Internet addiction, there is little research exploring these factors (Yang et al., 2014).

Furthermore, the next predictor chosen in the study to access the relation of Internet addiction would be mindfulness. Mindfulness is a process that involves attention, awareness, and an open-minded acceptance of the present moment; it is concerned with the quality of consciousness itself, and it is not associated with reflective thought, but rather "offers a bare display of what is taking place" in the moment of observation (Conversano et al., 2020). It is most regularly characterized as the condition of being attentive to and aware of what is occurring in the present (Arslan, 2017; Brown et al., 2007; Brown et al., 2003; Good et al., 2015; Liu et al., 2020). Several components of mindfulness such as noticing and acting with mindfulness, are proposed to improve executive control (Teper et al., 2013) and, thusly, could show reactivity to Internet use (Calvete et al., 2017). A study conducted by Liu et al. (2020) has stated that mindfulness is an important factor in determining problematic Internet usage. Evidence of the relationship between mindfulness and problematic Internet usage is scarce (Calvete et al., 2017). Problematic Internet use is considered as the indication of an absence of cognitive control, is relied upon to be accompanied by a less reluctant course of consideration and consciousness of stimulus, the critical parts of mindfulness (Sinha et al., 2021).

Claude Bernard (1957) noticed that the support of life is fundamentally subject to keeping our inner milieu consistent despite an evolving climate. Cannon (1929) called this "homeostasis." Selye (1956) utilized the expression "stress" to address the impacts of

whatever truly undermines homeostasis. The real or saw danger to a life form is alluded to as the "stressor" and the reaction to the stressor is known as the "stress reaction." Stress in more recent literature has defined a sensation of mental press and strain (Shahsavarani et al., 2015), stress can be characterized as external occasions or conditions that influence people (Segerstrom & O'Connor, 2012). Although stress reactions advance as versatile cycles, serious and delayed stress reactions may prompt tissue harm and infection (Schneiderman et al., 2005). Stress is perceived as a significant issue in essential and clinical neuroscience research (McEwen et al., 2015). Therefore, this is an ongoing concern regarding the factors of Internet addiction, and it is crucial to carry out the present study as it aims to focus on the relationships between mindfulness, flow experience, stress and Internet addiction among students in Malaysia.

Problem Statement

The Malaysian Communications and Multimedia Department (2020), has provided statistics of Internet users in Malaysia that shows the highest number of Internet users are at the age of 20 to 24 years old. Several studies (Haghighi et al., 2011; Wan Ismail et al., 2020; Zenebe et al., 2021), portrayed how Malaysian Internet users are at a high risk of being described as being severe in regards to Internet addiction. To differentiate, the age groups of university students fall under the ages of 18 to 25 years old (MalaysiaEducation.info, 2020). The term Internet addiction alludes to network use behaviour in which people are unable to handle themselves and the behaviour debilitates the daily functions or constructs (Feng et al., 2019). The number of Internet users in Malaysia are 28.4 million in 2020 (Statista, 2021), showing contrast to the Malaysian population by the Department of Statistics Malaysia (2021) by 32.7 million citizens. The number shows 86.9% of the population in Malaysia is dependent on the Internet. Over the top utilization of and dependence on the Internet might bring about many negative psychological and actual harms, and these perceptions might be

more pervasive among adolescent students (Yang et al., 2014). University students are more susceptible to Internet addiction due to the usage of the Internet for academic purposes on a day-to-day basis (Lee et al., 2019), whereby the ongoing usage causes a decrease in productivity hazard of mental, psychosocial and physical outcomes (Islam et al., 2018; Salubi et al., 2019). A study on university students and their prevalence in Internet addiction shows that 46.6% of males and 24.4% of females were Internet addicts which brings the majority of the sample to be Internet addicts (Hamade, 2009). Another study shows out of 603 students, 85% of them were found to have Internet addiction (Zenebe et al., 2021).

The province of flow experience is described by unselfconscious and complete drenching in a pursuit that, despite the fact that requiring significant degrees of ability and focus, brings about a feeling of easy activity and control (Rheinberg, 2008). Numerous researchers have attempted to discover and disclose concerning why certain individuals are exceptionally energetic and focused on specific exercises without clear external rewards (Kyriazos et al., 2018). Previous studies regarding Internet addiction and its predictors were done in regards to examining behavioural causes of Internet addiction that relates to the compulsive behaviours in Internet usage, social dependency level as a predictor, gender and finding specific age groups that are susceptible to Internet addiction (Haghighi et al., 2011; Kapahi et al., 2013; Khan & Magdalene, 2016). Studies that are related to the variables of flow experience and Internet addiction have been implemented in South Africa (Thatcher et al., 2008), America (Kamssu & Siekpe, 2012), Taiwan (Yang & Wu, 2017). As cultural differences can be found based on the types of culture researched on while some may not show differences (Fatehi et al., 2020). Yet it seems there are insufficient studies that have determined the direct effect of flow experience and Internet addiction in the context of Malaysia.

Based on Fawzy and Hamed (2017) research, the researchers have found out that stress seems to be an ordinary issue occurring among university students. There are several reasons which cause university students to struggle with stress, such as financial burdens (Chernomas & Shapiro, 2013), social networking, completing assignments and examinations, fulfilling the expectation from parents, etc. (Scott, 2020). Few studies have specifically mentioned the correlation between stress and Internet addiction (Jun & Choi, 2015; Ibrahim et al., 2019), and determined that the stress issues should be emphasised on Internet addiction. Moreover, a literature gap has been found as previous studies (e.g., Akin & Iskender, 2011; Ostovar et al., 2016; Radeef & Faisal, 2018; Wan Ismail et al., 2020) examined the Internet addiction as the predictor of stress, it shows a discrepancy with the present study which has set an expectation of the direct effect among the variables. Meanwhile, study support that the direct effects of stress and Internet addiction have not been well explored (Woon, 2020). Besides, in the context of stress was examined the outcomes specifically in medical students (Radeef & Faisal, 2018), high school students (Gholamian et al., 2017). Recent studies (Darling Selvi & Rajaprabha, 2020), has acknowledged that stress is commonly seen among university students and it is suggested that the stress-related variables can be implemented in future studies among university students to investigate their behaviours from time to time. Internet addictions are two new social and mental difficulties affecting university students who are particularly vulnerable to Internet addictions since confirming their identity and forming new relationships are important developmental tasks for them (Wan Ismail et al., 2020). Furthermore, a Malaysian study does indeed show the predictive factor of Internet addiction as a factor that causes stress (Wan Ismail et al., 2020) which is distinct from the current proposed study in terms of the variable arrangement.

According to the Department of Statistics Malaysia (2021), 89.6% of households are found to have full Internet access. Moreover, the immaturity of mindfulness regarding

excessive Internet usage is because insufficient awareness campaigns have been implemented in Malaysia (Ayub et al., 2017) as mindfulness as an intervention has aided in the mediation of addictive behaviours among university students (Soriano-Ayala et al., 2020). According to Atasalar and Michou (2017), relationships between problematic Internet usage and mindfulness are underexplored. Students with more elevated levels of mindfulness regularly have high levels of self-regulation (Hj Ramli et al., 2018), therefore, students' autonomy in academics is affected by self-regulation whereby the lack of self-regulation causes procrastination behaviours (Valenzuela et al., 2020). Further examined by Cheng and Xie (2021), that procrastination is prominent among university students which can be concluded that the negative consequence of using the Internet causes procrastination which is positively correlated to Internet addiction (Gong et al., 2021). University students are adapting to using digital technologies for education purposes (Yot-Domínguez & Marcelo, 2017). There is a research gap which is to be regarded as the researchers were mainly focused on the phenomenon among different age ranges, as for the mindfulness related past studies were targeted on adolescents (Gamez-Guadix & Calvete, 2016), secondary school students (Wu & Li, 2021).

Significance of Study

Theoretical Contribution

Internet addiction is an aspect of everyone's lives as we are indulging in the use of the Internet daily. However, with the consequences that it brings, this study would benefit in exploring the factors that predict the outcomes of Internet addiction. The findings of this study help to fill up the literature gaps of academic purposes or the general public about how mindfulness, flow experience, stress predicts the outcomes of Internet addiction. By conducting this study, these specific sets of variables are able to be researched to fill up the knowledge gaps regarding Internet addiction and its predictors. Therefore, more research is

needed to have more full knowledge of this psychopathology, which has been observed in a variety of settings. Moreover, this study will provide further understanding in the field of topics inhibiting stress, mindfulness, flow experience and Internet Addiction in the context of university students as it is reported that students are the primary users of the Internet and are prone to facing addiction towards it. As an added opportunity, this study further fills the literature gaps in the cultural context department of Malaysian studies especially as there are limited studies in regards to the set of variables of flow experience as a predictor of Internet addiction. The importance of examining this study should be emphasised by mental health professionals and scholars of academia. The Malaysian perspective of this study will provide a multicultural and collectivistic aspect of the literature. By conducting this study, the general public would be able to understand the mentioned aspects of the study as well as the issues that are mentioned in a more understandable and "closer to home" nature. Furthermore, by directing the current review, different researchers can have a more profound comprehension of the expected basic systems as this study would provide explanations to how the selected variables (flow, mindfulness and stress) affect the Internet addiction consequence. Furthermore, the current study conceptually provides relevant research in terms of Flow theory and the Cognitive-behavioural model of Pathological Internet Use in the selected variables of flow, mindfulness and stress on Internet addiction.

Practical Contribution

In the practical contribution perspective, the findings of the study are important to develop awareness among the general public on the factors that predict Internet addiction. The general public may consider daily Internet usage as a normal aspect of their lives, the addictive aspect of Internet usage may not be well known by the general public. Therefore, the empirical findings of the current research may provide a stepping stone to developing comprehensive interventions or campaigns to aid those with Internet addiction. The findings

of the study would be a source of benefit towards multiple parties involved in the development of intervention programmes such as hospitals, parents, educators, psychologists or possibly a government sector. The parties mentioned would be able to nullify the negative impacts of Internet addiction. Moreover, Internet users among the general public could use the information from this study to build awareness towards their own personal usage of the Internet or perhaps in certain cases to seek professional help to overcome their personal issues.

Research Questions

1. Dos flow experience, mindfulness and stress significantly predict Internet addiction among university students in Malaysia?

Research Objectives

1. To examine the predictive effects of flow experience, mindfulness and stress on Internet addiction among university students in Malaysia.

Hypotheses

H_1: Flow experience positively predicts Internet addiction among university students in Malaysia.

H_2: Stress positively predicts Internet addiction among university students in Malaysia.

H_3: Mindfulness negatively predicts Internet addiction among university students in Malaysia.

Conceptual Definitions

Internet Addiction

Internet addiction can be defined as a compulsive-impulsive spectrum disease that fuses online and additionally disconnected Internet use (Dell'Osso et al., 2006; Hollander, 2008) and has at least three subtypes: excessive gaming; sexual preoccupations; and e-mail or

text messaging, according to the definition. With four elements attached to it being, excessive use, withdrawal, tolerance and negative consequences (Block, 2008; Shaw & Black, 2008).

Flow Experience

The flow experience is characterized as the state in which individuals are so engaged with an action that nothing else appears to issue; the actual experience is entirely agreeable, to the point that individuals will do it even at incredible expense, for the sheer purpose of doing it (Kaur et al., 2016; Su et al., 2016). The result of flow experience gives such inherent pleasure that individuals are prepared to play out similar activities over and over (Kaur et al., 2016).

Stress

Stress can be characterized as sensations of nervousness and danger that people experience when confronted with mental and actual troubles (Song & Park, 2019). The expression "stress" is an umbrella term addressing encounters in which the ecological requests of a circumstance offset the person's apparent mental and physiological capacity to adapt to it successfully (Crosswell & Lockwood, 2020).

Mindfulness

The idea of mindfulness has been depicted as the full, direct, and dynamic familiarity with experienced peculiarities that is profound in aspect and that is kept up within a moment (Gámez-Guadix & Calvete, 2016). Mindfulness very well might be extensively depicted as a characteristic human limit, which includes observation, participation and toleration of every moment from a condition of balance or adoring generosity (Ager et al., 2015).

Operational Definitions

Internet Addiction

Internet Overuse Screening Questionnaire (Short-Form) (IOS-Qs) by Park et al. (2020) is a measurement to test habitual Internet usage (Lee et al., 2017). It is an 8-item scale

which is using a 5-point Likert scale that ranges from 1 (*not at all*) to 5 (*to a large extent*). The total score lies between 8 to 40. The higher scores represent the higher Internet usage.

Flow Experience

Flow Short Scale (FSS) by Rheinberg et al. (2003) can be known as an instrument to examine the nine components of flow experience. This 10-item scale is using a 7-point Likert scale which ranges from 1 (*not at all*) to 7 (*very much*). The total score lies in between 7 to 70. The higher the score, the higher one's flow experience.

Stress

Perceived Stress Scale (PSS-10) by Cohen and Williamson (1988) was used to measure the stress level through feelings and thoughts in the past month. It includes 10 items which are using a 5-point Likert scale which ranges from 0 (*never*) to 4 (*very often*) to measure the scores. The total score lies between 0 to 40. The higher the score, the higher one's stress.

Mindfulness

Mindful Attention Awareness Scale (MAAS) by Brown and Ryan (2003) is known as a tool to measure people's mindful awareness. It consists of 15 items which are using a 6-point Likert scale which ranges from 1 (*almost always*) to 6 (*almost never*) to examine the item scores. The total score lies between 15 to 90 and the higher the score, the higher one's mindfulness.

Chapter II

Literature Review

Conceptualizing on Internet Addiction

According to Kumar and Mondal (2018), the Internet is being coordinated as a piece of everyday life on the grounds that the use of the Internet has been becoming widespread around the world. It has significantly changed the current correspondence situation, and there has been an extensive expansion in the number of Internet clients worldwide somewhat recently. With the headway in media and advancements, the Internet has arisen as a successful apparatus in disposing of human topographical boundaries. With the accessibility and versatility of new media, Internet addiction has arisen as a possible issue in among people which alludes to over-the-top Internet utilisation that meddles with their regular routine. There have been developing concerns worldwide for what has been named Internet addiction (Kumar & Mondal, 2018). According to the study conducted by Soule et al. (2003), they have mentioned several populations reviewed from past studies have a risky vulnerable rate towards the Internet. Human's demands to some extend heighten the excessive usage of the Internet. The Internet is utilized to work with research and to look for data for relational correspondence and for deals. Then again, it very well may be utilized by some to enjoy pornographic material, unnecessary gaming, talking for extended periods, and in any event, betting. While the reason being to use the Internet is able to relate to the ritualist and instrumentalist usage. A ritualist Internet user is defined as the people are seeking for enjoyment when they are involved in the sense of loneliness and boredom, whereas an instrumentalist Internet user is prone to strive for knowledge and information by using the browsers to fulfil self-gratifications (Douglas et al., 2008; Suwarsi & Daquioag-Lorica, 2021). When the intrinsic motions have been contented by utilizing the Internet, it dedicated more usage of the Internet (Alexander, 2000).

Conceptualizing on the Flow Experience

The flow experience is known as a combination of multivariate components such as centred attention, temporal distortion, pleasure, and telepresence. (Yang et al., 2014), which is also indicated as a positive mental state (Hirao, 2015) or psychophysical state (Biasutti, 2011). Past research on flow has recognized three assignment related antecedents of flow that work with an optimal experience when playing out the undertaking: (a) there should be a harmony between the seen difficulties of the assignment and the abilities important to perform it; (b) the action ought to have clear and explicit objectives; (c) there ought to be some type of criticism concerning execution on the undertaking, antecedents having both positive and negative perspectives to them (Abuhamdeh, 2020; Culbertson et al., 2014; Kasa & Hassan, 2013). Flow provides causation in multiple contexts in the form of intrinsic motivation and absorption of activity such as physical or outdoor activities, gaming, education, painting and many more activities that extends the usability of flow (Mahnke et al., 2014). A study conducted by Park and Hwang (2009) showed that when individuals are experiencing flow, they are more presumably to develop a repetitive behaviour. As in the time of people are enjoying the activities; they are losing control against their behaviour simultaneously. Furthermore, flow experience is able to drive people to highly be pleased in the moment of involving in challenging activities (Csikszentmihalyi, 1990), when they demanded in satisfying their mental states, as in terms of intrinsic rewards. The engagement of telepresence was due to socialization (Thatcher et al., 2008). It is a linkage of communication with family, friends, and peers, as it is able to present authentic emotions and feelings virtually (Esteban-Millat et al., 2014). The presence of telepresence was absorbing the attention of people as it fully presents the non-verbal clues online, which is more convenient than a face-to-face interaction in the sense of time and cost-saving.

Conceptualizing on Stress

Based on the study conducted by Monroe (2008), stress is defined as a condition related to the responses from the environment and people. The development of stress brings an influence on the human's body and mental states, and the regulation of body functions. By understanding the terms of stress, it can be explored in multiple aspects (e.g., biology, psychology, sociology, etc.). It is also linked with three perspectives of elements (e.g., time, condition, and creature) to explain stress developments. One of the influential factors of stress that have been introduced in the study is the psychological field. The psychological context is in relation to cognition developments. It is linked with the recognition process of the environment among individuals as the environment is one of the factors to cause stress. Albeit stress was a physiological peculiarity that is central to endurance, it is additionally unequivocally identified with a few mental problems including, misery, uneasiness, post-horrendous stress issues (Nemeroff, 2016; Walsh, 2011). Studies focusing on the unpredictability of stress are making progress, in any case, a couple of examinations on individuals have acquired liberal responsibilities to its progress, as examined by Hariri and Holmes (2015).

Conceptualizing on Mindfulness

Mindfulness is a mental state that is aware and focus on the present environment without any judgmental thoughts (Kabat-Zinn, 2003; Teasdale & Segal, 2007). It has been constructed by several components with past studies supports: (a) self-regulation (Bishop et al., 2004; Shapiro & Schwartz, 2000). Self-regulation is a part of mindfulness that captures the environmental characteristics in order to be aware in the next experiences, with administering on the emotions and behaviours, to avoid the attention being distracted. As if the environmental factors have been structured in people's cognition to generate awareness and concentration, the excessive behaviours will be less likely to develop (Chen et al., 2014);

(b) openness and acceptance (Bishop et al., 2004). The components involved in mindful awareness relates to the facets of openness which is the inquisitiveness of the environment, and the acceptance of environmental factors to avoid judgements. It is related to the individual's experiences at the moment of recognizing the environments, the conditions of openness tend to let people be curious and act accordingly while the acceptance will absorb the factors to recognize the behaviour to produce mindful awareness.

The Flow Experience and Internet Addiction

Flow represents the experience as fully engaged in an activity with attention. By relating flow to Internet addiction, the features of flow (e.g., focus and enjoyment; Csikszentmihalyi, 1990) are commonly found in the condition of Internet users (e.g., behaviour control of usage, entertainments, interest, etc.; Wan & Chiou, 2006).

In examining the flow as a predictor of Internet addiction, research which was carried out by Khang et al. (2013), has examined flow as a significant predictor of Internet addiction, with a positive correlation. This research implemented variables with effects from college students, with 290 applicable responses and has mentioned that flow experience exhibits the presence of Internet addiction. It can be explained as the moment that when people experience flow with pleasant feelings, they are more likely to insert themselves into the usage of the Internet thereby leading to excessive usage behaviours. The flow theory model has indicated that favourable activities with positive outcomes in emotion, will strengthen the motivation as well as the concentration in engaging in the activities.

Some studies (e.g., Alzahrani et al., 2016; Lee & Tsai, 2010) in different contexts have investigated flow predicting the effects of online gaming behaviours. Actual online game playing is predicted by the flow experience in this research, with the results showing evolvement of enjoyment and concentration in gaming. According to Alzahrani et al. (2016) and Lee & Tsai (2010), both studies concluded that there are no trends in excessive playing

behaviours if people have not generated the interest in games among undergraduates within the Malaysian context. Csikszentmihalyi's flow theory has explained that meaningful events were to be emerged with the engagement to experience optimal flow. In other words, people are less likely to engage in activities that make no sense or are exciting to them since pleasure feelings are unlikely to develop as people will not be able to contribute their full attention in the activities that they are unconcerned with. While less involvement in online games are linked to the deficiency of Internet usage, online gaming is related to the Internet as it takes place online to organize the activities (e.g., gaming, gambling, and socialization; Griffiths & Kuss, 2015). In contrast, Internet users were experiencing positive emotions in gaming (Chen, 2006), due to gaming being mean to them and their entire focus is invested in it. In the moment of experiencing the pleasure events, they will be fully merged to it and lead to excessive gaming behaviours, which are associated with Internet addiction.

