

GRIT PERSONALITY AS A MEDIATOR OR MODERATOR FOR THE EFFECTS OF INTERNET ADDICTION ON PROCRASTINATION

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ABSTRACT

The current study aims to triangulate the relationships among internet addiction, grit personality, and academic procrastination. It further examines the role of grit either as a mediator or a moderator in the effects of internet addiction on procrastination. Purposive sampling and survey methods were applied in recruiting 430 undergraduate students from a university located in a rural area of Malaysia. The results suggested that internet addiction is positively associated with academic procrastination, while grit is negatively linked to academic procrastination. Further to this exploration, findings also implied that internet addiction serves as a negative factor to the consistency of interest but not to the perseverance of effort in grit personality. Additionally, the present report concluded that consistency is a mediator rather than a moderator for the effects of internet addiction on procrastination. To combat the problem of procrastination among undergraduate students, it is advisable to provide a supportive environment that would accommodate students' needs as another alternative in reducing their chance of internet addiction, as well as enhancing the consistency of interest in their academic endeavor.

Keywords: Internet addiction, grit, procrastination, undergraduates

Introduction

Procrastination is defined as voluntarily delaying an intended course of action despite its negative consequences (Klingsieck, 2013). Academic procrastination, on the other hand, is a kind of procrastination specifically related to the area of academic study. It has eventually caused students to suffer negative consequences in their academic performances and subjective well-being (Andangsari, Djunaidi, Fitriana, & Harding, 2018).

In the academic setting, procrastination is a common occurrence among students because, within a restricted timeframe, these students have to face many demands and datelines requested by the courses they are undertaking. It is estimated that over 75% of college students are procrastinators. They usually would do their assignments only when deadlines were close or return library books when due dates had passed. They delay writing papers, and instead of preparing for the examination, they would simply waste their time doing nothing (Schouwenburg & Lay, 1995; Steel, 2007).

Procrastination and internet addiction

The antecedents of academic procrastination generally include two aspects: The motivational aspects (such as lack of self-control) and the clinical aspects (such as addiction and anxiety) (Andangsari et al., 2018). Among all these antecedents, internet addiction or excessive use of the Internet is regarded as the third most addictive behavior which contributes to academic procrastination among undergraduate students (Mohammed & Abdulwasiiu, 2017). It is followed by addictions to alcohol and drugs. Internet addiction is a term labeled as pathological internet use, problematic internet use, or internet dependence. In addition, it is also defined as the inability of an individual to manage his or her internet usage, thus resulting in feelings of distress and functional impairment of daily routine (Shapira, Goldsmith, Keck Jr, Khosla, & McElroy, 2000).

There are several reasons why undergraduates become so addicted to internet usage. Firstly, the Internet is highly appealing as it offers users high autonomy, opportunities for identity exploration, and a space free of parental control (Reinecke et al., 2018). Secondly, online activities like social media, gaming, and watching videos provide immediate gratifications that are pleasurable to procrastinators, especially while users are trying to avoid tasks (Thatcher, Wretschko, & Fridjhon, 2008). Finally, internet usage, in general, is distracting and is easily habituated, causing it hard for adolescents and young adults to have self-control. As a result, these young people are at higher risk and more likely to become addicted when compared to other age groups (Ni, Qian, & Wang, 2017).

Studies have found that when the Internet serves as a medium of distraction, internet users tend to delay urgent tasks (Reinecke et al., 2018). Most procrastinators have no control over their desire to go online, and this has caused them to spend most of their time on the Internet rather than on the academic duties they planned to complete (Lavoie & Pychyl, 2001).

Procrastination and grit

Besides internet addiction, the personality trait of grit is suggested to be another factor relevant to procrastination (Wolters & Hussain, 2015; Wyszynska, Ponikiewska, Karaś, Najderska, & Rogoza, 2017). Grit is a personality trait defined as passion and perseverance in achieving long-term goals. It prompts a person to work hard when facing challenges and enables him or her to put effort and attentiveness into tasks over the years, regardless of failures and obstacles along the process (Duckworth, Peterson, Matthews, & Kelly, 2007).