Previous studies have investigated that the correlation between flow experience and Internet addiction is positive among high school students (Yang et al., 2014) and in a general range (Thatcher et al., 2008). However, the limited finding has explored the direct relationship between flow experience and Internet addiction among university students in the Malaysian context.

Stress and Internet Addiction

Stress can be found in multi-dimensional facets (e.g., financial, academic, emotional, etc.). While based on past research (Pariat et al., 2014), it is indicated that university students experienced a series of barriers in life events that are able to create stress. Furthermore, there is a linkage between stress-related variables and Internet addiction (Lam et al., 2009). The findings have resulted in a conclusion that the multi-faceted stresses are correlated with addictive behaviours towards the Internet among university students.

Based on the results found by Gong et al. (2021), they have measured the direct effect of stress and Internet addiction with 460 Chinese college students. The findings showed that negative-emotional effects were to be generated based on individual's stress perceived and motivates the keen involvement in a pleasant environment. While the Internet creates the development of positive feelings in the engagement of Internet activities (e.g., gaming and gambling). The predictive effect of stress towards Internet addiction is found to be significant, it relates mood regulation (demands of releasing negative emotion – stress) to addictive use of the Internet (platform of release emotions). The motive of releasing stress perceived in life events, are often to be stimulated by an individual's mood regulation and lead to the discovery of platforms for emotional self-regulation. In the sense of cognitive-behavioural model of PIU which is proposed by the present study, has shown the association of mood regulation boosts in addictive use of the Internet to release their stress.

Based on the study carried out by D'Souza et al. (2018), has investigated the correlation between academic stress and Internet addiction among college students. The results of this study have demonstrated a positive association on multi-domain of stress and Internet addiction with the supports from several empirical studies. The researchers found out that university students are often engaged in stressful events which will predict negative outcomes in separate dimensions (e.g., social, school performance, abuse, physical or psychological mental health). This study has also strongly highlighted that majority of college students have suffered from peer pressure, which is related to one of the stress conditions, as the people's response creates the formulation of stress. While it is an intense predictor toward Internet addiction, with similar results from Kıran-Esen (2009) study. By integrating with the research findings, explanations of peer pressure linked with Internet addiction are much more relevant in the terms of interpersonal relationships. The findings showed people who are addicted to the Internet are less likely to deal with peers by absorbing

the stress and pressure given, as peer pressure are mainly from the coercion to act accordingly. While lower social relationships drive people to release their stress through an online platform, the conditions have been underpinned by the theory applied in the present study as it drives them to be more likely in engaging themselves on the Internet used and become more dependent on the Internet which leads to the excessive usage of the Internet.

There is research that has studied Internet addiction and stress in the Malaysian context, they have suggested stress is able to be one of the predictors for Internet addiction (Radeef & Faisal, 2018). Whereas the predictive effects of stress towards Internet addiction has also been identified as positive, it obtained tally results with previous studies (e.g., Ching et al., 2017; Feng et al., 2019; Moslehpour & Batjargal, 2013; Woon, 2020) in a distinct context.

Mindfulness and Internet Addiction

The study conducted by Wu and Li (2021) indicated that mindfulness training is able to mitigate addictive behaviours, yet it brings another meaning that a low-mindful individual will be craved on using the Internet as the implementation of mindfulness training was to be applied for them to alleviate such impulsive behaviours. Hence, mindfulness is able to affect addictive behaviours, which is Internet addiction.

According to the research conducted by Gámez-Guadix and Calvete (2016), they have examined the consequences in the context of mindfulness and problematic Internet use. Research findings showed three reasons to explain the negative correlation between two roles, with empirical supports: (a) people who are suffering from problematic behaviours have difficulties controlling themselves, which has been supported by a study (Brand et al., 2014). In the sense of higher mindfulness is able to control themselves to being addictive in several domains, it is due to people is aware of the feelings and experiences is momentary (Appel & Kim-Appel, 2009); (b) level of mindfulness relates to the level of interpersonal

skills; this study has investigated the similar outcomes with Dekeyser et al. (2008) as they resulted in a higher level of mindful people will more likely to engage in social interactions, and unlikely to develop social anxiety. Gámez-Guadix and Calvete have mentioned that problematic Internet users are less preferably to involve in social interactions physically but online. Therefore, they have concluded that higher mindful people have less inclination to interact via web-based.

Based on the research conducted by Sinha et al. (2021), 390 postgraduate students have been observed to discover the outcomes of mindfulness that predicts Internet addiction. A study has indicated that higher mindful individual has constructed positive socialization, disciplinary and behaviour controls. Mindfulness relates to social interaction as a study revealed that an individual's interpersonal skills are often utilized in face-to-face interaction rather than online to show the authentic personality (Amichai-Hamburger et al., 2002), as mindfulness is fall into line with authentic characteristics (Tohme & Joseph, 2020). The connection of mindfulness and Internet addiction showed, as the preferred interaction method for mindful people is certain to be the traditional approach and avoiding the usage of the Internet. Mindfulness is also related to the awareness of self-control, addictive behaviours are less likely to exist among mindful people is because they are able to dominate their own behaviours and thoughts with intense awareness. In contrast, people with low mindfulness have insufficient self-control towards their behaviour. They often experience the loss of control and lead to addiction (Weinstein & Lejoyeux, 2010).

Past studies (e.g., Arslan, 2017; Calvete et al., 2017; Gámez-Guadix & Calvete, 2016; Peker et al., 2018; Sinha et al., 2021) have examined the correlation between mindfulness and Internet addiction. A negative correlation is encountered in most of the studies with similar outcomes. Seemingly mindfulness has been used as an observed variable in psychological field research over the years (Saddhajeewa, 2019). However, it mainly played as a variable in

the problem gambling field (Shonin et al., 2014), as contemporary gambling activity is visible in Internet platforms (Glimne, 2019), with the requirement of a device to connect with the Internet (Gainsbury et al., 2013). While problematic gambling has a connection with Internet addiction as the users will be increasing their engagement on gambling activity via Internet, it brings another meaning that the users are increasing the usage of the Internet which might cause the addiction. In this case, a previous study has demonstrated that insufficient study to implement the role of Internet addiction (Gámez-Guadix & Calvete, 2016).

Theoretical Framework

The Cognitive-Behavioural Model of Pathological Internet Use (PIU)

The cognitive-behavioural model of PIU by Davis (2001) can be known as a framework that underlines cognitive as a core component to engage in abnormal behaviours, issues encountered in the terms of psychosocial tend to influence people's cognition in a negative way which may drive to a deficiency in impulse control of behaviours (Caplan, 2010). A linkage of deficient impulse control has been figured out by Davis et al. (2002), while Caplan (2010) has raised that the model has generalized the extensive Internet usage into such multiple-connective elements: (a) prefer online social interaction. The reason that people who have the inclination in online interaction is because they have mostly developed psychosocial issues such as loneliness, depression, social anxiety (Caplan, 2003), and deficient social skills (Haagsma et al., 2013); (b) mood regulation affects the usage of the Internet. Negative emotion and cognition are able to be released through Internet platforms (Caplan, 2003); (c) insufficient self-regulation. This model has emphasized this component as a key point of the PIU characteristic, with scholastic supports (e.g., Billieux & Van Der Linden, 2012; Gámez-Guadix et al., 2015; Özdemir et al., 2014); (d) negative effects are examined among individuals who have high engagement on Internet used, as in the construct of physical and psychological illness (Alavi et al., 2011). The interrelation effects of four

components have been examined by Gámez-Guadix et al. (2012) to analyse the direct or indirect consequences.

The implementation of the cognitive-behavioural model of PIU can be found in various psychological domains with Internet addiction, as in the context of mindfulness (Calvete et al., 2017; Gámez-Guadix & Calvete, 2016), social anxiety (Durak & Senol-Durak, 2013; Prizant-Passal et al., 2016), depression (Durak & Senol-Durak, 2013), and loneliness (Moretta & Buodo, 2020). These studies have applied the model in the study of maladaptive cognitions and deficient self-regulation towards addictive behaviours, with results of favourable outcomes such as maintained by the mechanisms of the cognitive-behavioural model of PIU.

The limitation of this model is the insufficient factors to develop on personal experiences as it is containing the formulation of positive emotions or thoughts. The current mechanism is that negative outcomes will exist when people have invested their attention into the Internet used. However, a study has indicated that positive impacts in different domains (e.g., psychological, behavioural, interpersonal, etc.) can be developed through the excessive usage of the Internet (Alam et al., 2014). Hence, the present study has included an additional theory to explain the experiences with a theoretical mechanism for further understanding about the structure of the present study.

The Flow Theory

The previous theory model was to be examined the negative impacts of Internet addiction, while flow theory is able to support that personal experiences in regards to the positive impacts formulated and lead to Internet addiction. Flow theory is introduced by Mihaly Csikszentmihalyi in the 1970s, by demonstrating that the flow experience is optimally presented in the engagement of activities, sense of enjoyment can be experienced through the activities that are voluntary participated without any extrinsic rewards (Csikszentmihalyi,

1990). Csikszentmihalyi has also indicated that when people are submerged in their preferable or challenging activities, they would be able to experience the flow as pleasure and concentration. Flow is an optimal experience, which is also linked with the cognition field as it is also known as a psychophysical state (Biasutti, 2011). The characteristics of the flow model have been implemented as the conditions of engaging in the ultimate flow experience. The eight elements are as follows, with the supportive elaborations by Biasutti (2011; 2017): (a) balance personal skills and challenges. Flow is able to be experienced at the moment that personal skills are balanced with the challenging tasks (Schmidt, 2010). A pleasure outcome has been determined through the process of concentration in resolving the challenges; (b) combination of behaviour and awareness. In terms of body and mind, people are able to be aware of enhancing concentration and controlling behaviours; (c) distinct objectives and prompt feedbacks. A clear objective assists in people's concentration on performing tasks to achieve goals and the achievement of goals is related to the feedback received as it is able to heighten the quality of performance; (d) task absorption. People's attention is highly contributed to the tasks, and they are excluded as in unlikely to be influenced by the external environment; (e) sense of control on behaviour. People are less likely to experience out control in behavioural aspects as if they are deeply engaged in the activity. They are being conscious while focusing on the tasks; (f) deficiency of self-consciousness. Profound engagement of activities somehow leads people to absorb more mental resources of self-consciousness to concentrate on the activity; (g) distortion in sense of time. People are less likely to be aware of the time concept while focusing on desire activities. They have fully contributed the focus into the performance of an activity and are less likely to be aware of the timing; (h) autotelic motivation. Involving in the activities with own volition will experience the flow in regards to the intrinsic elements that can be fulfilled, the sense of pleasure increases when people are able to achieve their objectives.

Flow model can be practised in numerous domains in artistry (Biasutti, 2011), education (Schmidt, 2010), Internet addiction (Gong et al., 2021; Wan & Chiou, 2006; Yang et al., 2014), and specifically in online gaming (Chen & Park, 2005). Developing a deep engagement in flow experiences is required for the conditions to be fulfilled. Studies that develop the correlation within the variables resulted in a satisfying outcome, in a short period (Wan & Chiou, 2006).

Flow theory has been found to be the model which supported flow experience producing a sense of enjoyment, which is also the positive impact on Internet addiction. Nevertheless, flow theory has yet to exploit the cognition distortion towards behavioural issues as the model has only introduced the emotional formulation is related to the development of behaviour. While Davis's theory indicated the cognitive development is controlled by the inclination of behaviour. Thus, the combination of both models in the present study is to be observed that cognition and experience lead the behaviour orientation.

The Cognitive-Behavioural Model of Pathological Internet Use (PIU) and the Flow Theory

Both theory models have been found a similarity regarding the working mechanisms. Davis (2001) has implemented the causal relationship as the cause is the maladaptive cognitions and the effect is the PIU symptoms in the cognitive-behavioural model of PIU. While, Csikszentmihalyi (1990) has pointed out that the people's interest reflexed the behaviour or non-behaviour in the flow theory, which also has a linkage with the cause and effects as interest cause the action. Therefore, the consistency of both theories is the applied mechanisms, and both theories can be implemented concurrently as the models are compatible, with the complement of shortage in each theory.

Conceptual Framework

The variables which will be examined in the present study are flow experience, stress, mindfulness, and Internet addiction. Figure 2.1 showed the predictors were flow experience,

stress, and mindfulness towards Internet addiction (outcome). The theories which are applied in the present study are Csikszentmihalyi's flow theory and Davis's Cognitive-behavioural model of PIU to expect that higher flow experience, higher stress, and lower mindfulness are predicting a higher Internet addiction.

With the variables involved, the relationship between flow and Internet addiction is governed by the concept of flow theory. Flow is recognized by retention in a moment and submersion in the experience and can be casually alluded to as being 'in the zone' where clock time does not seem to matter when they fully merged in the activities. In this sense, flow is like a few moments of Internet usage in which spaces of synchronicity permit users to make and control context-dependent occasions (Hassan, 2013). A past study by Stavropoulos et al. (2013), Internet usage enables flow that causes immersion and absorption to occur which shows that flow is an immense contributor to Internet addiction. Others, however, have mentioned that the surrounding aspects of flow and Internet addiction have to be experienced even further (Kuss & Griffiths, 2012). Past studies have mentioned high school students as avid Internet users that experience flow does lead to Internet addiction as a dependency towards the Internet (Li et al., 2013; Xu et al., 2012). Arguably, flow is tied to concentration and in a past study, concentration reflects the effort required when using the Internet (Esteban-Millat et al., 2014). Exploratory behaviour on the Internet is classified as the increase of interest in specific activities as the individual has entered the flow state and repetition of the activities causes addiction towards it (Yang et al., 2014). Hausman and Siekpe (2009) conceptualized the flow experience utilizing four variables: interest, curiosity, attention, and perceived control. Whereas Guo and Poole (2009) estimated the flow insight by including six aspects: focus, perceived control, change of time, the emergence of activity and mindfulness, the greatness of self, and autotelic experience. Lee and Chen (2010) inspected four elements of flow experience (e.g., satisfaction, focus, telepresence, and time

contortion). Furthermore, Zhou (2013) noticed that the flow experience incorporates three variables: satisfaction, perceived control, and consciousness.

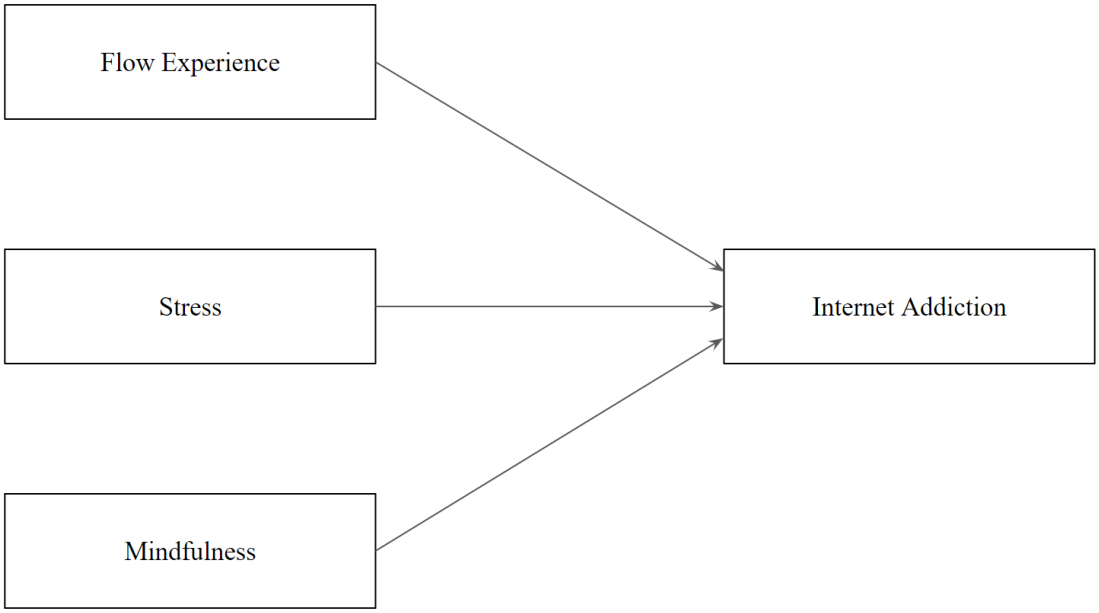
Stress is correlated with negative emotions, as the negative emotions are often emerged from stress conditions (Du et al., 2018), while Caplan (2003) introduced that Internet overuse is predicted by negative emotions based on the theoretical mechanism in the Cognitive-behavioural model of PIU, the study has also indicated that people were addicted towards Internet since they are able to liberate their negative emotions through an online platform and develop the excessive use of the Internet. Hence, it can be concluded that the stress, which arises the negative emotions can be released through online activities as the negative emotions will be exhausted. As Liu et al. (2020) have stated that, unfavourable encounters and stressors would rouse a few people to unreasonably using the Internet as a way to deal. Besides, research has indicated that the probability of addiction to the Internet is high if people have experienced stress (Mustafa et al., 2020). Hence, in the present study, the researchers are expecting that higher stress level predicts Internet addiction with the reasons of, advanced technologies have provided an alternative for people to have several Internet platforms in order for them to reveal themselves, and the connection with the Internet is popular in worldwide population nowadays and online interaction is to be an effective approach. Hence, the correlation between stress and Internet addiction is expected to be positive in the present study.

As the key component which has been specified in the cognitive-behavioural model of PIU is the deficiency of self-regulation. It is strongly related to mindfulness which is explained in the way of ability in managing the behaviours (self-regulation; Vago & Silbersweig, 2012). Past study has associated mindfulness and Internet addiction with the application of the Cognitive-behavioural model of PIU, with giving an explanation of higher mindfulness heighten self-regulation in avoiding addictive behaviours (Gámez-Guadix &

Calvete, 2016). In opposite, the present study assumed that low-mindfulness individuals have more possibility to develop Internet addiction as they have insufficient ability to control their behaviours, this may result in a negative consequence (e.g., addiction, abuse, problematic used). Hence, mindfulness is possible to be one of the predictor variables toward Internet addiction with the model supports.

Figure 2.1

Conceptual Framework of Present Study



Chapter III

Methodology

Research Design

The present study implemented a quantitative, cross-sectional and descriptive design to examine the predictive effects of flow experience, mindfulness and stress on Internet addiction. Based on Kenton (2020), the quantitative study is a measurement that is used to analyse human behaviour in numerical research. The present study has implemented a quantitative method, as the researchers collected the data from the distribution of the survey and analysed the collected data.

Cross-sectional research is an observational study in which data are collected across a certain time period (Asiamah et al., 2019). It is appropriate for this study as the cross-sectional design measures the causes and outcomes (Sedgwick, 2014). There are two types of cross-sectional studies: descriptive and analytical. The data obtained are in the form of numerical scores that can be analysed and interpreted, whereas descriptive research refers to a study aimed at obtaining a description of the features of a certain group (Gravetter & Forzano, 2018). Present research applied descriptive study as it estimates the illness prevalence, features such as smoking behaviour, people's attitudes, knowledge, or health behaviour, whereas analytical studies aim to analyse relationships between multiple factors (Kesmodel, 2018). The examined variables (e.g., Internet addiction, flow experience, stress, mindfulness) in the present study were linked with the prevalence of illness, as the addictive behaviours predicted by people’s cognitive and behavioural facets. Furthermore, this research strategy was selected because it is cost-effective and allows researchers to collect significant amounts of data in a short length of time (Setia, 2016). A cross-sectional design allows for the simultaneous use of many variables (Mann, 2003; Thelle & Laake, 2015), which were used as the predictive variables (e.g., flow experience, stress, and mindfulness) in the current

research. Hence, by distributing a self-administered survey questionnaire, it is able to use a quantitative (Barker et al., 2015) and descriptive method (Bhattacherjee, 2012) for collecting data. Past studies have applied the online survey to investigate the addictive behaviours in Internet and predictive effects of other variables (e.g., Bozoglan et al., 2013; Erol & Cirak, 2019; Hardie & Tee, 2007; La Rosa et al., 2021) which would be similar to the present study.

Sampling Method

Non-probability sampling is the sampling method applied in this study, as non-probability sampling alludes to a sample that is not chosen randomly and involves the judgement from researchers (Showkat & Parveen, 2017). Furthermore, this study would be using purposive sampling or judgement sampling which is a method in which specific circumstances, people, or events are purposefully chosen to deliver essential knowledge that is unable to be accessed through other means (Taherdoost, 2016). This sampling method was appropriate to use in the present study as there were several criteria to be fulfilled, it brought the convenience for the researchers to recruit people by determining their qualifications. Non-probability sampling methods are frequently preferred due to practical and financial constraints (Feild et al., 2006). The researchers depended on their judgement to select the participants who fulfilled the requirement, it does not rely on the advanced machines and equipment (International Monetary Fund, 2009). Besides, previous studies applied purposive sampling as the sampling method which was in the domain of Internet addiction (Rakhmawati et al., 2021), flow experience (Su et al., 2016), stress (Simanjutak & Ko, 2021), and mindfulness (Atanes et al., 2015).

Purposive sampling was chosen to meet certain criteria for the sample and to determine that the sample is representative of the population (Elfil & Negida, 2017; Feild et al., 2006). The inclusion criteria of the current study involved Malaysian university students. In regards to providing questionnaires, researchers are allowed to use data provided from

those who voluntarily participated in the survey, this is done by providing consent confirmation before beginning the questionnaire. Researchers made a judgement on the impact of these inclusion and exclusion criteria on the external validity of the results based on these criteria (Patino & Ferreira, 2018). Therefore, the inclusion criteria were (a) Malaysian university students (b) participants that fall under the first criterion and have provided consent. Self-administered surveys have been sent to the target sample (Malaysian university students) via online platforms in this study (e.g., Instagram, WeChat, WhatsApp, and Facebook). Besides, the exclusion criteria were (a) participants who are not university students which included college students; (b) participants who are not Malaysian. Moreover, the researchers selected the participants through Facebook pages (e.g., UTAR Confession, Sunway Confessions, Internship in Malaysia) and groups (e.g., Malaysia University Student Survey Group, UTAR Kampar Flea Market, UTAR & TARC FLEA MARKET (KAMPAR)), while WeChat, Instagram and WhatsApp were to distribute the survey for peers who are studying in different universities. In addition, the researchers gathered the contacts of university students from peers and directly approached them. The participants who were selected or collected by the researchers were to be asked several questions which are regarding the criteria (e.g., “Are you a Malaysian?”, “Are you a university student?”, “What is the program that you currently pursuing?”) before sending the online survey link, it is to identify the identity of participants.

Sample Size

The present study has implemented G* Power 3.1.9.4 as the sample size calculation programme as it is an advanced statistical power analysis programme as compared to the first version which was developed by Erdfelder et al. (1996). It was designed by Faul et al. (2007) and is applicable in the present study. The analysis programme has comprised of the effect size (f2), level of significance (α), number of predictors, and the confidence interval level.

The present study has calculated .18 (refer to Appendix B, p. 96) as the total effect size with using the formula, f2 = R2 /(1-R2) for the variables suggested by Faul et al. (2007), the calculated sample size (.18) is concluded as a medium effect size. According to the effect size criterion for multiple regression and correlation analysis from Cohen (1988), the analyses were showed .02 as small effect size, .15 as medium effect size, and .35 as large effect size. The confidence interval and error probability rate has set as .95 and .5 respectively due to Sharma et al. (2020) having indicated that it is one of the adequate significance levels.

The sample size calculated was 102 (refer to Appendix B, p. 97), with .18 of effect size (medium), .95 of power level, .5 of Type I error probability, and three predictors in the present study. However, previous study suggested adding an additional 10% to 15% of the total sample size to prevent the barriers that probably exists during the data collection and analysation (Martínez-Mesa et al., 2014). Therefore, the present study increased 15% in total sample size to prevent the challenge assumptions, which is a minimum of 118 respondents.

Participants

The targeted participants were university students in Malaysia. Students who were still undergoing foundation program, bachelor degree program, master degree program, and PhD program, meanwhile pursuing their study in private or government university were involved in the present study recruitment. The present study had recruited 122 university students in Malaysia. Their age ranged from 18 to 25 years old (M=21.95; SD=1.21). 100 of them were Chinese, 13 were Indians, and 9 were Malay. There are 72.1% were female (n=88), and 27.9% were male (n=34). Among 122 participants, 116 of them were pursuing bachelor's degrees, and 6 were undergoing master's degrees. While 57.4% of students are from Universiti Tunku Abdul Rahman (n=70), 4.9% from Multimedia University (n=6), 4.1% from UOW Malaysia KDU University College (n=5), 3.3% from Quest International University (n=4), and the remaining were from other universities in Malaysia.

Location

The location the present study was conducted to collect the data from participants is within Malaysia. The data were collected through distributing the online survey for people who met the criteria in social media platforms (e.g., Instagram, WeChat, Facebook, and WhatsApp).

Instruments

Internet Overuse Screening Questionnaire (Short-Form) (IOS-Qs)

Internet Overuse Screening Questionnaire (Short-Form) (IOS-Qs) developed by Park et al. (2020) is a measurement to test habitual Internet usage (Lee et al., 2017). For example, the items “I like using the Internet more than spending time with family”, “I like using the Internet more than socializing with friends”, “I skip school or work to go somewhere where I can use the Internet”, and “I am not interested in anything except using the Internet”. This instrument is an 8-item short scale that is using a 5-point Likert scale that ranges from 1 (*not at all*) to 5 (*to a large extent*). The total score lies between 8 to 40, higher scores represent higher habits on using the Internet as the highest point of the scale indicated as a large extent of occurrence regarding the items. Cronbach's alpha was .80 in the study conducted by Park et al. (2020), based on the rule of thumb it is considered as good reliability. While in the present study, the internal reliability of the pilot test was .83 and the actual study was .80, it was reported as high reliability.

Flow Short Scale (FSS)

Flow Short Scale (FSS) designed by Rheinberg et al. (2003) can be known as an instrument to examine the seven components of flow experience. For instance, the item “I don’t notice time passing” was time distortion, “I am totally absorbed in what I am doing” represented as task absorption, the items “I know what I have to do each step of the way” and “I feel that I have everything under control” were the sense of control, and “I feel just the

right amount of challenge" was the balancing of skills and challenges. This 10-item short scale is using a 7-point Likert scale which ranges from 1 (*not at all*) to 7 (*very much*). The total score lies in between 7 to 70, and higher scores indicate a higher flow experience. However, there is a reverse item which is Item 10, "I am completely lost in thought". Cronbach's alpha was found as .92 in Engeser and Rheinberg's (2008) study, considered as excellent internal consistency. Nevertheless, the present study has indicated .84 as the internal reliability of the pilot test, and .85 as the reliability of the actual study.

Perceived Stress Scale (PSS-10)

Perceived Stress Scale (PSS-10) developed by Cohen and Williamson (1988) was used to measure the stress level through feelings and thoughts in the past month. For example, the items were "In the last month, how often have you been upset because of something that happened unexpectedly?", "In the last month, how often have you felt that you were unable to control the important things in your life?", "In the last month, how often have you found that you could not cope with all the things that you had to do?", and "In the last month, how often have you been angered because of things that happened that were outside of your control?". It includes 10 items that are using a 5-point Likert scale which ranges from 0 (*never*) to 4 (*very often*) to measure the scores. The total score lies between 0 to 40 as higher scores indicate higher perceived stress in the past month. There are a few reverse items found in this instrument, such as "In the last month, how often have you felt confident about your ability to handle your personal problems?", "In the last month, how often have you felt that things were going your way?", In the last month, how often have you been able to control irritations in your life?", and "In the last month, how often have you felt that you were on top of things?". The Cronbach's alpha was .89 in Roberti et al. (2006) research, nearly to be an excellent reliability scale. While the present study has examined the

internal reliability for the pilot study (.88) and actual study (.85), it is considered as good internal reliability.

Mindful Attention Awareness Scale (MAAS)

Mindful Attention Awareness Scale (MAAS) designed by Brown and Ryan (2003) is known as a tool to measure people's mindful awareness. For instance, the items to test mindfulness were "I could be experiencing some emotion and not be conscious of it until some time later", "I break or spill things because of carelessness, not paying attention, or thinking of something else", "I tend not to notice feelings of physical tension or discomfort until they really grab my attention", and "I find myself doing things without paying attention". This instrument consists of 15 items which are using a 6-point Likert scale which ranges from 1 (*almost always*) to 6 (*almost never*) to examine the item scores. The total score lies between 15 to 90 and higher scores examine higher mindfulness. Based on the study conducted by Brown and Ryan (2003), Cronbach's alpha found was .82, as good reliability. The present study has tested the internal reliability for pilot and actual study, there were .87 and .89 respectively. While it can be concluded as high reliability as it is close to the excellent reliability range.

Procedure

The ethical clearance had been applied by the researchers for the protection of participant's personal data from the Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman before conducting the pilot study and actual study.

Pilot Study

A pilot study was implemented before the actual study began, while it is to test against the feasibility of the research conducted. According to Hill (1998), the suggestion given was to recruit within 10 to 30 participants in pilot research. The researchers of the present study have invited 30 of the participants to involve in this research and created an

online survey via Qualtrics. The survey was upon with the introduction of the research objectives, consent form, demographics questions, and items of instruments. The researchers asked the consent from targeted students with greetings, and they have mainly focused on the distribution of questionnaires through social media platforms (e.g., WhatsApp, Facebook, Wechat, and Instagram) in order to get their responses immediately. Besides, the researchers had asked some questions (e.g., “Are you a Malaysian?”, “Are you a university student?”, “What is the program that you currently pursuing?”) before the distribution of the survey link which is to identify the identity of participants.

Actual Study

The actual study had been conducted after reviewing the pilot test results. The online survey with informed consent was distributed to the targeted participants via several platforms such as Facebook, WeChat, WhatsApp, and Instagram. The data cleaning has been done before the data analyses, as the data which have met the exclusion criteria has been removed, while the incomplete data have been eliminated as well to ensure the data quality and the accuracy of results. The rest of the completed data have been analysed by using the IBM SPSS Statistic 23 computer software.

Data Analysis

Data Cleaning

The present study has collected 182 responses from targeted participants. There were 63 responses were removed from the present study as the responses were not completed, blank responses, missing values, and not fulfilled the criteria. There is a potential multivariate outlier that has been found in the present study, while it has not violated any benchmarks of indicators (Cook’s Distance, Mahalanobis Distance, and Centered-Leverage Value). Hence, there are only 60 incomplete responses removed, and the remaining 122 responses as the final sample were to be analysed.

Normality Test

There are five indicators for the assumption of normality, those are including (a) histogram, it is known as the frequency distribution which plots on the values and offers a distribution to judge on the shape and outlier data (Peat & Barton, 2005); (b) Quantile-Quantile plot (Q-Q plot), it is a scatterplot that included a straight line with data points, while the points plot along with the straight line is concluded as a normally distributed (Zubir et al., 2017); (c) skewness and kurtosis, are the distribution measurement of symmetry and peakedness respectively (Kim, 2013), while the acceptable range for both measurements was ±2 (Garson, 2012); (d) Kolmogorov-Smirnov test, it is applied to investigate the data distribution with the significant value, as if the *p*-value is smaller than .05, it is considered as not normally distributed (Zubir et al., 2017).

Multiple Linear Regression (MLR)

The present study has applied multiple linear regression (MLR) to observe the correlation between the examined variables (e.g., Internet addiction, flow experience, stress, and mindfulness). The assumption of MLR was tested instantly after the assumption of normality.

Multivariate outliers. Outliers are determined as the influencers of data's means and standard deviations, which also involved some essential information like the contemporary phenomenon, or certain human's behaviour (Filzmoser, 2005). Multivariate outlier is indicated as the presence of abnormal data that have multiple variables. It is not an extreme value which existed as the high or low score (Filzmoser, 2005). There are three main tests to analyse the multivariate outliers, which are Mahalanobis Distance, Cook's Distance, and Centered-Leverage value. Mahalanobis Distance is examined through the sample means and covariance matrix to identify the outliers (Li et al., 2019). The benchmark of Mahalanobis Distance is the value of outliers has lower than 15 (Barnett & Lewis, 1978). Cook's Distance

is to detect the individual's score which affect the regression model (Zhu et al., 2012). The outliers which have met the criterion (<1) were concluded as acceptable points (Cook & Weisberg, 1982). Centered-Leverage value is to analyse the distance of the points and means value. The potential outliers can be detected through the cut-off calculation ($\frac{2(p+1)}{n}$, p represents as the numbers of independent variables, and *n* stands for the final sample size) from Hoaglin and Welsch (1978). In conclusion, the potential outliers were needed to be identified through the cut-off range of each method.

Type of variables. It is to categorize the type of variables which has separated into two groups, discrete (e.g., ordinal, nominal) or continuous (e.g., interval, ratio) (Lutabingwa & Auriacombe, 2007).

Independent. It is the non-correlation of predicted variables in the research to observe variety sorts of research field (Berry, 1993).

Multicollinearity. Based on the research conducted by Daoud (2017), he explained that multicollinearity is the multiple correlation of predictors. To diagnose the existence of multicollinearity was using two indicators, which are tolerance and variance inflation factors (VIF). According to Daoud (2017), the presence of correlation was influenced the standard error and variances of the examined predictor's coefficient, while it directly linked with VIF and possibly led to non-multicollinearity. Tolerance is represented as the reciprocal of VIF (Miles, 2014). The cut-off range for tolerance is greater than .10 while VIF is lower than ten (Hair et al., 2010).

Independence of residuals. It is non-correlated relationship of the examined variables and residuals. Durbin-Watson test was applied to indicate the residuals assumption. According to the standard of Champion et al. (1998), the cut-off is ranged on below than one and greater than three. Based on the rule of thumbs, if the value is closed to two, it considered as a good score.

Test of normality of error, linearity of error, and homoscedasticity. Normality of error stands for the existed residual is normally distributed, linearity of error represents the linear correlation of X and Y, and homoscedasticity is the variances of residuals are consistent in each of the level X (Zach, 2020). The scatterplot is to examine the normality of residuals, linearity of residuals, and homoscedasticity. The residuals were not be detected as if the points in the scatterplot are evenly distributed around the diagonal line with a pretty constant variance (Osborne & Waters, 2002).

Chapter IV

Results

Normality Assumptions

The normality assumptions are tested by five indicators, which are histogram, Quantile-Quantile plot (Q-Q plot), skewness and kurtosis values, and Kolmogorov-Smirnov test.

Histogram

Each of the histograms for continuous variables showed a bell-shaped curve, which is known as the data collected is close to the means value. Hence, this indicator of each variable has signified the normality assumptions (refer to Appendix D, p. 100).

Q-Q Plot

Each of the Q-Q plots for the examined variables was closed to the diagonal line, therefore, it resulted that this indicator of each variable has normally distributed (refer to Appendix D, p. 101).

Skewness and Kurtosis Values

Each skewness value and kurtosis value fulfilled the standard range which is ±2. The skewness values were ranged from -.155 to .397, while the kurtosis value were ranged from -.407 to .482. Thus, this indicator of each variable has resulted a good normality assumption.

Table 4.1

Skewness and Kurtosis Value for Each Variables

Variables	Skewness	Kurtosis
Internet Addiction	.397	-.297
Flow experience	-.106	-.407
Stress	.207	.482
Mindfulness	-.155	-.035

Kolmogorov-Smirnov Test

As the Kolmogorov-Smirnov test results a non-significant p-value (p >.05), it indicates the normal distribution is fall under the acceptable standard. The test value showed in Table 4.2 for Internet addiction, D (122) = .040, p < .05, and mindfulness, D (122) = .039, p < .05, were showed non-normally distributed while flow experience, D (122) = .061, p >.05, and stress, D (122) = .057, p > .05, resulted a normally distributed in this indicator.

Table 4.2

Kolmogorov-Smirnov Test

Variables	Significant value
Internet Addiction	.040
Flow experience	.061
Stress	.057
Mindfulness	.039

Summary

The histogram, Q-Q plot, skewness value, and kurtosis value of each variable have been tested and showed a good normally assumptions, however, the value of Kolmogorov-Smirnov test for Internet addiction, and mindfulness were not ranged in the acceptable standard. All of the examined variables were still concluded as met the normality assumptions due to four out of five indicators of two variables (Internet addiction, and mindfulness), and five indicators of flow experience and stress have indicated as no violation.

Outliers

Multivariate Outliers

Present study has implimented Cook's Distance, Mahalanobis Distance, and Centered-Leverage range with the standard deviations of two as the analysis tools to investigate the multivariate outliers. Based on Table 4.3, there was a potential outlier case detected which is Case 134. As according to the benchmark of Mahalanobis Distance, the

value for Case 134 (7.39238) has lower than 15 (Barnett & Lewis, 1978). Besides, the standard of Cook's Distance which is 1 has not been exceeded by Case 134 (.21371) (Cook & Weisberg, 1982). While the calculated range of Centered Leverage Value is .0656 by using the formula from Hoaglin and Welsch (1978), the Case 134 (.06109) has ranged within the specification. Therefore, the Case 134 was not deleted as it has not breached the benchmark of Cook's Distance, Mahalanobis Distance, and Centered-Leverage Value.

Table 4.3

Multivariate Outliers Test

Variables		Case ID	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
Group_1	1	134	7.39238	.21371	.06109
Total N			1	1	1

Descriptive Statistics

The sample of present study has involved 122 university students (27.9% male; 95.1% bachelor's degree; M_{age}=21.95), 82% were Chinese (*n*=100), 10.7% were Indians (*n*=13), and 7.4% were Malay (*n*=9). Majority of the students were from Universiti Tunku Abdul Rahman (*n*=70), and the remaining were from other universities in Malaysia. 84.4% of university students are using Wireless Fidelity (Wi-Fi) to access for Internet. The frequency of the majority's Internet usage for recreational purpose in a week was everyday (*n*=108) with 88.5%. Based on the data showed, the average duration of Internet usage for majorities were three hours to seven hours (*n*=49) with 40.2%. Present study showed that 52.5% of university students have low Internet addiction (*n*=64), 49.2% of low flow experience (*n*=60), 52.5% of low level of stress (*n*=64) and 46.7% of low level of mindfulness (*n*=57) as referring to Table 4.4.

Table 4.4

Frequency Distribution of Participants in Demographic Variables and Main Variables

	n	*%*	*M*	*SD*
Age			21.95	1.21
Sex				
Male	34	27.9		
Female	88	72.1		
Race				
Malay	9	7.4		
Chinese	100	82.0		
Indian	13	10.7		
Current Education Program				
Bachelor Degree	116	95.1		
Master Degree	6	4.9		
Institution				
Brickfields Asia College	1	0.8		
Han Chiang University College of Communication	1	0.8		
HELP University	2	1.6		
Heriot-watt University Malaysia	1	0.8		
International Medical University	1	0.8		
International University of Malaya-Wales	1	0.8		
INTI International University	2	1.6		
Lincoln University College	1	0.8		
Management and Science University	1	0.8		
Multimedia University	6	4.9		
Perdana University	2	1.6		
Quest International University	4	3.3		
SEGi University	1	0.8		
Sunway University	2	1.6		
Taylor's University	2	1.6		
Tunku Abdul Rahman University College	2	1.6		
UCSI University	1	0.8		
Universiti Kebangsaan Malaysia	1	0.8		
Universiti Malaysia Perlis	1	0.8		
Universiti Malaysia Terengganu	1	0.8		
Universiti Pendidikan Sultan Idris	1	0.8		
Universiti Sains Malaysia	3	2.5		
Universiti Teknologi Malaysia	2	1.6		
Universiti Teknologi MARA	1	0.8		
Universiti Tunku Abdul Rahman	70	57.4		
University of Cyberjaya	2	1.6		
University of Nottingham Malaysia	2	1.6		
University of Reading Malaysia	1	0.8		
University Utara Malaysia	1	0.8		
UOW Malaysia KDU University College	5	4.1		
Type of Internet connection				
Wireless Fidelity (Wi-Fi)	103	84.4		
Mobile data	19	15.6		

Table 4.4 (Continued)

Frequency Distribution of Participants in Demographic Variables and Main Variables

	n	*%*	*M*	*SD*
Frequency of Internet usage (per week)				
1 day to 2 days	6	4.9		
3 days to 4 days	7	5.7		
5 days to 6 days	1	0.8		
everyday	108	88.5		
Average duration of Internet usage (per day)				
less than 1 hour	5	4.1		
1 hour to 3 hours	16	13.1		
3 hours to 7 hours	49	40.2		
7 hours to 10 hours	32	26.2		
more than 10 hours	20	16.4		
Device				
Laptop	25	20.5		
Computer	2	1.6		
Smartphone	92	75.4		
Tablet	3	2.5		
Location to access Internet				
Home/Hostel	119	97.5		
Institution	2	1.6		
Workplace	1	0.8		
Internet activity				
Reading	12	9.8		
Watching movies/videos	57	46.7		
Listening music	9	7.4		
Gaming	19	15.6		
Gambling	1	0.8		
Communication	14	11.5		
Shopping/Payment	3	2.5		
Get information/directions	4	3.3		
Social Media	3	2.5		
Age exposure to Internet			11.65	3.16
Internet usage experience(s)				
1 year to 3 years	1	0.8		
3 years to 5 years	3	2.5		
5 years to 7 years	16	13.1		
7 years to 10 years	31	25.4		
more than 10 years	71	58.2		
Family members access to Internet				
Yes	67	54.9		
No	55	45.1		
Internet addiction			16.72	04.94
Low (<16.72)	64	52.5		
High (≥16.72)	58	47.5		
Flow experience			40.86	9.44
Low (<40.86)	60	49.2		
High (≥40.86)	62	50.8		

Table 4.4 (Continued)

Frequency Distribution of Participants in Demographic Variables and Main Variables

	n	*%*	*M*	*SD*
Stress			29.50	6.14
Low (<29.50)	64	52.5		
High (≥29.50)	58	47.5		
Mindfulness			61.24	12.03
Low (<61.24)	57	46.7		
High (≥61.24)	65	53.3		

Multiple Linear Regression Assumptions

Types of Variables

The examined variables in present study are aligned with the multiple linear regression assumptions as those variables are involved continuous variables. Hence, it can be concluded as the assumption has been satisfied.