Overall, grit includes two factors: Consistency of interest and perseverance of effort (Duckworth & Quinn, 2009). In the first place, consistency of interest is the tendency that allows one to focus and dedicate oneself to the same set of important goals over a long period. It gives meaning to the goal and a sense of optimism towards achieving it. Consequently, it helps the individual to overcome challenges and difficulties. Next, perseverance of effort is one's ability to commit and maintain energy or effort towards one's goals. It is present when an individual can attach significant meanings to the goal set. Similarly, grit is bestowed when the individual finds a compelling mission in his or her tasks, allowing him or her to persist and moving towards the final destination without being defeated by the adversities faced in the pursuit of achieving it (Duckworth et al., 2007). In short, consistency of interest is responsible for sustaining an individual's passion, while perseverance of effort keeps the individual on track (Perez, 2015).

The personality trait of grit can help an individual to persist in hard times with self-efficacy and productivity and controls his or her behavior of consciously delaying the task (Andangsari et al., 2018). Studies have reported that grit personality brings significant impacts on procrastination. The results indicate that grittier people show lower levels of procrastination (Wolters & Hussain, 2015; Wyszynska et al., 2017). Students who procrastinate on their tasks are not because of the absence of planning or lacking the awareness of negative consequences. More likely, it is because of their low energy and willpower (Wijaya & Tori, 2018).

Procrastination, internet addiction, and grit

Substantial studies prove that both internet addiction and grit were associated with academic procrastination (Alaoui & Fons-Rosen, 2016; Reinecke et al., 2018). Findings

show that grit is negatively associated with internet addiction and mobile addiction (Maddi et al., 2013; P. C. Siah, 2016). Nonetheless, few studies have been conducted to examine the relationships among these three variables. As one can see, the findings from the above-mentioned research have suggested a possible triangular relationship among internet addiction, grit, and academic procrastination. Aiming in this direction, the main objective of the current study is to examine the connection among these three variables.

Research models and constructs

On the second research question, the research also investigates whether grit could have been serving either as a mediator or a moderator of the effects of internet addiction on procrastination. From the essentialist perspective, personality traits are biologically based and they are not susceptible to the influence of the environment (Caspi, Roberts, & Shiner, 2005). However, viewing from the contextual perspective, personality should be fluid and prone to change during developmental periods, especially at the period when one is marked undergoing rapid physical and cognitive changes, social demands, experience from life events and social environment (Caspi et al., 2005; Specht, Egloff, & Schmukle, 2011; Srivastava, John, Gosling, & Potter, 2003). The life events in this period could be specific events including marriage, first job, the birth of a child, and death of a family member (Specht et al., 2011).

A research model based on the essentialist perspective was proposed to examine the relationships among procrastination, internet addiction, and grit (see Fig 1). As mentioned, personality is difficult to be changed by a social context. Thus, it can be a moderator but not a mediator for the effects of predictors on the outcomes. In other words, the influence of social context (internet addiction) on social behavior (procrastination) would be moderated by personality (grit) from this perspective.

In this study, the participants or the group of undergraduate students have just undergone a social-environmental change of life when they left their hometowns, staying away from their parents and guardians. Eventually, they would spend much time using the Internet to cope with their problems such as academic stress and interpersonal issues (Gaultney, 2010; Hershner & Chervin, 2014; Rozental & Carlbring, 2014). Therefore, they might become a potential risk group for internet addiction (Odaci, 2011), especially they were the group of undergraduate students who were recruited from a university located in the rural area whereby not many entertainments are available for them in their daily life.

Therefore, it is assumed that undergraduate students with a lower level of grit tend to have problems with procrastination because their motivation and passion for study are easily affected by the gratification obtained from the Internet. However, internet addiction is less likely to influence the habit of procrastination among undergraduate students with higher levels of grit

since they could uphold the values generated from the grit personality they possess, embracing passion and persistence to committing their goals. They would then not be randomly distracted by the Internet. In this study, an internet addiction test proposed by Young (2004) was employed to measure the internet addiction construct. The grit-short form designed by Duckworth and Quinn (2009) was used as an assessment of grit personality. Lastly, the academic procrastination scale – a short form suggested by Yockey (2016) was applied to the benchmark level of procrastination.