Independent

According to the research conducted by Berry (1993), the setting of independences as the results of examined variables was totally independent on each other. The data collected in present study was fulfilled the assumptions as the independent settings existed.

Multicollinearity

The presence of Tolerance and Variance Inflation Factor (VIF) were applied to analyse the correlation of each independent variable. The cut-off point of Tolerance and VIF are above .10 and below 10 respectively (Hair et al., 2010). Table 4.5 showed that the value of Tolerance and VIF for each independent variables were resulted that there is no multicollinearity issue emerged.

Table 4.5

Collinearity Statistics

	Tolerance	VIF
Flow experience	.613	1.631
Stress	.560	1.786
Mindfulness	.751	1.332

Independence of Residuals

Durbin-Watson test was applied to examine the residual assumption in present study, while the benchmark was in between 1 to 3 (Champion et al., 1998). Table 4.6 demonstrated that the assumption has met as there is an absence of violation as the value is 1.871, which showed a good assumption as it close to 2.

Table 4.6

Independent Error Test

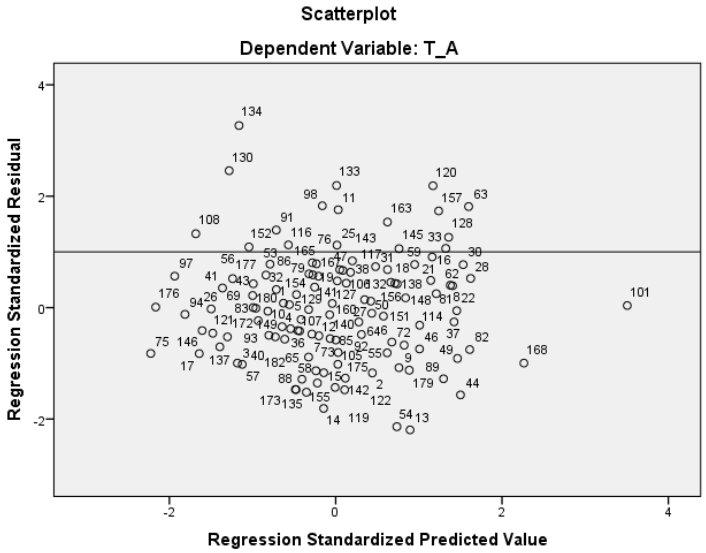
Model	Durbin-Watson
1	1.871

Test of Normality of Error, Linearity of Error, and Homoscedasticity

Based on Figure 4.1, the scatterplot showed the residuals were mostly centralized on the zero line and the residuals around were dispersed randomly. The three assumptions of multiple linear regression analysis have been met.

Figure 4.1

Scatterplot Showed Homoscedasticity, Normality of Residuals, and Linearity of Residuals among Variables



Multiple Linear Regression Analysis

Multiple regression analysis applied in present study to investigate the significance of predictors as for flow experience, stress, and mindfulness toward the Internet addiction. Based on Table 4.7, the model was statistically significant as $F(3, 121) = 21.914$, $p = .001$, and accounted 10.2% of variances. Besides, Table 4.7 showed the mindfulness is significantly and negatively predicted Internet addiction ($\beta = -.330$, $p = .001$). While flow experience ($\beta = -.106$, $p = .338$), and stress ($\beta = -.062$, $p = .591$) are not a significant predictors of Internet addiction among university students in Malaysia.

Table 4.7

Result of Regression Model

	df	*F*	*p*	Adj. R^2
Regression	3	5.578	.001	.102
Residual	118			
Total	121			

Note. Dependent Variable = Internet addiction. Predictors = Flow experience, stress, and mindfulness.

Table 4.8

Result of Regression Coefficient

	Std. β	*t*	*p*
Flow experience	-.106	-.961	.338
Stress	-.062	-.539	.591
Mindfulness	-.330	-3.321	.001

Note. Dependent Variable = Internet addiction.

Summary of Findings

In short, the Table 4.9 has resulted that the H3 hypothesis was supported, but H1 and H2 hypotheses were not supported by the present study.

Table 4.9

Summary of Findings

Hypotheses	Std. β	*p*	Decision
H1: Flow experience positively predicts Internet addiction among university students in Malaysia.	-.106	.338	Not supported
H2: Stress positively predicts Internet addiction among university students in Malaysia.	-.062	.591	Not supported
H3: Mindfulness negatively predicts Internet addiction among university students in Malaysia.	-.330	.001	Supported

Chapter V

Discussion

H_1: Flow experience positively predicts Internet addiction among university students in Malaysia

The result found through the regression model does not support the first hypothesis of the study, which indicates that flow experience does not predict Internet addiction among university students in Malaysia. In contrast to past findings (Khang et al., 2013; Thatcher et al., 2008; Watters et al., 2013; Yang et al., 2014; Yang & Tung, 2007), the current study shows flow experience as a negative and non-significant predictor of Internet addiction. The non-significant results can be the cause of the challenge level of day-to-day Internet usage not being high enough to cause users to enter the flow state. If the activity is harder to perform than the required capabilities of the individual performing it, the individual will turn out to be discouraged, however, boredom occurs if the activity is easier than the required capabilities (Khoshnoud et al., 2020) as most tasks are done on the Internet is easily done with minimal effort, also factoring that the Internet is used to reduce effort. A past study by Rettie (2001) had noted that avid users of the Internet require less skill and do not make them enter the flow state. Past study has found that the interplay of skill and activity requirements crucially affects the degree of pleasure when they are conducting an activity as it also affects the intrinsic motivation of said activity. Flow theory also has a pre-requisite of the activity that needs to be challenging enough for adequate skill level to engage in a flow state (Keller & Blomann, 2008; Mao et al., 2020). Past studies have also noted the effort used by university students is significantly decreased as it provides easy access to what they require (Apuke & Iyendo, 2018).

H_2: Stress positively predicts Internet addiction among university students in Malaysia.

The findings of the current study do not support the second hypothesis. In contrast to past findings (Ching et al., 2017; D'Souza et al., 2018; Feng et al., 2019; Gong et al., 2021;

Moslehpour & Batjargal, 2013; Woon, 2020), the current study showed stress as a negative and non-significant predictor for Internet Addiction among university students in Malaysia. This might be the case due to the Internet being used as a way to relieve stress instead of being stressed by the Internet. A study conducted by Rebecca et al., (2019), showed that social media platforms are used as a tool for overcoming stress. The Internet can turn into a positive technique for decreasing mental and physical parts of stress and anxiety situations (Hinic et al., 2016). In the multiple uses of the Internet, such as gaming, searching for information, research, communication and many others, there are a few uses of the Internet whereby it is mainly used as a platform to improve user's well-being. This can be in the form of communication whereby Internet interactions has a positive connection with well-being by means of the mediating variable closeness to companions (Omar et al., 2019; Valkenburg et al., 2007).

On the Internet usage of online gaming which can be also used as a method to reduce stress as research suggests that more engagement in gaming is of positive advantage and that the advantages can by instructive, physical, and therapeutic (Amin et al., 2020). Also, the Internet is becoming a widespread resource that allows users to rid existing stress by researching ways to reduce stress. The Internet has quickly been taken on as a device for conveyance of psychological interventions, both as independent administrations and as enhancements to supplier conveyed care. Questions regarding significant issues can be searched on the Internet as well as interventions to reduce psychological distress can be found on the Internet (Benight et al., 2008; Son et al., 2020) therefore, reducing the stress levels of Internet users.

***H_3*: Mindfulness negatively predicts Internet addiction among university students in Malaysia.**

Finally, similar with past studies (Arslan, 2017; Brand et al., 2014; Calvete et al., 2017; Gámez-Guadix & Calvete, 2016; Peker et al., 2018; Sinha et al., 2021; Wu & Li, 2021), the

results of the present study found that mindfulness negatively predicts Internet addiction, which supports the fourth hypothesis.

This is because mindfulness is presented as the association of lower levels of behavioural problems such as addiction. In other words, being mindful is to be aware of mental states and therefore higher levels of mindfulness negatively predicts Internet addiction which can also be proven by several past studies (Brown et al., 2011; Dakwar et al., 2011; Fernandez et al., 2010). To be precise, in the idea of controlling addictive behaviours, awareness plays a huge role (Dundas et al., 2013). A study by Arslan (2017), had results where lower levels of mindfulness portray a high level of Internet addiction which is consistent with the current study and explains mitigation of Internet addiction with mindfulness among undergraduate university students. Mindfulness also develops a self-control effect on Internet addiction and therefore is able to lower the risk of the addiction (Song & Park, 2019).

Another reason to the hypothesis is because mindfulness as its own can be a good treatment towards addictive behaviours as it is able to create awareness to ones-self. This is seen in a past studies (e.g., Brown & Ryan, 2003; Shonin et al., 2014), where people with raised degrees of mindfulness are more aware of their emotional states and can oversee and control their feelings. Mindfulness can be correlated to emotion regulation capabilities (Dundas et al., 2013), as well as mindfulness as a reason to harmonious Internet usage (Atasalar & Michou, 2017). Past studies have pointed out that mindfulness-based cognitive therapy is useful in dealing with technological addictive behaviours among college students (Zhang & Zhu, 2014). Since using the Internet evokes emotions whether negative or positive, it is important to control those emotions whereby too much of a positive emotion towards something can cause an addiction towards it. Therefore, emotion regulation is important whence trying to be mindful while using the Internet.

Implication

Theoretical Implication

In the current study, flow experience, stress and mindfulness were used as predictors to Internet addiction. However, based on the results of the study, flow experience (Khang et al., 2013; Thatcher et al., 2008; Watters et al., 2013; Yang et al., 2014; Yang & Tung, 2007) and stress (Ching et al., 2017; D'Souza et al., 2018; Feng et al., 2019; Gong et al., 2021; Moslehpour & Batjargal, 2013; Woon, 2020) were not found significant which was contrast to past studies. Therefore, the inconsistency of the current study and past studies could bring about the attention of researchers to this field with the intention of identifying the reasons behind the inconsistencies or results which can be a new addition to the existing literature.

The current study the implemented the Cognitive-Behavioural Model of Pathological Internet Use (PIU) by Davis (2001), to examine the predictive effects of stress and mindfulness on Internet addiction. However, the non-significant findings of stress and Internet addiction imply that the Cognitive-Behavioural Model of PIU is not applicable to stress and Internet addiction among university students in Malaysia. Reasons for this could be that Cognitive-Behavioural Model of PIU tends to explore negative psychosocial effects of cognitive states whereas the Internet could be a way to nullify those negative psychosocial states rather than increase them. Therefore, this study contributes to this selected theory by giving the idea that the Cognitive-Behavioural Model of PIU could potentially be used for revaluating the negative uses of the Internet and its associated mental states such as stress. Moreover, the significant findings of mindfulness as a predictor to Internet addiction shows that this study supports the theoretical aspect and makes a contribution as a new reference in the field of study.

The current study also implemented the Flow Theory by Mihaly Csikszentmihalyi (1970), to examine flow experience as a predictor to Internet addiction which was found to be a non-significant result. Reasons to the non-significance could be explained with the lack of

correlation of cognitive disruption towards addictive issues as well as whether Internet usage really does require the flow state. This study has extended the theoretical application of flow theory on how the flow state can be presented during Internet usage which could be explored in further studies.

The present study has shed light on to the implications that mindfulness has towards the addictive behaviour of Internet addiction with the results of mindfulness negatively predicting Internet addiction. The reasons of the significance have shown the prevalence of mindfulness towards addictive behaviours and therefore may push mindfulness as a reason for more addiction-based research for future studies. Therefore, the findings of the current study could benefit in filling literature gaps for the Malaysian culture of undergraduate students. Future researchers could consider the Malaysian undergraduate students as a huge factor to the findings of the present study which could benefit future researchers in developing intensive ideas for their findings as Malaysian students are avid users of the Internet and are the chosen target group for the current study, in order for future researchers to gain new insight. Despite present study findings, Internet addiction is still a widely known issue and it would be imperative for further studies could be conducted with multiple different cultural context and distinct predictors to Internet addiction. Finally, Internet as a tool is currently widely used daily, future studies could reiterate the importance of understand Internet addiction's existence as an addiction or is Internet as a tool that is a necessity for everyone.

Practical Implication

The present study is able to contribute to the database of research in the suggestion to reconsider perspectives of Internet addiction as the present study has been able to contribute into the idea of Internet addiction and some of its possible underlying factors which are flow experience, stress and mindfulness. However, based on past literature, Internet addiction is widely considered as a major threat to the technologically evolving world and has to be taken

into significant consideration majorly by policymakers and mental health workers. The literature of Internet addiction could provide a stepping stone towards creating intervention programmes for individuals of extensive Internet usage which may assist in nullifying the worst-case scenarios of Internet addiction. The present study has shown that mindfulness is a factor that is able to challenge addictive behaviours which could be beneficial for mental health practitioners and educators to diminish addictive behaviours. As an example, Liu et al. (2021) conducted Logotherapy-based mindfulness intervention which has successfully reduced Internet addiction prevalence. Quinones and Griffiths (2019) have also conducted mindfulness interventions to combat compulsive Internet use. To combat Internet addiction, policymakers are also able to develop restrictions towards specific content or age groups to prevent excessive Internet usage as they should be encouraged to alleviate severity of Internet addiction through the usage of mindfulness-based interventions to cultivate mindfulness.

Limitation of Study

In present study, there are a few of limitations to be addressed. First and foremost, the present study has applied cross-sectional research design to investigate the predictive effects of flow experience, stress, and mindfulness towards Internet addiction. However, there is a time limitation for cross-sectional study, as it is only a single time observational method (Wang & Cheng, 2020). While stress as a predictor of Internet addiction, is confined to observe participant's behaviour for over a one month. The application of cross-sectional study was unable to investigate the dynamics of stress level among the observed participants, and the influences toward other examined variables.

Besides, the location setting was only done in the Malaysian context. There is a limitation on the multi-culture connection as the comparison was absent. Present study is unable to observe the differences of variety in culture and perspectives to fill up the research

gap, which is regarding on the culture diversity, while it is based on the discrepancies of behaviours and attitudes toward the research's variables.

Thirdly, the targeted participants have been restricted to university students in Malaysia. Based on the past and present phenomenon, young children (Fradelos et al, 2016) and adolescents (Hsieh et al., 2021) are the emerging groups to emphasize regarding Internet addiction issues. Youngsters are having a high vulnerability to excessive Internet usage in the contemporary era. Hence, the discrepancies between different age groups and level of social status is insufficient to be compared in the present study, in which the development of Internet addiction issues was still remaining as a gap.

Moreover, the ratio of sex and races were not proportionate, it may lead to a biased result, as females are less likely to develop Internet addiction as compared to males generally. Meanwhile, the research conducted by Su et al. (2019) has indicated that addiction-related research is mainly to be explored to observe the differences between both genders.

Lastly, the present study has resulted in a 10.2% variance among the predictors. It is the predictors (e.g., flow experience, stress) that did not significantly predict Internet addiction, while there are still be leftover about 90% of complementary factors which are possible to predict Internet addiction among university students and in the context of Malaysia. Moreover, the sample size is also one of the factors which caused the non-significance of predicting the outcome.

Recommendation of Study

Present study has several recommendations for the limitations which have been revealed. Firstly, the researchers are to be suggested for applying the longitudinal study as the research design to explore the behavioural changes in a sufficient time span. Therefore, if future research has adopted longitudinal design with testing the same variables of present study, it is able to have a higher accuracy result towards the examined predictor (e.g., stress).

Secondly, future study is suggested to involve distinct cultures to examine the diversity between culture by culture, it is able to elevate the understanding of multi-culture context with minimizing the culture shock. Thirdly, the targeted participants should be emphasized by the researchers to detect the emerging groups in the contemporary generation for the forecasting of development. Future research is recommended to explore more researches among the youngsters as their growth is along with the development of era, while the issues are able to be pointed out for getting the attention and improvements.

Fourthly, the distribution of the survey to the targeted participants needs to emphasize gender and race, in order to control the equilibrium of both demographic data. The balance of both genders and races are less likely to develop biased result, which has minimized the risk of violation. Future study is suggested to apply a stratified sampling method to identify the demands of recruitment and fulfil them by randomly choosing from the division of strata (e.g., male and female; Chinese, Malay, and Indian), this method is able to proportionate the ratio of genders and races. Hence, the findings of gender differences and race-differences can be the references for forthcoming research.

Last but not least, present study has indicated that the 10.2% of variances is only accounted by mindfulness, while around 90% were predicted by other variety of variables. Therefore, future study is encouraged to examine other possible variables which are capable to significantly predict Internet addiction. The examples of potential predictors as like depression, loneliness, social anxiety, and social supports. Meanwhile, the extension of sample size is recommended to be implemented as the significant level will be increase.

Conclusion

In conclusion, the current study supports the third hypothesis which was mindfulness negatively predicts Internet addiction among university students in Malaysia. This indicates that high levels of mindfulness predict lower Internet addiction, which suggests that mindfulness is a protective and preventive factor against Internet addiction. This study has provided a greater understanding of flow experience, stress and mindfulness as predictors of Internet addiction in the context of Malaysian undergraduates, which benefits in filling up literature gaps of needed contexts. The study also provides an understanding of mindfulness intervention programs and their usefulness. This study is a source of perspective for future researchers to investigate more on this topic in research studies.

References

Abuhamdeh, S. (2020). Investigating the "flow" experience: Key conceptual and operational issues. *Frontiers in psychology, 11*(158), 1-13. https://doi.org/10.3389/fpsyg.2020.00158

Ager, K., Albrecht, N., & Cohen, P. (2015). Mindfulness in schools research project: Exploring students' perspectives of mindfulness—what are students' perspectives of learning mindfulness practices at school? *Psychology, 6*, 896-914. https://doi.org/10.4236/psych.2015.67088.

Akin, A., & Iskender, M. (2011). Internet addiction and depression, anxiety and stress. *International Online Journal of Educational Sciences, 3*(1), 138-148.

Alam, S. S., Hazrul Nik Hashim, N. M., Ahmad, M., Che Wel, C. A., Nor, S. M., & Omar, N. A. (2014). Negative and positive impact of Internet addiction on young adults: Empirical study in Malaysia. *Intangible Capital, 10*(3), 619-638. http://dx.doi.org/10.3926/ic.452

Alavi, S. S., Maracy, M. R., Jannatifard, F., & Eslami, M. (2011). The effect of psychiatric symptoms on the Internet addiction disorder in Isfahan's University students. *Journal of Research in Medical Sciences, 16*(6), 793–800.

Alexander, B. K. (2000). The globalization of addiction. *Addiction Research, 8*(6), 501-526. https://doi.org/10.3109/16066350008998987

Alzahrani, A. I., Mahmud, I., Ramayah, T., Alfarraj, O., & Alalwan, N. (2016). Extending the theory of planned behavior (TPB) to explain online game playing among Malaysian undergraduate students. *Telematics and Informatics, 34*(4), 239-251. http://dx.doi.org/10.1016/j.tele.2016.07.001

Amichai-Hamburger, Y., Wainapel, G., & Fox, S. (2002). "On the Internet no one knows I'm an introvert": Extroversion, neuroticism, and Internet interaction. *Cyberpsychology & Behavior, 5*(2), 125-128. https://doi.org/10.1089/109493102753770507

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*, 296-302. https://doi.org/10.1007/s11469-020-00358-1

Appel, J., & Kim-Appel, D. (2009). Mindfulness: Implications for substance abuse and addiction. *International Journal of Mental Health and Addiction, 7*, 506–512. https://doi.org/10.1007/s11469-009-9199-z

Apuke, O. D., & Iyendo, T. O. (2018). University students' usage of the Internet resources for research and learning: Forms of access and perceptions of utility. *Heliyon, 4*(12), https://doi.org/10.1016/j.heliyon.2018.e01052

Arslan, G. (2017). Psychological maltreatment, forgiveness, mindfulness, and Internet addiction among young adults: A study of mediation effect. *Computers in Human Behavior, 72*, 57–66. https://doi.org/10.1016/j.chb.2017.02.037

Asiamah, N., Mends-Brew, E., & Boison, B. K. T. (2019). A spotlight on cross-sectional research: Addressing the issues of confounding and adjustment. *International Journal of Healthcare Management, 14*(1), 183-196. https://doi.org/10.1080/20479700.2019.1621022

Atanes, A. C. M., Andreoni, S., Hirayama, M. S., Montero-Marin, J., Barros, V. V., Ronzani, T. M., Kozasa, E. H., Soler, J., Cebolla, A., Garcia-Campayo, J., & Demarzo, M. M. P. (2015). Mindfulness, perceived stress, and subjective well-being: A correlational study in primary care health professionals. *BMC Complementary and Alternative Medicine, 15*, 303 . https://doi.org/10.1186/s12906-015-0823-0

Atasalar, J., & Michou, A. (2017). Coping and mindfulness: Mediators between need satisfaction and generalized problematic Internet use. *Journal of Media Psychology, 31*(2), 1-6. https://doi.org/10.1027/1864-1105/a000230

Ayub, S. H., Manickam, Y., Hamzah, M. R., Suanda, J., & Yusoff, H. F. (2017). Health related campaigns in social media and its practical aspects for youths in Malaysia. *SHS Web of Conferences, 33*. https://doi.org/10.1051/shsconf/20173300061

Barker, C., Pistrang, N., & Elliott, R. (2015). Self-report methods. *Research Methods in Clinical Psychology: An Introduction for Students and Practitioners* (3rd ed, pp. 96-119). John Wiley & Sons. https://doi.org/10.1002/9781119154082.ch6

Barnett, V., & Lewis, T. (1978). *Outliers in statistical data*. Wiley.

Benight, C. C., Ruzek, J. I., & Waldrep, E. (2008). Internet interventions for traumatic stress: A review and theoretically based example. *Journal of Traumatic Stress, 21*(6), 513–520. https://doi.org/10.1002/jts.20371

Bernard, C. (1957). *An introduction to the study of experimental medicine*. Courier Corporation.

Berry, W. D. (1993). *Understanding regression assumptions*. Sage Publications.

Bhattacherjee, A. (2012). Survey Research. *Research Methods for the Social Sciences* (2nd ed, pp. 73-82). Creative Commons Attribution.

Biasutti, M. (2011). Flow and optimal experience. In M. A. Runco & S. R. Pritzker (Eds.), *Encyclopedia of Creativity* (2nd ed., Vol. 1, pp. 522-528). Elsevier. https://doi.org/10.1016/B978-0-12-375038-9.00099-6

Biasutti, M. (2017). Flow and optimal experience. In J. P. Stein (Ed.), *Reference Module in Neuroscience and Biobehavioral Psychology*. Elsevier. https://doi.org/10.1016/B978-0-12-809324-5.06191-5

Billieux, J., & Van Der Linden, M. (2012). Problematic use of the Internet and self-regulation: A review of the initial studies. *The Open Addiction Journal, 5*, 24-29. https://doi.org/10.2174/1874941001205010024

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*(3), 230-241. https://doi.org/10.1093/clipsy.bph077

Block, J. J. (2008). Issues for DSM-V: Internet addiction. *American Journal of Psychiatry, 165(*3), 306–307. https://doi.org/10.1176/appi.ajp.2007.0710155

Bozoglan, B., Demirer, V., & Sahin, I. (2013). Loneliness, self-esteem, and life satisfaction as predictors of Internet addiction: A cross-sectional study among Turkish university students. *Scandinavian Journal of Psychology, 54*(4), 313-319. https://doi.org/10.1111/sjop.12049

Brand, M., Young, K. S., & Laier, C. (2014). Prefrontal control and Internet addiction: A theoretical model and review of neuropsychological and neuroimaging findings. *Frontiers in Human Neuroscience, 8*, 1–18. https://doi.org/10.3389/fnhum.2014.00375

Brown, K. W. & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822-848. https://doi.org/10.1037/0022-3514.84.4.822

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18(*4), 211–237. https://doi.org/10.1080/10478400701598298

Brown, K. W., West, A. M., Loverich, T. M., & Biegel, G. M. (2011). Assessing adolescent mindfulness: Validation of an adapted mindful attention awareness scale in adolescent normative and psychiatric populations. *Psychological Assessment, 23*(4), 1023-1033.

Calvete, E., Gámez-Guadix, M., & Cortazar, N. (2017). Mindfulness facets and problematic Internet use: A six-month longitudinal study. *Addictive behaviors, 72*, 57–63. https://doi.org/10.1016/j.addbeh.2017.03.018

Cannon, W. B. (1929). *Bodily changes in pain, hunger, fear and rage: An account of recent researches into the function of emotional excitement*. Daniel Appleton.

Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior, 18*(5), 553–575. https://doi.org/10.1016/S0747-5632(02)00004-3

Caplan, S. E. (2003). Preference for online social interaction. *Communication Research, 30*(6), 625–648. https://doi.org/10.1177/0093650203257842

Caplan, S. E. (2010). Theory and measurement of generalized problematic Internet use: A two-step approach. *Computers in Human Behavior, 26*(5), 1089-1097. https://doi.org/10.1016/j.chb.2010.03.012

Champion, R. & Lenard, C., & Mills, T. (1998). Demonstrating the Durbin-Watson statistic. *Journal of the Royal Statistical Society Series D-the Statistician, 47*(4), 643-644. http://doi.org:10.1111/1467-9884.00161

Chen, H. (2006). Flow on the net-detecting web users' positive affects and their flow states. *Computers in Human Behavior, 22*(2), 221–233. https://doi.org/10.1016/j.chb.2004.07.001

Chen, J. V., & Park, Y. (2005). The differences of addiction causes between massive multiplayer online game and multi user domain. *International Review of Information Ethics, 4*, 53-60.

Chen, P., Jindani, F., Perry, J., & Turner, N. L. (2014). Mindfulness and problem gambling treatment. *Asian Journal of Gambling Issues and Public Health, 4*(2), 1-17. https://doi.org/10.1186/2195-3007-4-2

Cheng, S. L., & Xie, K. (2021). Why college students procrastinate in online courses: A self-regulated learning perspective. *The Internet and Higher Education, 50.* https://doi.org/10.1016/j.iheduc.2021.100807

Chernomas, W. M., & Shapiro, C. (2013). Stress, depression, and anxiety among undergraduate nursing students. *International Journal of Nursing Education Scholarship, 10*(1), 255-266. https://doi.org/10.1515/ijnes-2012-0032

Ching, S. M., Awang, H., Ramachandran, V., Lim, S. M. S., Wan Sulaiman, W. A., Foo, Y. L., Yee, A., & Hoo, F. (2017). Prevalence and factors associated with Internet addiction among medical students - A cross-sectional study in Malaysia. *Medical Journal of Malaysia, 72*(1), 7-11.

Cho, H., Kwon, M., Choi, J. H., Lee, S. K., Choi, J. S., Choi, S. W., & Kim, D. J. (2014). Development of the Internet addiction scale based on the Internet Gaming Disorder criteria suggested in DSM-5. *Addictive Behaviors, 39*(9), 1361–1366. https://doi.org/10.1016/j.addbeh.2014.01.020

Chor, Y. O., Ching, S. M., Norsiah, A., Shahnul, K. Hj. S., Azlin, A., Yusnita, Y., Zaiton, Y., Nabihah, S., Idora, I., Fauzia, A. M., Fazlin, S. O., Nik, S. Z., Artini, A., & Nor, H. T. (2020). Prevalence and factors associated with Internet addiction among adolescents in Malaysia: A cross-sectional study. *Journal of Indian Association for Child and Adolescent Mental Health, 16*, 33-44.

Cohen, J. (1988). Multiple regression and correlation analysis. *Statistical Power Analysis for the Behavioral Sciences* (2nd ed, pp. 407-444). Lawrence Erlbaum Associates.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapam & S. Oskamp (Eds), *The Social Psychology of Health* (pp. 31-67). Sage.

Conversano, C., Di Giuseppe, M., Miccoli, M., Ciacchini, R., Gemignani, A., & Orrù, G. (2020). Mindfulness, age and gender as protective factors against psychological distress during COVID-19 pandemic. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.01900

Cook, R. D., & Weisberg, S. (1982). *Residuals and influence in regression*. Chapman and Hall.

Crosswell, A. D., & Lockwood, K. G. (2020). Best practices for stress measurement: How to measure psychological stress in health research. *Health Psychology Open*. https://doi.org/10.1177/2055102920933072

Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. Jossey-Bass Publishers.

Csikszentmihalyi, M. (1990). *Flow – The Psychology of optimal experience*. Harper & Row.

Culbertson, S. S., Fullagar, C. J., Simmons, M. J., & Zhu, M. (2014). Contagious flow: Antecedents and consequences of optimal experience in the classroom. *Journal of Management Education, 39*(3), 319–349. https://doi.org/10.1177/1052562914545336

D'Souza, L., Manish, S., & Shravan Raj M. S. (2018). Relationship between academic stress and Internet addiction among college students. *The International Journal of Indian Psychology, 6*(2), 100-108. https://doi.org/10.25215/0602.010

Dakwar, E., Mariani, J. P., & Levin, F. R. (2011). Mindfulness impairments in individuals seeking treatment for substance use disorders. *The American Journal of Drug and Alcohol Abuse*, 37, 165–169. https://doi.org/10.3109/00952990.2011.553978

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

Darling Selvi, V., & Rajaprabha, P. (2020). Causes and consequences of academic stress among college students. *South African Journal of Economic and Management Sciences, 23*(9), 1-7. https://doi.org/10.4102/sajemsin.v23i1.6395

Davis, R. A. (2001). A cognitive behavioral model of pathological Internet use (PIU). *Computers in Human Behavior, 17*(2), 187–95. https://doi.org/10.1016/S0747-5632(00)00041-8

Davis, R. A., Flett, G. L., & Besser, A. (2002). Validation of a new scale for measuring problematic Internet use: Implications for pre-employment screening. *CyberPsychology & Behavior, 5*(4), 331–345. https://doi.org/10.1089/109493102760275581

Dekeyser, M., Raes, F., Leijssen, M., Leysen, S., & Dewulf, D. (2008). Mindfulness skills and interpersonal behaviour. *Personality and Individual Differences, 44*(5), 1235–1245. https://doi.org/10.1016/j.paid.2007.11.018

Dell'Osso, B., Altamura, A. C., Allen, A., Marazziti, D., & Hollander, E. (2006). Epidemiologic and clinical updates on impulse control disorders: A critical review. *European archives of psychiatry and clinical neuroscience, 256*(8), 464–475. https://doi.org/10.1007/s00406-006-0668-0

Department of Statistics Malaysia. (2021, April 12). *ICT use and access by individuals and households survey report, Malaysia, 2020*. https://www.dosm.gov.my/v1/index.php

Department of Statistics Malaysia. (2021, July 15). *Current population estimates, Malaysia, 2021*. https://www.dosm.gov.my/v1/index.php

Dol, K. S. (2016). Fatigue and pain related to Internet usage among university students. *Journal of Physical Therapy Science, 28*, 1233-1237. https://doi.org/10.1589/jpts.28.1233.

Douglas, A. C., Mills, J., Mamadou, B., Niang, C., Stepchenkova, S., Byun, S., Ruffini, C., Lee, S. K., Loutfi, J., Lee, J., Atallah, M., & Blanton, M. (2008). Internet addiction: Meta-synthesis of qualitative research for the decade 1996–2006. *Computers in Human Behavior, 24*(6), 3027–3044. https://doi.org/10.1016/j.chb.2008.05.009

Dowling, N. A., & Quirk, K. L. (2009). Screening for Internet dependence: Do the proposed diagnostic criteria differentiate normal from dependent Internet use*? CyberPsychology & Behavior, 12*(1), 21–27. https://doi.org/10.1089/cpb.2008.0162

Du, J., Huang, J., An, Y., & Xu, W. (2018). The relationship between stress and negative emotion: The mediating role of rumination. *Clinical Research and Trials, 4*(1), 1-5. https://doi.org/10.15761/CRT.1000208

Dundas, I., Vøllestad, J., Binder, P. E., & Sivertsen, B. (2013). The five factor mindfulness questionnaire in Norway. *Scandinavian Journal of Psychology*, *54*(3), 250–260. https://doi.org/10.1111/sjop.12044

Durak, M., & Senol-Durak, E. (2013). Associations of social anxiety and depression with cognitions related to problematic Internet use in youths. *Education and Science, 38*, 19-29.

Elfil, M., & Negida, A. (2017). Sampling methods in clinical research; An educational review. *Emergency, 5*(1), 1-3. http://dx.doi.org/10.22037/emergency.v5i1.15215

Engeser, S., & Rheinberg, F. (2008). Flow, performance and moderators of challenge-skill balance. *Motivation and Emotion, 32*, 158–172. https://doi.org/10.1007/s11031-008-9102-4

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPower: A general power analysis program. *Behavior Research Methods, Instruments, & Computers, 28*(1), 1-11. https://doi.org/10.3758/BF03203630

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

Esteban-Millat, I., Martínez-López, F. J., Huertas-García, R., Meseguer, A., & Rodríguez-Ardura, I. (2014). Modelling students' flow experiences in an online learning environment. *Computers and Education, 71*, 111–123. https://doi.org/10.1016/j.compedu.2013.09.012

Fatehi, K., Priestley, J. L., & Taasoobshirazi, G. (2020). The expanded view of individualism and collectivism: One, two, or four dimensions? *International Journal of Cross Cultural Management*, *20*(1), 7–24. https://doi.org/10.1177/1470595820913077

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191. https://doi.org/10.3758/BF03193146

Fawzy, M., & Hamed, S. A. (2017). Psychological stress among medical students in Assiut University. *Egypt. Psychiatry Research*. http://dx.doi.org/10.1016/j.psychres.2017.05.027

Feild, L., Pruchno, R. A., Bewley, J., Lemay, E. P., & Levinsky, N. G. (2006). Using probability vs. nonprobability sampling to identify hard-to-access participants for health-related research. *Journal of Aging and Health, 18*(4), 565–583. https://doi.org/10.1177/0898264306291420

Feng, Y., Ma, Y., & Zhong, Q. (2019). The relationship between adolescents' stress and Internet addiction: A mediated-moderation model. *Frontiers in Psychology, 10.* https://doi.org/10.3389/fpsyg.2019.02248

Fernandez, A. C., Wood, M. D., Stein, L., & Rossi, J. S. (2010). Measuring mindfulness and examining its relationship with alcohol use and negative consequences. *Psychology of Addictive Behaviors, 24*(4), 608-616. https://doi.org/10.1037/a0021742

Filzmoser, P. (2005). Identification of multivariate outliers: A performance study. *Austrian Journal of Statistics, 34*(2), 127-138. https://doi.org/10.17713/ajs.v34i2.406

Fradelos, E. C., Kourakos, M., Velentza, O., Polykandriotis, T., & Papathanasiou, I. V. (2016). Internet addiction in children and adolescents: Etiology, signs of recognition and implications in mental health nursing practice. *Medico Research Chronicles, 3*(4), 264-272.

Gainsbury, S. M., Russell, A., Hing, N., Wood, R., & Blaszczynski, A. (2013). The impact of Internet gambling on gambling problems: A comparison of moderate-risk and problem Internet and non-Internet gamblers. *Psychology of Addictive Behaviors, 27*(4), 1092–1101. https://doi.org/10.1037/a0031475

Gámez-Guadix, M., & Calvete, E. (2016). Assessing the relationship between mindful awareness and problematic Internet use among adolescents. *Mindfulness, 7*(6), 1281-1288. https://doi.org/10.1007/s12671-016-0566-0

Gámez-Guadix, M., Calvete, E., Orue, I., & Las Hayas, C. (2015). Problematic Internet use and problematic alcohol use from the cognitive–behavioral model: A longitudinal study among adolescents. *Addictive Behaviors, 40*, 109–114. http://dx.doi.org/10.1016/j.addbeh.2014.09.009.

Gámez-Guadix, M., Villa-George, F. I., & Calvete, E. (2012). Measurement and analysis of the cognitive-behavioral model of generalized problematic Internet use among Mexican adolescents. *Journal of Adolescence, 35*(6), 1581–1591. https://doi.org/10.1016/j.adolescence.2012.06

Garson, G. D. (2012). Testing statistical assumptions (2012 ed.). *Statistical Publishing Associates*. http://doi.org/10.1002/9781119528388

Gholamian, B., Shahnazi, H., & Hassanzadeh, A. (2017). The prevalence of Internet addiction and its association with depression, anxiety, and stress, among high-school students. *International Journal of Pediatrics, 5*(4), 4763-4770. https://doi.org/10.22038/ijp.2017.22516.1883

Glimne, D. (2019, February 20). Gambling. *Encyclopedia Britannica*. https://www.britannica.com/topic/gambling

Gong, Z., Wang, L., & Wang, H. (2021) Perceived stress and Internet addiction among Chinese college students: Mediating effect of procrastination and moderating effect of flow. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2021.632461

Good, D. J., Lyddy, C. J., Glomb, T. M., Bono, J. E., Brown, K. W., Duffy, M. K., Baer, R. A., Brewer, J. A., & Lazar, S. W. (2015). Contemplating mindfulness at work. *Journal of Management, 42*(1), 114–142. https://doi.org/10.1177/0149206315617003

Gravetter, F. J., & Forzano, L. B. (2018). *Research Methods for the Behavioural Sciences* (4th ed). Cengage Learning.

Griffiths, M. D., & Kuss, D. J. (2015). Online addictions: Gambling, video gaming, and social networking. In S. Shyam Sundar (Ed.), *The Handbook of the Psychology of Communication Technology* (pp. 384-403). Wiley Online Library. https://doi.org/10.1002/9781118426456.ch17

Guo, Y. M., & Poole, M. S. (2009). Antecedents of flow in online shopping: A test of alternative models. *Information Systems Journal, 19*(4), 369–390. https://10.1111/j.1365-2575.2007.00292.x

Haagsma, M. C., Caplan, S. E., Peters, O., & Pieterse, M. E. (2013). A cognitive-behavioral model of problematic online gaming in adolescents aged 12–22 years. *Computers in Human Behavior, 29*(1), 202–209. https://doi.org/10.1016/j.chb.2012.08.006

Haghighi, B. T., Othman, M., & Hashim, F. H. (2011). Internet addiction and dependency: A case study in UNITEN, Malaysia. *ICIMU 2011: Proceedings of the 5th International Conference on Information Technology & Multimedia*. https://doi.org/10.1109/icimu.2011.6122744

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: Global edition* (7th ed). Pearson Education. https://doi.org/10.1007/978-3-030-06031-2

Hamade, S. N. (2009). Internet addiction among university students in Kuwait. *Digest of Middle East Studies, 18*(2), 4-16.

Hardie, E. A., & Tee, M. Y. (2007). Excessive Internet use: the role of personality, loneliness and social support networks in Internet addiction. *Australian Journal of Emerging Technologies and Society, 5*(1), 34-47.

Hariri, A. R., & Holmes, A. (2015). Finding translation in stress research. *Natural Neuroscience, 18,* 1347–1352. https://doi.org/10.1038/nn.4111

Hassan, R. (2013). Networked time and the 'common ruin of the contending classes'. *Triplec: Communication, Capitalism & Critique, 11*(2), 359-374. https://10.31269/vol11iss2pp359-374

Hausman, A. V., & Siekpe, J. S. (2009). The effect of web interface features on consumer online purchase intentions. *Journal of Business Research, 62*(1), 5–13. https://10.5267/j.msl.2015.5.002

Hill, R. (1998). What sample size is "enough" in Internet survey research? *Interpersonal Computing and Technology: An Electronic Journal for the 21st Century, 6*(3-4), 1-10.