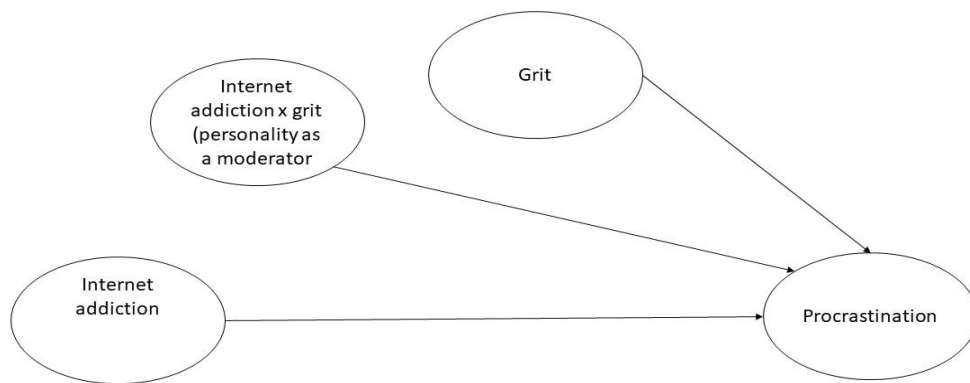


Fig 1. A research model for the moderating effects of grit personality

Nonetheless, viewing from the contextual perspective, personality is a mediator instead of a moderator for the effects of social context on social behaviors (Fig 2). The social context of the undergraduate students in this study might have increased their chances of internet dependency when they gratify their needs in a new environment. As a result, their addiction to the Internet would interfere with their persistence and commitment to the goal of their academic performance. Consequently, this internet dependency would shift them to the likelihood of procrastination. In other words, grit mediates the effects of internet addiction on procrastination.

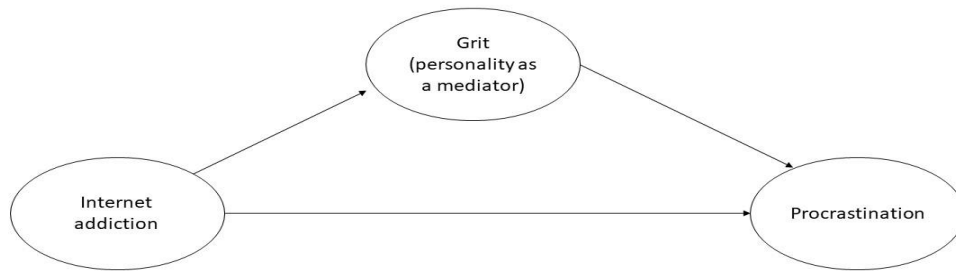


Fig 2. A research model for the mediating effects of grit personality

Aims of the study

Overall, past studies have shown the relationships between internet addiction and procrastination (Reinecke et al., 2018), grit personality and procrastination (Wolters & Hussain, 2015), and grit personality and internet addiction (Maddi et al., 2013). However, not many or none of the studies examined the triangular relationships of these three variables among undergraduate students in Malaysia. By employing essentialist and contextual perspectives on personality as a research framework, the present study thus seeks to understand the relationships among internet addiction, procrastination, and grit personality, auditing either grit mediates or moderates the effects of internet addiction on procrastination. The results of the study would provide information to educators and policy makers dealing with the problem of academic procrastination among undergraduate students. Partial Least Square Structural equation modeling is used to examine the research questions by using SmartPLS program. The hypotheses are as follows:

- H1: Internet addiction is negatively associated with grit
- H2: Internet addiction is positively associated with procrastination
- H3: Grit is negatively associated with procrastination.
- H4: Grit is a statistical mediator for the effects of internet addiction on procrastination
- H5: Grit is a statistical moderator for the effects of internet addiction on procrastination

Method

Participants

In this study, the sample consists of 430 undergraduate students with an average age of 21.23 years ($SD = 1.73$), while 61.4% of them were females and 38.6% were males. This sample size is larger than the sample size suggested by Hair et al., (2016), who pointed out that the

minimum sample size should be equal to the larger of the ten times the largest number of formative indicators used to measure one construct, in this context, 200.