Hinic, D., Jovic, J., & Ristic, D. I. (2016). Characteristics of Internet use as a means of perceived stress reduction in health care students. *Special Education and Rehabilitation, 15*, 305-327. https://doi.org/10.5937/specedreh15-11183

Hirao, K. (2015). Difference in mental state between Internet-addicted and non-addicted Japanese undergraduates. *International Journal of Adolescent Medicine and Health, 27*(3), 307–310. https://doi.org/10.1515/ijamh-2014-0030

Hj Ramli, N. H., Alavi, M., Mehrinezhad, S., & Ahmadi, A. (2018). Academic stress and self-regulation among university students in Malaysia: Mediator role of mindfulness. *Behavioral Sciences, 8*(12), 1-9. https://10.3390/bs8010012

Hoaglin, D. C., & Welsch, R. E. (1978). The hat matrix in regression and ANOVA. *The American Statistician, 32*(1), 17-22.

Hollander, E., Berlin, H. A., & Stein, D. S. (2008). Impulse-control disorders not elsewhere classified. In R. E. Hales, S. C. Yudofsky & G. O. Gabbard (Eds.), *The American Psychiatric Publishing Textbook of Psychiatry* (5th ed., pp. 779-822). American Psychiatric Publishing.

Hsieh, Y. P., Hwa, H. L., Shen, A. C. T., Wei, H. S., Feng, J. Y., & Huang, C. Y. (2021). Ecological predictors and trajectory of Internet addiction from childhood through adolescence: A nationally representative longitudinal study. *International Journal of Environmental Research and Public Health, 18*, 6253. https://doi.org/10.3390/ijerph18126253

Ibrahim, M., Suryani, S., & Sriati, A. (2019). Relationship external factors with Internet addiction in adolescent age 15–18 years. *The Padjadjaran Nursing Journal, 7*(3), 255-265. https://doi.org/10.24198/jkp

International Monetary Fund. (2009). Sampling issues in price collection. *Export and Import Price Index Manual* (pp. 102-120). Organisation for Economic Co-Operation and Develop. https://doi.org/10.5089/9781589067806.069

Islam, S., Malik, M. I., Hussain, S., Thursamy, R., Shujahat, M., & Sajjad, M. (2018). Motives of excessive Internet use and its impact on the academic performance of business students in Pakistan. *Journal of Substance Use, 23*(1), 103-111.

Jun, S., & Choi, E. (2015). Academic stress and Internet addiction from general strain theory framework. *Computers in Human Behavior, 49*, 282-287. http://dx.doi.org/10.1016/j.chb.2015.03.001

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, *10*(2), 144–156. https://doi.org/10.1093/clipsy/bpg016

Kamssu, A., & Siekpe, J. (2012). Relating online flow experience with Internet addiction. *International Journal of Social Health Information Management, 5*(12), 1–7.

Kapahi, A., Ling, C., Ramadass, S., & Abdullah, N. (2013). Internet addiction in Malaysia causes and effects. *iBusiness, 5*, 72-76. https://doi.org/10.4236/ib.2013.52009.

Kasa, M., & Hassan, Z. (2013). Antecedent and consequences of flow: Lessons for developing human resources. *Social and Behavioral Sciences,* 209 – 213. https://doi.org/10.1016/J.SBSPRO.2013.10.224

Kaur, P., Dhir, A., Chen, S., & Rajala, R. (2016). Flow in context: Development and validation of the flow experience instrument for social networking. *Computers in Human Behavior, 59*, 358–367. http://doi.org/10.1016/j.chb.2016.02.039

Keller, J., & Blomann, F. (2008). Locus of control and the flow experience: An experimental analysis. *European Journal of Personality, 22*(7), 589-607. https://doi.org/10.1002/per.692

Kenton, W. (2020). Quantitative analysis (QA). *Investopedia*. https://www.investopedia.com/terms/q/quantitativeanalysis.asp

Kesmodel, U. S. (2018). Cross-sectional studies - what are they good for? *Methodology in Clinical Epidemiological Research in Obstetrics and Gynecology, 97*(4), 388–393. https://doi.org/10.1111/aogs.13331

Khan, V. T., & Magdalene, C. H. A. (2016). Internet use and addiction among students in Malaysian public universities in East Malaysia: Some empirical evidence. *Journal of Management Research, 9*(2), 31-47. https://doi.org/10.5296/jmr.v8i2.9092

Khang, H., Kim, J. K., & Kim, Y. (2013). Self-traits and motivations as antecedents of digital media flow and addiction: The Internet, mobile phones, and video games. *Computers in Human Behavior, 29*, 2416-2424. http://dx.doi.org/10.1016/j.chb.2013.05.027

Khoshnoud, S., Alvarez, I. F., & Wittmann, M. (2020). Peripheral-physiological and neural correlates of the flow experience while playing video games: A comprehensive review. *Peer Journals*. https://doi.org/10.7717/peerj.10520

Kim, H. Y. (2013). Statistical notes for clinical researchers: Assessing normal distribution (2) using skewness and kurtosis. *Restor Dent Endod, 38*(1), 52-54. http://doi.org/10.5395/rde.2013.38.1.52

Kıran-Esen, B. (2009). Adolescents' Internet addiction is predicted by peer pressure and perceived social support. *E-Journal of New World Sciences Academy, 4*(4), 1331-1340.

Kumar, M., & Mondal, A. (2018). A study on Internet addiction and its relation to psychopathology and self-esteem among college students. *Industrial Psychiatry Journal, 27*(1), 61-66. https://doi.org/10.4103/ipj.ipj_61_17

Kurniasanti, K. S., Assandi, P., Ismail, R. I., Nasrun, M. W. S., & Wiguna, T. (2019). Internet addiction: A new addiction? *Medical Journal of Indonesia, 28*(1), 82. https://doi.org/10.13181/mji.v28i1.2752

Kuss, D. J., & Griffiths, M. D. (2012). Internet gaming addiction: A systematic review of empirical research. *International Journal of Mental Health and Addiction, 10*(2), 278–296. https://doi.org/10.1007/s11469-011-9318-5

Kyriazos, T. A., Stalikas, A., Prassa, K., Galanakis, M., Flora, K., & Chatzilia, V. (2018). The Flow Short Scale (FSS) dimensionality and what MIMIC shows on heterogeneity and invariance. *Scientific Research Publishing, 9,* 1357-1382. https://doi.org/10.4236/psych.2018.96083

La Rosa, V. L., Gori, A., Faraci, P., Vicario, C. M., & Craparo, G. (2021). Traumatic distress, alexithymia, dissociation, and risk of addiction during the first wave of COVID-19 in Italy: Results from a cross-sectional online survey on a non-clinical adult sample. *International Journal of Mental Health and Addiction*, 1-17. https://doi.org/10.1007/s11469-021-00569-0

Lam, L. T., Peng, Z., Mai, J., & Jing, J. (2009). Factors associated with Internet addiction among adolescents. *Cyberpsychology & Behavior, 12*(5), 551–555. https://doi.org/10.1089/cpb.2009.0036

Lee, H. K., Kim, J. H., Fava, M., Mischoulon, D., Park, J. H., Shim, E. J., Lee, E. H., Lee, J. H., & Jeon, H. J. (2017). Development and validation study of the Smartphone Overuse Screening Questionnaire. *Psychiatry Research, 257*, 352–357. https://doi.org/10.1016/j.psychres.2017.07.074

Lee, M. C., & Tsai, T. R. (2010). What drives people to continue to play online games? An extension of technology model and theory of planned behavior. *International Journal of Human-Computer Interaction, 26*(6), 601–620. http://dx.doi.org/10.1080/10447311003781318

Lee, S. M., & Chen, L. (2010). The impact of flow on online consumer behaviour. *Journal of Computer Information Systems, 50*(4), 1–10.

Lee, S. Y., Kim, M. S., & Lee, H. K. (2019). Prevention strategies and interventions for Internet use disorders due to addictive behaviors based on an integrative conceptual model. *Current Addiction Reports*, *6*(3), 303-312.

Li, X., Deng, S., Li, L., & Jiang, Y. (2019). Outlier detection based on robust Mahalanobis Distance and its application. *Open Journal of Statistics*, *9*(1), 15-26. https://doi.org/10.4236/ojs.2019.91002

Li, X., Li, D., & Newman, J. (2013). Parental behavioural and psychological control and problematic Internet use among Chinese adolescents: The mediating role of self-control. *Cyberpsychology, Behaviour, and Social Networking*, *16(*6), 442–447. https://doi.org/10.1089/cyber.2012.0293

Liu, C. C., & Chang, I. C. (2016). Model of online game addiction: The role of computer-mediated communication motives. *Telematics and Informatics, 33*(4), 904–915. https://doi.org/10.1016/j.tele.2016.02.002

Liu, C., Liu, Z., & Yuan, G. (2020). Cyberbullying victimization and problematic Internet use among Chinese adolescents: Longitudinal mediation through mindfulness and depression. *Journal of Health Psychology*, 1-10. https://doi.org/10.1177/1359105320934158

Liu, X., Jiang, J., & Zhang, Y. (2021). Effects of Logotherapy-Based Mindfulness Intervention on Internet addiction among adolescents during the COVID-19

pandemic. *Iranian journal of public health, 50*(4), 789–797. https://doi.org/10.18502/ijph.v50i4.6005

Lutabingwa, J., & Auriacombe, C. J. (2007). Data analysis in quantitative research. *Journal of Public Administration, 42*(6).

Mahnke, R., Benlian, A., & Hess, T. (2014). Flow experience in information systems research: Revisiting its conceptualization, conditions, and effects. *Thirty Fifth International Conference on Information Systems.* https://core.ac.uk/download/pdf/301363419.pdf

Majumdar, A., & Basu, A. (2020). Internet usage & depressive tendency among young adults. *International Journal of Advance Research and Innovative Ideas in Education, 6*(6), 2517- 2524.

MalaysiaEducation.info. (2020). *An overview of the education structure in Malaysia*. https://www.malaysiaeducation.info/education-system/education-structure-in-malaysia.html

Malaysian Communications and Multimedia Department. (2020). *Internet users survey 2020: Infographic*. https://www.mcmc.gov.my/skmmgovmy/

Mann, C. J. (2003). Observational research methods. Research design II: Cohort, cross sectional, and case-control studies. *Emergency Medicine Journal, 20*(1), 54-60. http://dx.doi.org/10.1136/emj.20.1.54

Mao, Y., Yang, R., Bonaiuto, M., Ma, J., & Harmat, L. (2020). Can flow alleviate anxiety? The roles of academic self-efficacy and self-esteem in building psychological sustainability and resilience. *Sustainability, 12*(7), *2987.* https://doi.org/10.3390/su12072987

Martínez-Mesa, J., González-Chica, A., Bastos, J. L., Bonamigo, R. R., & Duquia, R. P. (2014). Sample size: How many participants do I need in my research? *Epidemiology and Biostatistics Applied to Dermatology, 89*(4). https://doi.org/10.1590/abd1806-4841.20143705

McEwen, B. S., Gray, J. D., & Nasca, C. (2015). 60 years of neuroendocrinology: Redefining neuroendocrinology: Stress, sex and cognitive and emotional regulation. *Journal of Endocrinology, 226*(2), 67-83. https://doi.org/10.1530/joe-15-0121

Mihajlov, M., & Vejmelka, L. (2017). Internet addiction: A review of the first twenty years. *Psychiatria Danubina*, *29*(3), 260-272. https://doi.org/10.24869/psyd.2017.260

Miles, J. (2017). Tolerance and Variance Inflation Factor. In N. Balakrishnan, T. Colton, B. Everitt, W. Piegorsch, F. Ruggeri, & J. Teugels (Eds.), *Wiley StatsRef: Statistics Reference Online*. John Wiley & Sons. https://doi.org/10.1002/9781118445112.stat06593

Monroe, S. M. (2008). Modern approaches to conceptualizing and measuring human life stress. *Annual Review of Clinical Psychology, 4,* 33-52. https://doi.org/10.1146/annurev.clinpsy.4.022007.141207.

Moretta, T., & Buodo, G. (2020). Problematic Internet use and loneliness: How complex is the relationship? A short literature review. *Current Addiction Reports, 7,* 125–136. https://doi.org/10.1007/s40429-020-00305-z

Moslehpour, M., & Batjargal, U. (2013). Factors influencing Internet addiction among adolescents of Malaysia and Mongolia. *Jurnal Administrasi Bisnis, 9*(2), 101-116.

Mustafa, M. Y., Rose, N. N., & Ishak, A. S. (2020). Internet addiction and family stress: Symptoms, causes and effects. *Journal of Physics: Conference Series, 1529*. https://doi.org/10.1088/1742-6596/1529/3/032017

Nalwa, K., & Anand, A. P. (2003). Internet addiction in students: A cause of concern. *CyberPsychology & Behavior, 6*(6), 653–656. https://doi.org/10.1089/109493103322725441

Nemeroff, C. B. (2016). Paradise lost: The neurobiological and clinical consequences of child abuse and neglect. *Neuron, 89,* 892–909. https://doi.org/10.1016/j.neuron.2016.01.019

Nichols, L. A., & Nicki, R. (2004). Development of a psychometrically sound Internet addiction scale: A preliminary step. *Psychology of Addictive Behaviors, 18*(4), 381–384. https://doi.org/10.1037/0893-164x.18.4.381

Norliah, K., Safiah, S., Zakiah, I., Massila, K., Mahadi, A. H., & Shahrulanuar, M. (2017). Internet usage pattern and types of Internet users among Malaysian university students. *Journal of Engineering and Applied Sciences, 12,* 1433-1439. https://doi.org/10.3923/jeasci.2017.1433.1439.

Omar, S. Z., Fadzil, M. F. B., & Bolong, J. (2019). The relationship between Internet usage and subjective wellbeing among youths in Malaysia. *International Journal of Academic Research in Business and Social Sciences, 9*(7), 461-469. http://dx.doi.org/10.6007/IJARBSS/v9-i7/6138

Osborne, J. W., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical assessment, research, and evaluation, 8*(2), 1-5. http://ericae.net/pare/getvn.asp?v=8&n=2

Ostovar, S., Allahyar, N., Aminpoor, H., Moafian, F., Nor, M. B., & Griffiths, M. D. (2016). Internet addiction and its psychosocial risks (depression, anxiety, stress and loneliness) among Iranian adolescents and young adults: A structural equation model in a cross-sectional study. *International Journal of Mental Health and Addiction, 14,* 257-267. https://doi.org/10.1007/s11469-015-9628-0

Özdemir, Y., Kuzucu, Y., & Ak, Ş. (2014). Depression, loneliness and Internet addiction: How important is low self-control? *Computers in Human Behavior, 34,* 284–290. http://dx.doi.org/10.1016/j.chb.2014.02.009.

Pariat, L., Rynjah, A., & Kharjana, J. M. G. (2014). Stress levels of college students: Interrelationship between stressors and coping strategies. *IOSR Journal of Humanities and Social Science, 19*(8), 40–46. https://doi.org/10.9790/0837-19834046

Park, S., Lee, S., Choi, B., Cho, S., Hong, J. P., Jeon, H. J., Kim, J., Park, J. E., & Lee, J. Y. (2020). Development and validation of a short-form Internet overuse screening questionnaire for adults. *European Addiction Research, 26*(6), 335–345. https://doi.org/10.1159/000506629

Patino, C. M., & Ferreira, J. C. (2018). Inclusion and exclusion criteria in research studies: Definitions and why they matter. *Jornal Brasileiro de Pneumologia, 44*(2), 84. https://doi.org/10.1590/s1806-37562018000000088

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

Peker, A., Nebioglu, M., & Odemis, M. H. (2018). Addiction in a virtual environment: A model test for the mediation role of mindfulness. *Anatolian Journal of Psychiatry, 20*(2), 153-158. https://doi.org/10.5455/apd.301945

Pontes, H. M., Szabo, A., & Griffiths, M. D. (2015). The impact of Internet-based specific activities on the perceptions of Internet addiction, quality of life, and excessive usage: A cross-sectional study. *Addictive Behaviors Reports, 1,* 19-25. https://doi.org/10.1016/j.abrep.2015.03.002

Privette, G., & Bundrick, C. M. (1987). Measurement of experience: Construct and content validity of the experience questionnaire. *Perceptual and Motor Skills, 65,* 315–332

Prizant-Passal, S., Shechner, T., & Aderka, I. M. (2016). Social anxiety and Internet use - a meta-analysis: What do we know? What are we missing? *Computers in Human Behavior, 62,* 221-229. http://dx.doi.org/10.1016/j.chb.2016.04.003

Quinones, C., & Griffiths, M. D. (2019). Reducing compulsive Internet use and anxiety symptoms via two brief interventions: A comparison between mindfulness and gradual muscle relaxation. *Journal of behavioral addictions, 8(*3), 530–536. https://doi.org/10.1556/2006.8.2019.45

Radeef, A. S., & Faisal, G. G. (2018). Prevalence of Internet addiction and its association with depression, anxiety and stress among medical students in Malaysia. *Mediterranean Journal of Clinical Psychology, 6*(3). https://doi.org/10.6092/2282-1619/2018.6.1987

Rakhmawati, W., Kosasih, C. E., Widiasih, R., Suryani, S., & Arifin, H. (2021). Internet addiction among male adolescents in Indonesia: A qualitative study. *American Journal of Men's Health, 15*(3). https://doi.org/10.1177/15579883211029459

Rebecca, H., Martin, S., & Tom, J. (2019). Browsing to breathe: Social media for stress reduction. *Proceedings of the 52nd Hawaii International Conference on System Sciences,* 4221-4230. https://doi.org/10.24251/HICSS.2019.510

Rettie, R. (2001). An exploration of flow during Internet use. *Internet Research, (11)*2, 103-113. https://doi.org/10.1108/10662240110695070

Rheinberg, F. (2008). Intrinsic motivation and flow. In J. Heckhausen & H. Heckhausen (Eds.), *Motivation and Action* (pp. 323-348). Cambridge University Press. https://doi.org/10.1017/CBO9780511499821.014

Rheinberg, F., Vollmeyer, R., & Engeser, S. (2003). The assessment of flow experience. In J. Stiensmeier-Pelster & F. Rheinberg (Eds.), *Diagnosis of Motivation and Self-Concept*. Hogrefe.

Roberti, J. W., Harrington, L. N., & Storch, E. A. (2006). Further psychometric support for the 10-item version of the perceived stress scale. *Journal of College Counseling, 9*(2), 135–147. https://doi.org/10.1002/j.2161-1882.2006.tb00100.x

Saddhajeewa, E. (2019). *Mindfulness for substance abuse recovery*. University of the West.

Salubi, O. G., Nekhwevha, F. H., Oyediran-Tidings, S., & Ondari-Okemwa, E. M. (2019). Digital media usage and prevalence of Internet addiction among undergraduate students in South Africa. *The Technical University of Kenya*, 233-240.

Saville, B.K., Gisbert, A., Kopp, J., & Telesco, C. (2010). Internet addiction and delay discounting in college students. *Psychology Records, 60*, 273–286. https://doi.org/10.1007/BF03395707

Schmidt, J. A. (2010). Flow in education. In P. Peterson, E. Baker & B. McGaw (Eds.), *International Encyclopedia of Education* (3rd ed, pp. 605-611). Elsevier. https://doi.org/10.1016/B978-0-08-044894-7.00608-4

Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual review of clinical psychology*, *1*, 607–628. https://doi.org/10.1146/annurev.clinpsy.1.102803.144141

Scott, E. (2020, December 1). Common causes of stress in college. *Verywell Mind*. https://www.verywellmind.com/college-stress-causes-3145172

Sedgwick, P. (2014). Cross sectional studies: Advantages and disadvantages. *British Medical Journal, 348*, 1-2, https://doi.org/10.1136/bmj.g2276

Segerstrom, S. C., & O'Connor, D. B. (2012). Stress, health and illness: Four challenges for the future. *Psychology & Health, 27*(2), 128-140. https://doi.org/10.1080/08870446.2012.659516

Selye, H. (1956). *The stress of life*. McGraw-Hill.

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology, 61*(3), 261-264. https://doi.org/10.4103/0019-5154.182410

Shahsavarani, A. M., Abadi, E. A. M., & Kalkhoran, M. H. (2015). Stress: Facts and theories through literature review. *International Journal of Medical Review, 2*(2), 230-241.

Shao, Y. J., Zheng, T., Wang, Y. Q., Liu, L., Chen, Y., & Yao, Y. S. (2018). Internet addiction detection rate among college students in the People's Republic of China: A meta-analysis. *Child Adolescence Psychiatry Mental Health, 12*(25), 1-10. https://doi.org/10.1186/ s13034-018-0231-6.

Shapiro, S. L., & Schwartz, G. E. R. (2000). Intentional systemic mindfulness: An integrative model for self-regulation and health. *Advances in Mind-Body Medicine, 16*(2), 128–134. https://doi.org/10.1054/ambm.1999.0118

Sharma, S. K., Mudgal, S. K., Thakur, K., & Gaur, R. (2020). How to calculate sample size for observational and experimental nursing research studies? *National Journal of Physiology, Pharmacy and Pharmacology, 10*(1), 1-8. https://doi.org/10.5455/njppp.2020.10.0930717102019

Shaw, M., & Black, D. W. (2008). Internet addiction. *CNS Drugs, 22*(5), 353–365. https://10.2165/00023210-200822050-00001

Shonin, E., Van Gordon, W., & Griffiths, M. (2014). Mindfulness as a treatment for behavioural addiction. *Journal of Addiction Research and Therapy, 5*, e122. https://doi.org/10.4172/2155-6105.1000e122

Showkat, N., & Parveen, H. (2017). "*Non-probability and probability sampling*," in e-PG Pathshala.

Simanjutak, E. J., & Ko, H. (2021). Moderated-mediation roles: Relationship between Internet addiction, neuroticism, perceived stress, and adaptive coping style among Indonesian migrant workers in Taiwan. *Makara Human Behavior Studies in Asia*, *25*(1), 80-95. https://doi.org/10.7454/hubs.asia.1160321

Sinha, N. K., Kumar, P., Kumar, S., & Priyadarshi, P. (2021). Problematic Internet use and psychosocial well-being: Role of mindfulness mediated by self-control and negative affect. *IIM Kozhikode Society & Management Review*, *10*(1), 99-112. https://doi.org/10.1177/2277975220965346

Skadberg, Y. X., & Kimmel, J. R. (2004). Visitors' flow experience while browsing a web site: Its measurement, contributing factors and consequences. *Computers in Human Behavior*, *20*(3), 403–422. https://doi.org/10.1016/s0747-5632(03)00050-5

Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of medical Internet research*, *22*(9). https://doi.org/10.2196/21279

Song, W. J., & Park, J. W. (2019). The influence of stress on Internet addiction: Mediating effects of self-control and mindfulness. *International Journal of Mental Health and Addiction, 17*, 1063–1075. https://doi.org/10.1007/s11469-019-0051-9

Soriano-Ayala, E., Amutio, A., Franco, C., & Mañas, I. (2020). Promoting a healthy lifestyle through mindfulness in university students: A randomized controlled trial. *Multidisciplinary Digital Publishing Institute, 12*(8), 2450. https://doi.org/10.3390/nu12082450

Soule, L., Shell, W., & Kleen, B. (2003). Exploring Internet addiction: Demographic characteristics and stereotypes of heavy Internet users. *The Journal of Computer*

Information Systems, 44(1), 64–73. http://dx.doi.org/10.1080/08874417.2003.11647553

Statista. (2021). *Number of Internet users in Malaysia from 2010 to 2020 and a forecast up to 2025*. https://www.statista.com/statistics/553752/number-of-Internet-users-in-malaysia/

Stavropoulos, V., Alexandraki, K., & Motti-Stefanidi, F. (2013). Flow and telepresence contributing to Internet abuse: Differences according to gender and age. *Computers in Human Behavior, 29(*5), 1941–1948. https://10.1016/j.chb.2013.03.011

Su, W., Han, X., Jin, C., Yan, Y., & Potenza, M. N. (2019). Are males more likely to be addicted to the Internet than females? A meta-analysis involving 34 global jurisdictions. *Computers in Human Behavior, 99*, 86-100. https://doi.org/10.1016/j.chb.2019.04.021

Su, Y. S., Chiang, W. L., Lee, J. C. T., & Chang, H. C. (2016). The effect of flow experience on player loyalty in mobile game application. *Computers in Human Behavior, 63*, 240–248. https://doi.org/10.1016/j.chb.2016.05.049

Suwarsi, S., & Daquioag-Lorica, J. D. (2021). Proper health education for parents based on parents' life experience with long-time Internet use of adolescent. *The Malaysian Journal of Nursing, 13*(1), 95-101. https://doi.org/10.31674/mjn.2021.v13i01.014

Taherdoost, H. (2016). Sampling methods in research methodology; How to choose a sampling technique for research. *International Journal of Academic Research in Management, 5*(2), 18-27. http://dx.doi.org/10.2139/ssrn.3205035

Teasdale, J. D., & Segal, Z. V. (2007). *The mindful way through depression: Freeing yourself from chronic unhappiness.* Guilford Press.

Teper, R., Segal, Z. V., & Inzlicht, M. (2013). Inside the mindful mind how mindfulness enhances emotion regulation through improvements in executive control. *Current*

Directions in Psychological Science, 22(6), 449–454. http://dx.doi.org/10.1177/0963721413495869.

Thatcher, A., Wretschko, G., & Fisher, J. (2008). Problematic Internet use among information technology workers in South Africa. *CyberPsychology & Behavior, 11(*6), 785–787. https://doi.org/10.1089/cpb.2007.0223

Thatcher, A., Wretschko, G., & Fridjhon, P. (2008). Online flow experiences, problematic Internet use and Internet procrastination. *Computers in Human Behavior, 24*(5), 2236–2254. https://doi.org/10.1016/j.chb.2007.10.008

Thelle, D. S., & Laake, P. (2015). Epidemiology. In P. Laake, H. B. Benestad, & B. R. Olsen (Eds.), *Research in Medical and Biological Sciences* (2nd ed, pp. 275-320). Elsevier. https://doi.org/10.1016/B978-0-12-799943-2.00009-4

Tohme, O., & Joseph, S. (2020). Authenticity is correlated with mindfulness and emotional intelligence. *Journal of Humanistic Psychology*. https://doi.org/10.1177/0022167820940926

Trivedi, R. H., & Teichert, T. (2017). The janus-faced role of gambling flow in addiction issues. *Cyberpsychology, Behavior, and Social Networking, 20*(3), 180–186. https://doi.org/10.1089/cyber.2016.0453

Vago, D. R., & Silbersweig, D. A. (2012). Self-awareness, self-regulation, and self-transcendence (S-ART): A framework for understanding the neurobiological mechanisms of mindfulness. *Frontiers in Human Neuroscience, 6*, 296. https://doi.org/10.3389/fnhum.2012.00296

Valenzuela, R., Codina, N., Castillo, I., & Pestana, J. V. (2020). Young university students' academic self-regulation profiles and their associated procrastination: Autonomous functioning requires self-regulated operations. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.00354

Valkenburg, P. M., & Peter, J. (2007). Internet communication and its relation to well-being: Identifying some underlying mechanisms. *Media Psychology, 9*(1), 43–58. https://doi.org/10.1080/15213260709336802

Walsh, R. (2011). Lifestyle and mental health. *American Psychologist,* 66, 579–592. https://doi.org/10.1037/a0021769

Wan Ismail, W. S., Sim, S. T., Tan, K. A., Bahar, N., Ibrahim, N., Mahadevan, R., Nik Jaafar, N. R., Baharudin, A., & Abdul Aziz, M. (2020). The relations of Internet and smartphone addictions to depression, anxiety, stress, and suicidality among public university students in Klang Valley, Malaysia. *Perspectives in Psychiatric Care*, 1-7. https://doi.org/10.1111/ppc.12517

Wan, C., & Chiou, W. (2006). Psychological motives and online games addiction: A test of flow theory and humanistic needs theory for Taiwanese adolescents. *Cyberpsychology & Behavior, 9*(3), 317-324. https://doi.org/10.1089/cpb.2006.9.317

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *Supplement: An Overview of Study Design and Statistical Considerations, 158*(1), 65-71. https://doi.org/10.1016/j.chest.2020.03.012

Watters, C. A., Keefer, K. V., Kloosterman, P. H., Summerfeldt, L. J., & Parker, J. D. (2013). Examining the structure of the Internet addiction test in adolescents: A bifactor approach. *Computers in Human Behavior, 29*(6), 2294–2302.

Webster, J., & Martocchio, J. (1992). Microcomputer playfulness: Development of a measure with workplace implications. *Management Information Systems Quarterly, 16*, 201–226.

Weinstein, A., & Lejoyeux, M. (2010). Internet addiction or excessive Internet use. *The American Journal of Drug and Alcohol Abuse, 36*(5), 277-283. https://doi.org/10.3109/00952990.2010.491880

Woon, L. S. C. (2020). Internet addiction and mental well-being among secondary school students in a Malaysian district: A cross-sectional survey. *Turkish Journal of Clinical Psychiatry, 23*, 526-528. https://doi.org/10.5505/kpd.2020.72623

Wu, J., & Li, H. (2021). Mindfulness for sustainable Internet use in Chinese junior secondary school students: A dual-path mediation model. *Sustainability, 13*(9), 1-10. http://dx.doi.org/10.3390/su13094626

Xu, Z., Turel, O., & Yuan, Y. (2012). Online game addiction among adolescents: Motivation and prevention factors. *European Journal of Information Systems, 21*(3), 321–340. https://10.1057/ejis.2011.56

Yang, H., & Wu, W. (2017). The effect of flow frequency on Internet addiction to different Internet usage activities. *International Journal of Information and Communication Technology Education, 13*(4), 28-39. http://doi.org/10.4018/IJICTE.2017100103

Yang, S. C., & Tung, C. J. (2007). Comparison of Internet addicts and non-addicts in Taiwanese high school. *Computers in Human Behavior, 23*(1), 79–96. https://doi.org/10.1016/j.chb.2013.05.020

Yang, S., Lu, Y., Wang, B., & Zhao, L. (2014). The benefits and dangers of flow experience in high school students' Internet usage: The role of parental support. *Computers in Human Behavior, 41*, 504–513. https://doi.org/10.1016/j.chb.2014.09.039

Yazdi, K., Bilous, C., Mittermaier, M., Staudinger, K., & Fuchs-Leitner, I. (2020). Self-reported and parental assessments of Internet gaming disorder, and their accordance with DSM-5 criteria in a clinical relevant population. *Cyberpsychology, Behavior, and Social Networking.* https://doi.org/10.1089/cyber.2020.0335

Yot-Domínguez, C., & Marcelo, C. (2017). University students' self-regulated learning using digital technologies. *International Journal of Educational Technology in Higher Education, 14*(1). https://doi.org/10.1186/s41239-017-0076-8

Young, K. S. (1996). "*Internet addiction: The emergence of a new clinical disorder*," in 104th annual meeting of the American Psychological Association.

Young, K. S. (2004). Internet addiction. *American Behavioral Scientist, 48*(4), 402–415. https://doi.org/10.1177/0002764204270278

Yusuf, A. M., Mukhtar, M. I., Galadanci, B. S., & Muaz, S. A. (2020). Internet usage and addiction and effects on the academic performances of computer science students at bayero university, Kano, Nigeria. *Journal of Information Science, Systems and Technology*, *4*(2), 20-30.

Zach. (2020, January 8). The four assumptions of linear regression. *Statology*. https://www.statology.org/linear-regression-assumptions/

Zenebe, Y., Kunno, K., Mekonnen, M., Bewuket, A., Birkie, M., Necho, M., Seid, M., Tsegaw, M., & Akele, B. (2021). Prevalence and associated factors of Internet addiction among undergraduate university students in Ethiopia: A community university-based cross-sectional study. *BMC Psychology, 9*(4), 1-10. https://doi.org/10.1186/s40359-020-00508-z

Zhang, X. X., & Zhu, H. X. (2014). The intervention effect of Mindfulness-Based Cognitive Therapy on college students with mobile phone addiction. *Studies of Psychology and Behavior*, *12*(3), 391–394. https://doi.org/10.3969/j.issn.1672-0628.2014.03.019

Zhou, T. (2013). The effect of flow experience on user adoption of mobile TV. *Behaviour and Information Technology, 32*(3), 263–272. https://doi.org/10.1080/0144929X.2011.650711

Zhu, H., Ibrahim, J. G., & Cho, H. (2012). Perturbation and scaled Cook's Distance. A*nnals of Statistics, 40*(2), 785–811. https://doi.org/10.1214/12-AOS978

Zubir, N. S. A., Abas, M. A., Ismail, N., Rahiman, M. H. F., Tajuddin, S. N., & Taib, M. N. (2017). Statistical analysis of agarwood oil compounds in discriminating the quality of agarwood oil. *Journal of Fundamental and Applied Sciences, 9*(4S), 45-61. http://dx.doi.org/10.4314/jfas.v9i4s.3

Appendices

Appendix A

Questionnaire

Questionnaire

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:

a) Avinaash A/L Thiruselvam, Email: avinaash125@1utar.my
b) Lim Shu Jing, Email: shujingg@1utar.my

By proceeding with this form, I declare that I am:

a) a Malaysian
b) university student

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.

Part A: Demographic Information
The following are some questions about your general demographic.

Your age

…….

Your sex
- ☐ Male
- ☐ Female

Your race
- ☐ Malay
- ☐ Chinese
- ☐ Indian
- ☐ Others (please specify): …….

Your nationality
- ☐ Malaysian
- ☐ Others (please specify): …….

Are you a university student?
- ☐ No
- ☐ Yes

Your current education programme
- ☐ Foundation
- ☐ Diploma
- ☐ Bachelor Degree
- ☐ Master Degree
- ☐ PhD
- ☐ Others (please specify): …….

Your institution (please specify institution's full name) (e.g., Universiti Tunku Abdul Rahman)

……

The type of your Internet connection
- ☐ Wireless Fidelity (Wi-Fi)
- ☐ Mobile data
- ☐ No Internet connection

Frequency of your Internet usage for recreational purpose **only** (per week)
- ☐ none
- ☐ 1 day to 2 days
- ☐ 3 days to 4 days
- ☐ 5 days to 6 days
- ☐ everyday

Average duration of your Internet usage for recreational purpose **only** (per day)

- ☐ less than 1 hour
- ☐ 1 hour to 3 hours
- ☐ 3 hours to 7 hours
- ☐ 7 hours to 10 hours
- ☐ more than 10 hours

The most frequent device that you access the Internet for recreational purpose **only**

- ☐ Laptop
- ☐ Computer
- ☐ Smartphone
- ☐ Tablet
- ☐ Others (please specify): …….

The most common location that you access the Internet for recreational purpose **only**

- ☐ Home / Hostel
- ☐ Institution
- ☐ Work place
- ☐ Others (please specify): …….

The most frequent Internet activity that you access for recreational purpose **only**

- ☐ Reading
- ☐ Watching movies / videos
- ☐ Listening music
- ☐ Gaming
- ☐ Gambling
- ☐ Communication
- ☐ Investment / Funding
- ☐ Shopping / Payment
- ☐ Get information / directions
- ☐ Others (please specify): …….

Age of exposure to the Internet

…….

Internet usage experience(s)

- ☐ Less than 1 year
- ☐ 1 year to 3 years
- ☐ 3 years to 5 years
- ☐ 5 years to 7 years
- ☐ 7 years to 10 years
- ☐ more than 10 years

Do your family members access the Internet for recreational purpose **only?**

- ☐ No
- ☐ Yes

Part B: Internet Overuse Screening Questionnaire (Short-Form) (IOS-Qs)

Instructions: Below is a collection of statements about your everyday experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5
Not at all	Rarely	Sometimes	Often	To a large extent

I become irritated or angry without the Internet.	1	2	3	4	5
I need to use the Internet for a longer period of time to become as satisfied as before.	1	2	3	4	5
I like using the Internet more than spending time with family.	1	2	3	4	5
I like using the Internet more than socializing with friends.	1	2	3	4	5
I am late for school, work, appointments, and so on, due to my Internet use.	1	2	3	4	5
I quarrel with family due to my Internet use.	1	2	3	4	5
I skip school or work to go somewhere where I can use the Internet.	1	2	3	4	5
I am not interested in anything except using the Internet.	1	2	3	4	5

Part C: Flow Short Scale (FSS)

Instructions: Below is a collection of statements about your everyday experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6	7
Not at all	Rarely	Sometimes	Partially	Often	Always	Very much

I feel just the right amount of challenge.	1	2	3	4	5	6	7
My thoughts/activities run fluidly and smoothly.	1	2	3	4	5	6	7
I don't notice time passing.	1	2	3	4	5	6	7
I have no difficulty concentrating.	1	2	3	4	5	6	7
My mind is completely clear.	1	2	3	4	5	6	7
I am totally absorbed in what I am doing.	1	2	3	4	5	6	7
The right thoughts/movements occur of their own accord.	1	2	3	4	5	6	7
I know what I have to do each step of the way.	1	2	3	4	5	6	7
I feel that I have everything under control.	1	2	3	4	5	6	7
I am completely lost in thought.	1	2	3	4	5	6	7

Part D: Perceived Stress Scale (PSS-10)

Instructions: Below is a collection of statements about your last month experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

In the last month, how often have you been upset because of something that happened unexpectedly?	1	2	3	4	5
In the last month, how often have you felt that you were unable to control the important things in your life?	1	2	3	4	5
In the last month, how often have you felt nervous and stressed?	1	2	3	4	5
In the last month, how often have you felt confident about your ability to handle your personal problems?	1	2	3	4	5
In the last month, how often have you felt that things were going your way?	1	2	3	4	5
In the last month, how often have you found that you could not cope with all the things that you had to do?	1	2	3	4	5
In the last month, how often have you been able to control irritations in your life?	1	2	3	4	5
In the last month, how often have you felt that you were on top of things?	1	2	3	4	5
In the last month, how often have you been angered because of things that happened that were outside of your control?	1	2	3	4	5
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

Part E: Mindful Attention Awareness Scale (MAAS)

Instructions: Below is a collection of statements about your everyday experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I'm doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6
I drive places on 'automatic pilot' and then wonder why I went there.	1	2	3	4	5	6
I find myself preoccupied with the future or the past.	1	2	3	4	5	6
I find myself doing things without paying attention.	1	2	3	4	5	6
I snack without being aware that I'm eating.	1	2	3	4	5	6

- Thank You -

Appendix B

Calculation of Effect Size

Flow Experience

$f_1^2 = \frac{0.2304}{1-0.2304} = 0.2993$

Thatcher, A., Wretschko, G., & Fridjhon, P. (2008). Online flow experiences, problematic Internet use and Internet procrastination. *Computers in Human Behavior, 24*(5), 2236–2254. https://doi.org/10.1016/j.chb.2007.10.008

Stress

$f_2^2 = \frac{0.1296}{1-0.1296} = 0.1489$

Feng, Y., Ma, Y., & Zhong, Q. (2019). The Relationship between adolescents' stress and Internet addiction: A mediated-moderation model. *Frontiers in Psychology, 10*, 2248. https://doi.org/10.3389/fpsyg.2019.02248

Mindfulness

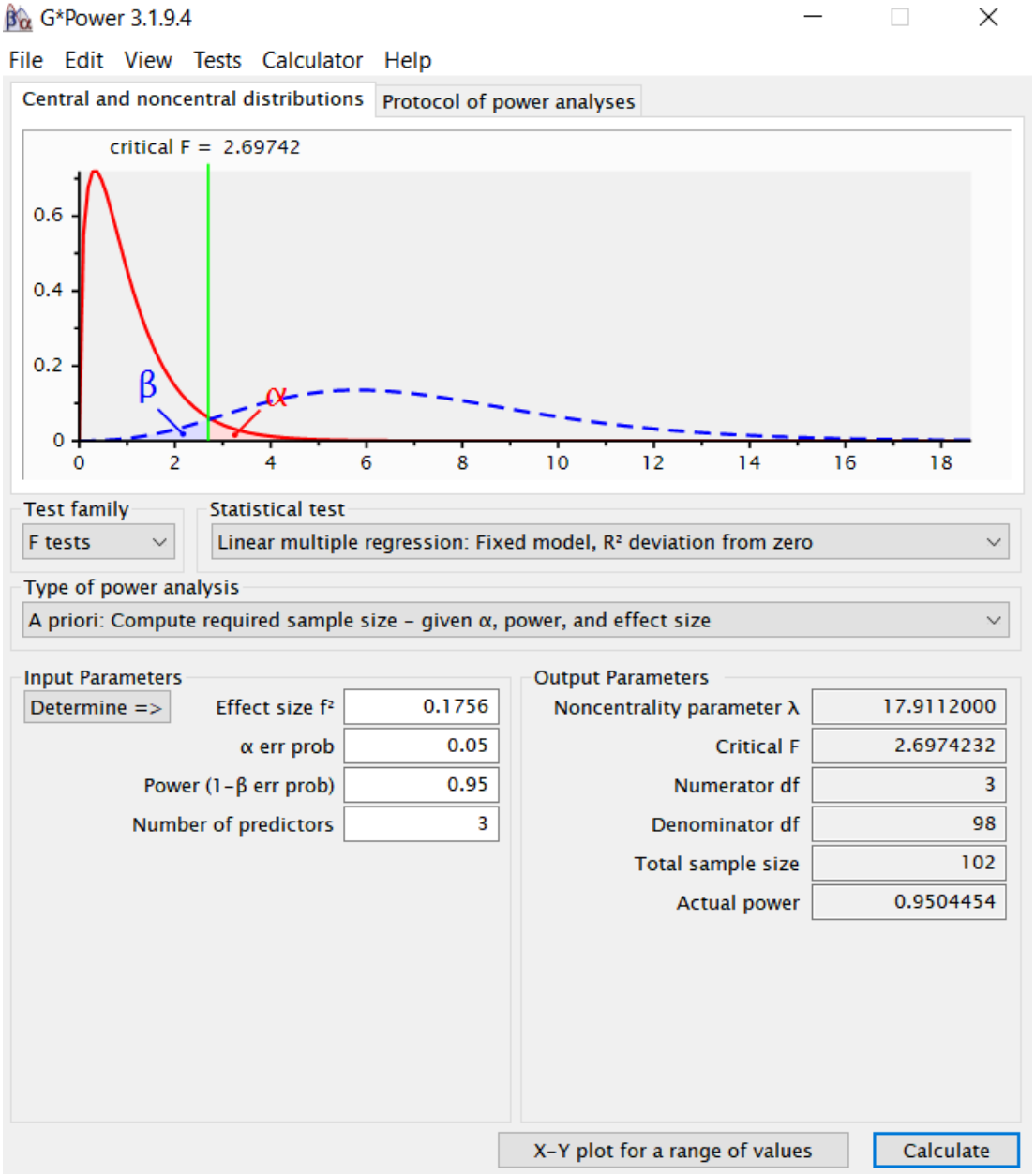
$f_3^2 = \frac{0.1296}{1-0.1296} = 0.0786$

Arslan, G. (2017). Psychological maltreatment, forgiveness, mindfulness, and Internet addiction among young adults: A study of mediation effect. *Computers in Human Behavior, 72*, 57-66. https://doi.org/10.1016/j.chb.2017.02.037

Total effect size

$f^2 = \frac{0.2993+0.1489+0.0786}{3} = 0.1756$, medium effect size.