Measurements

Grit-S. This scale adheres to eight items and uses a 5-point Likert scale ranging from one to five for participants to choose from. A higher score indicates that the item describes participants better (1 = “Not like me at all”; 5 = “Very much like me”). Four items (1, 3, 5, and 6) measure the consistency of interest and another four items (2, 4, 7, and 8) check the perseverance of effort. The internal consistency for this scale ranges from 0.73 to 0.83 (Duckworth & Quinn, 2009).

Internet addiction test. This scale complies with 20 items. Participants need to fill in their responses in a 6-point Likert scale, in which “does not apply” is 0, “rarely” is 1, “occasionally” is 2, “frequently” is 3, “often” is 4, and “always” is 5 (Young, 1998, 2004). The higher the total score is, the higher their level of internet addiction. The reliability of this scale is reported as 0.93 (Khazaal et al., 2008).

Academic Procrastination Scale Short Form (APS-S). There are five items on this scale. Participants were requested to give their agreement on each item by using a 5-point Likert scale, in which “agree” is 5, “slightly agree” is 4, “neutral” is 3, “slightly disagree” is 2, and “disagree” is 1. A higher score indicates a greater tendency to procrastinate on academic tasks. The internal consistency reliability for this scale is 0.87 (Yockey, 2016).

Results

Measurement Model

Construct reliability. The composite reliability of all four scales is as follows: 0.91 for internet addiction, 0.71 for the perseverance of efforts, 0.79 for consistency of interest, and 0.91 for procrastination. The composite reliability exceeded the recommended value of 0.7 (Hair Jr et al., 2016). Correspondingly, the findings suggested that the latent constructs of the four scales are acceptable.

Discriminant validity and collinearity statistics (VIF). The *Heterotrait-Monotrait ratio* was used to examine the discriminant validity of the measurements. As shown in Table 1, the discriminant validity of the measurements is acceptable as the *Heterotrait-Monotrait ratio* of all results is below the critical values of 0.85 (Henseler, Ringle, & Sarstedt, 2015). In addition, the results of VIF are all below 2. This indicates that there is no collinearity issue for the measurements (Hadi, Abdullah, & Sentosa, 2016) (see Table 2).

Table 1. Discriminant Validity of Measurements.

	Consistency	Internet Addiction	Perseverance
Consistency			
Internet Addiction	0.59		
Perseverance	0.15	0.13	
Procrastination	0.51	0.42	0.27

Table 2. Coefficient of Determination, Effect Size and Collinearity Statistics of Measurements

Dependent variable	Predictors	R ²	F ²	VIF
Consistency		0.24		
	Internet Addiction		0.32	1.00
Perseverance		0.001		
	Internet Addiction		0.001	1.00
Procrastination		0.27		
	Consistency		0.07	1.32
	Perseverance		0.07	1.01
	Internet Addiction		0.07	1.32

Structural Model

Table 3. Path Coefficients of Direct Effects

	Hypothesis	Path Coefficient	Standard Error	t-value	P Values
Internet Addiction → Consistency	H1	-0.49	0.04	13.84	<0.001
Internet Addiction → Perseverance	H1	0.01	0.07	0.03	0.978
Internet Addiction → Procrastination	H2	0.26	0.05	4.77	<0.001
Consistency → Procrastination	H3	-0.27	0.05	5.66	<0.001
Perseverance → Procrastination	H3	-0.23	0.05	4.27	<0.001

As shown in Table 3, participants who are highly addicted to the Internet have lower consistency, $p < 0.001$, but the same effect was not found between internet addiction and perseverance, $p = 0.98$. In terms of procrastination, both consistency and perseverance imposed negative effects on procrastination, $ps < 0.001$. In contrast, internet addition brought a positive effect on procrastination, $p < 0.001$.