G*Power Programme Analysis



Appendix C

Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman Scientific

UNIVERSITI TUNKU ABDUL RAHMAN
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/282/2021

8 December 2021

Dr Pung Pit Wan
Head, 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 Pung,

Ethical Approval For Research Project/Protocol

We refer to the application for ethical approval for your students' research projects from Bachelor of Social Science (Hons) Psychology programme enrolled in course UAPZ3013/UAPZ3023. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Perceived Stress, Self-control, and Subjective Well-being as Predictors in Predicting Social Media Addiction Among Young Adults During the Covid-19 Pandemic in Malaysia	1. Chiam Kok Yi 2. Chow Jing Keat 3. Lee Jiao Hao	Dr Pung Pit Wan	8 December 2021 - 7 December 2022
2.	Predicting Roles of Perceived Social Support and Perceived Academic Stress on Internet Addiction Among Undergraduate Students in Malaysia	1. Chan Yieng Ming 2. Ooi Kyxin 3. Loi Ting Sian		
3.	Attitudes toward Singlehood, Negative Stereotyping of Single Persons, and Perceived Control as Determinants of the Intention to be Single Among Young Adults in Malaysia	1. Joanne Chong Hui Qi 2. Leong Wen Sam 3. Leow Rou yi	Dr Tan Chee Seng	
4.	The Effect of Career Self-Efficacy, Career Outcome Expectations, And Future Career Anxiety on Final Undergraduate Year Last Semester Students' Career Choice	1. Tan Za Sen 2. Lee Quan Xuan 3. Viven Anak Thomas		
5.	The Relationship Between Sense of Coherence, Coping Strategies and Suicidal Ideation Among Youths in Malaysia	1. Nur Imanina Amani Binti Mustakim 2. Reshmika a/p Elangovan 3. Shobhanah a/p Ramesh	Dr Siah Poh Chua	
6.	Non-Attachment and Sense of Coherence: Their Relationships with Happiness	1. Gan Wei Xuan 2. Kashvini Muthu Kumar 3. Stephanie Wong Zi Shan		
7.	Grit, Social Relationship and Academic Performance: Their Relationships Among Undergraduates in Malaysia	1. Firozepall Singh 2. Arjan Singh a/l Ranjit Singh		
8.	Flow Experience, Stress, and Mindfulness as Predictors of Internet Addiction Among University Students in Malaysia	1. Avinaash a/l Thiruselvam 2. Lim Shu Jing	Ms T'ng Soo Ting	
9.	The Mediating Role of Emotion Regulation in the Relationship Between Negative Emotion, Positive Emotion, and Emotional Eating Among Young Adults in Malaysia	1. Chong Xuan Ni 2. Heng Wee Keat 3. Ruan, Yu		

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

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
10.	Determinants of Sexting Behavior Among Emerging Adults in Malaysia	1. Lee Li Teng 2. Ong Pei Ling 3. Wong Yoke Ting	Mr Tan Soon Aun	8 December 2021 - 7 December 2022
11.	The Association Between Compulsive Social Media Use and Psychological Well-being Among Young Adults in Malaysia: Social Media Fatigue as a Mediator	1. Foong Chee Ee 2. Lau Yau Chee 3. Sarvinna a/p Vasuthevan		

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.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,

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

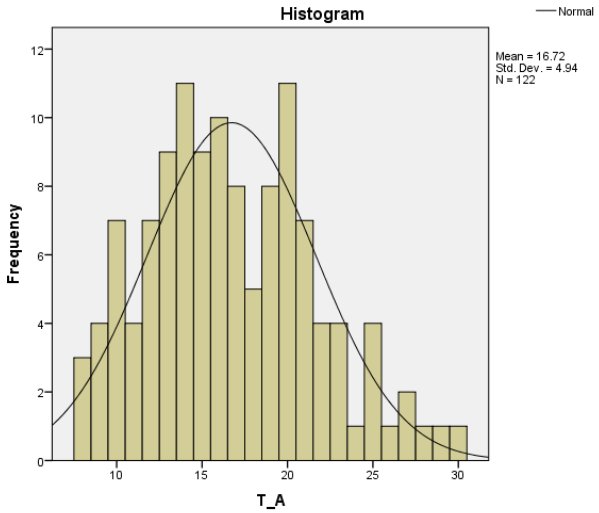
c.c Dean, Faculty of Arts and Social Science
Director, Institute of Postgraduate Studies and Research

Appendix D

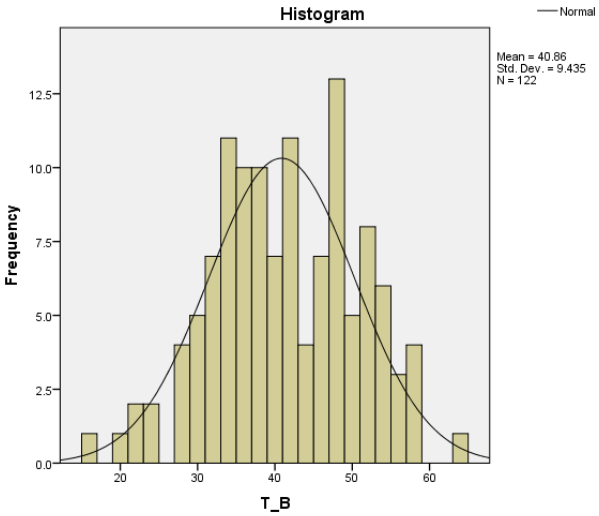
SPSS Output: Normality Assumptions

Histogram for Each Distribution

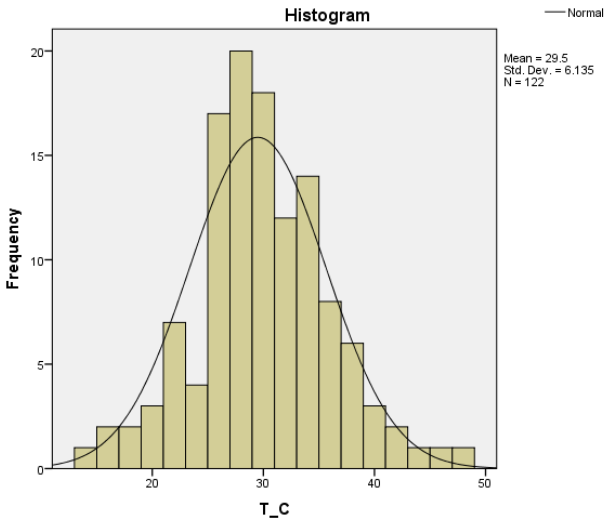
Internet addiction



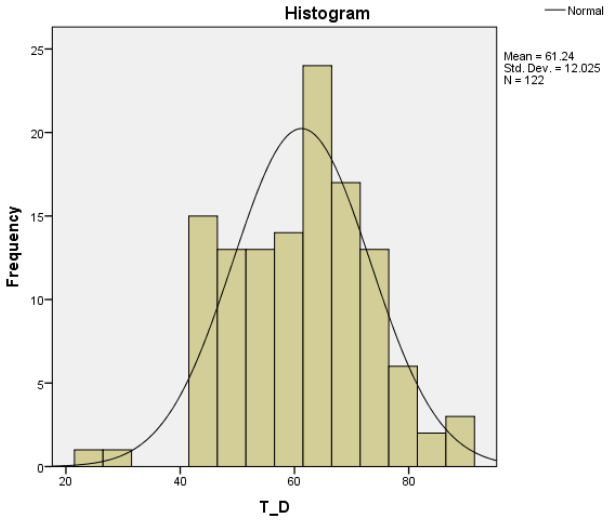
Flow experience



Stress

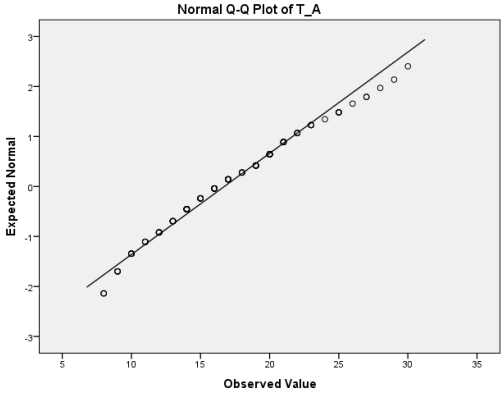


Mindfulness

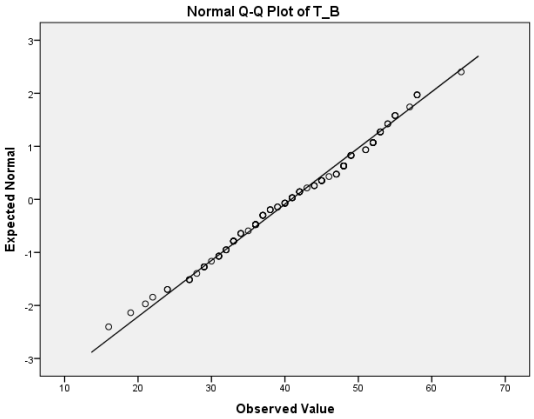


Normal Q-Q Plot for Each Distribution

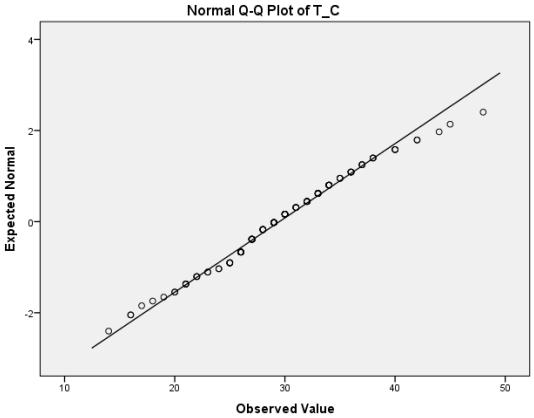
Internet addiction



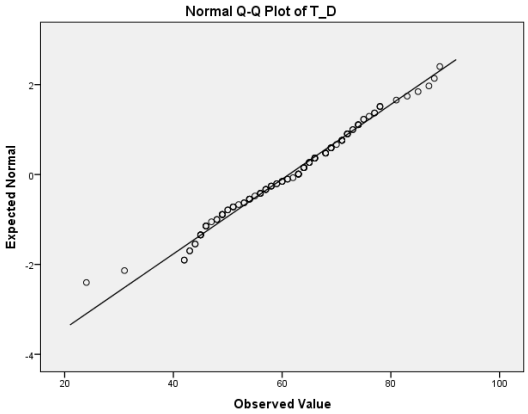
Flow experience



Stress



Mindfulness



Kolmogorov-Smirnov Test for Each Distribution

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
T_A	.083	122	.040	.977	122	.033
T_B	.079	122	.061	.989	122	.468
T_C	.079	122	.057	.988	122	.344
T_D	.083	122	.039	.987	122	.274

a. Lilliefors Significance Correction

Appendix E

SPSS Output: Outliers

Casewise Diagnostics[a]

Case Number	ID	Std. Residual	T_A	Predicted Value	Residual
89	134	3.269	30	14.70	15.303

a. Dependent Variable: T_A

Appendix F

SPSS Output: Multiple Linear Regression

Variance Inflation Factor (VIF) Values and Tolerance Values

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	28.766	5.372		5.354	.000		
	T_B	-.055	.058	-.106	-.961	.338	.613	1.632
	T_C	-.050	.093	-.062	-.539	.591	.560	1.786
	T_D	-.136	.041	-.330	-3.321	.001	.751	1.332

a. Dependent Variable: T_A

Durbin-Watson Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.352[a]	.124	.102	4.681	1.871

Regression Model

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	366.685	3	122.228	5.578	.001[b]
	Residual	2585.839	118	21.914		
	Total	2952.525	121			

a. Dependent Variable: T_A

b. Predictors: (Constant), T_D, T_B, T_C

Regression Coefficient

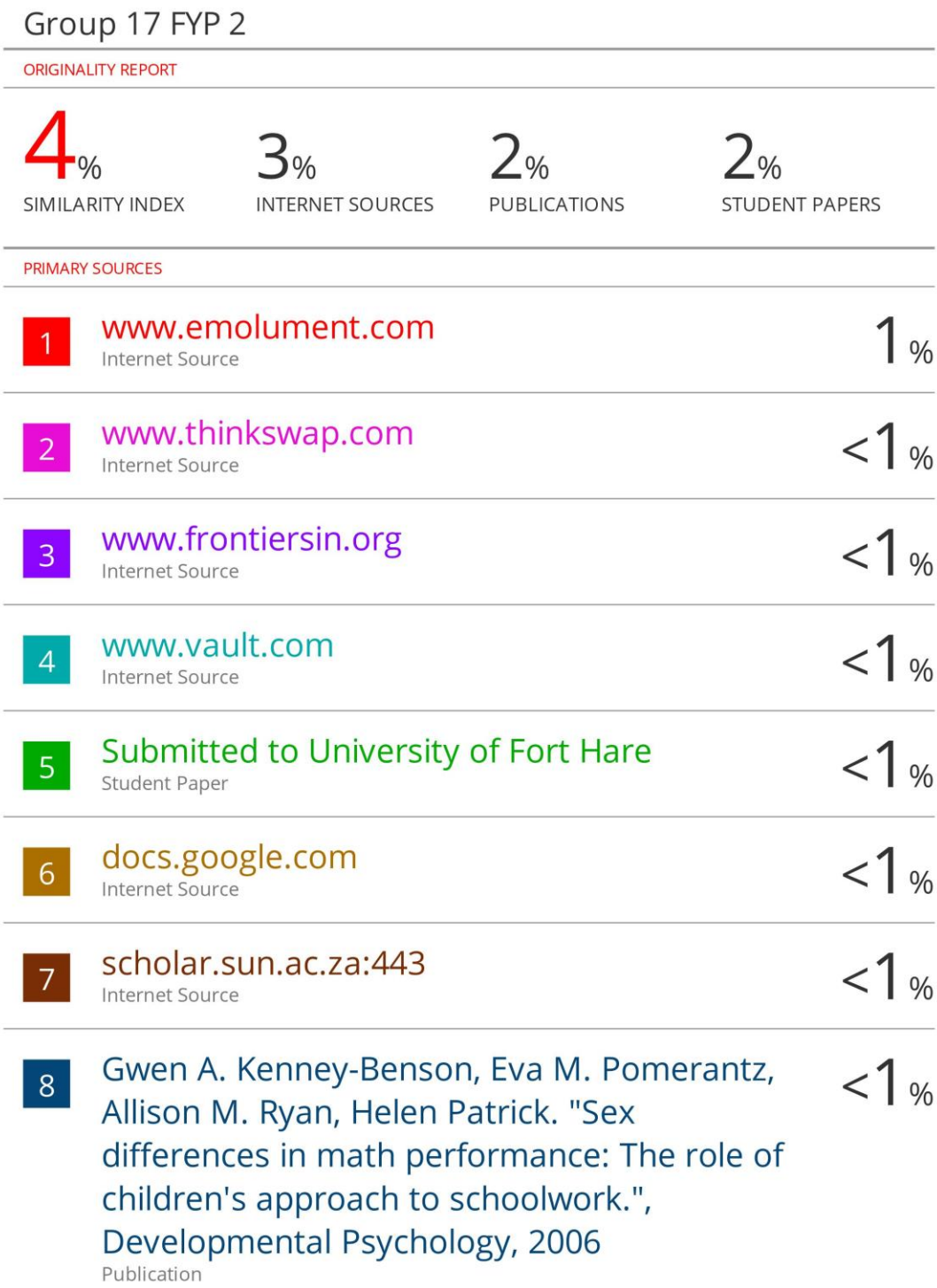
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	28.766	5.372		5.354	.000		
	T_B	-.055	.058	-.106	-.961	.338	.613	1.632
	T_C	-.050	.093	-.062	-.539	.591	.560	1.786
	T_D	-.136	.041	-.330	-3.321	.001	.751	1.332

a. Dependent Variable: T_A

Appendix G

Turnitin Summary Report



Group 17 FYP 2

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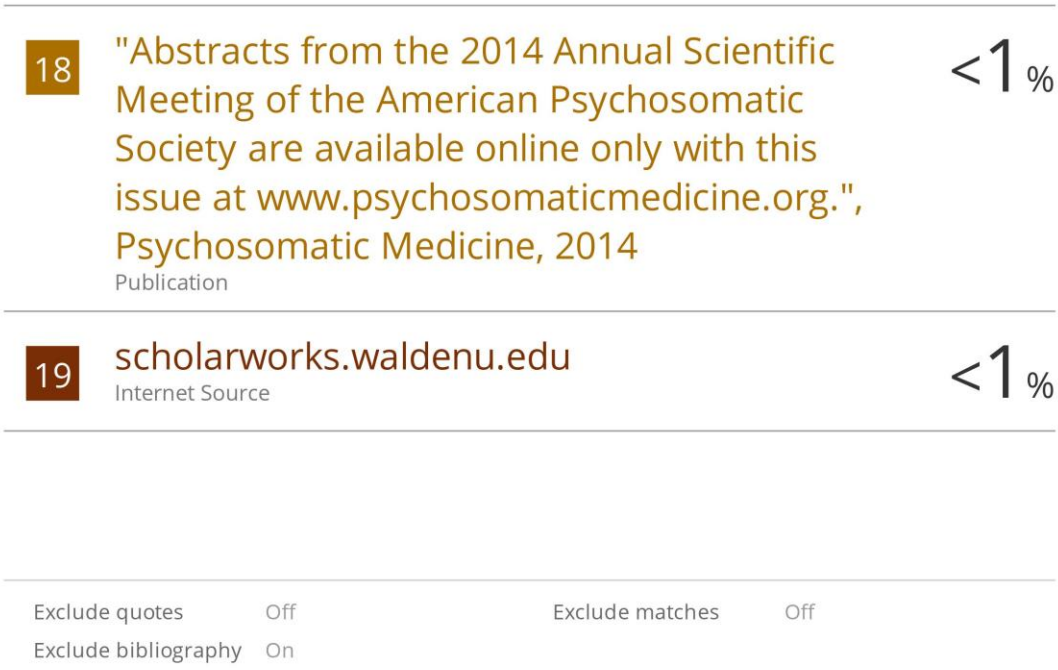
18
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