Mediating effect. As shown in Fig 1, the results significantly showed specific indirect effects of internet addiction on procrastination through the measurement of consistency, $B = 0.13$, $SE = 0.03$, $T = 4.87$, $p < 0.001$, which was indicated as a mediating effect of consistency of interest. Since the direct effect is as well significant, it marked a complementary mediating effect of consistency of interest (Nitzl et al., 2016; Zhao, Lynch Jr, & Chen, 2010). However, the results implied non-significant specific indirect effects of internet on procrastination through

perseverance of effort, $B = 0.01$, $SE = 0.01$, $T = 0.03$, $p = 0.98$, which has suggested no mediating effect of perseverance of effort.

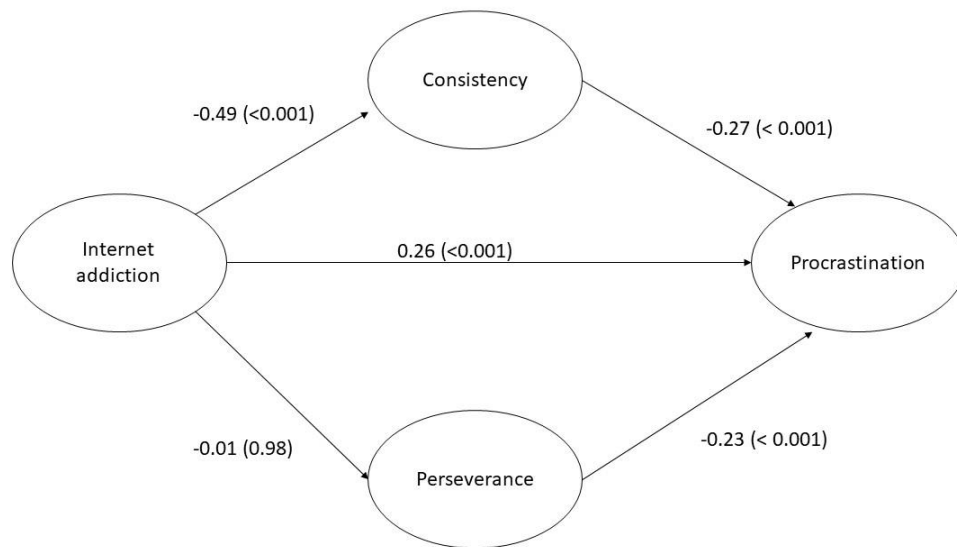


Fig 1. Path coefficients (p-values) of the mediating structural model

Moderating effect. As shown in Fig. 2, neither the interactive effect between internet addiction and consistency on procrastination ($B = 0.01$, $SE = 0.04$, $T = 0.05$, $p = 0.96$), nor that between internet addiction and perseverance on procrastination ($B = -0.04$, $SE = 0.04$, $T = 1.14$, $p = 0.25$) is significant. These results rejected the view that grit personality is a moderator for the effect of internet addiction on procrastination.

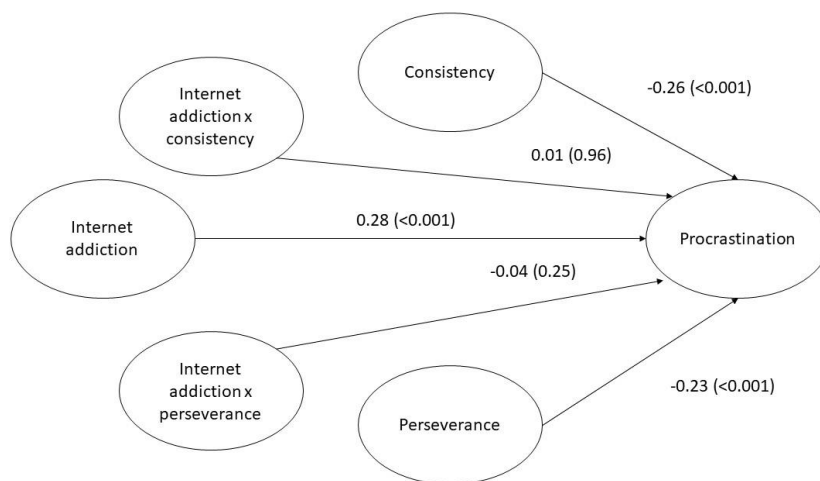


Fig 2. Path coefficients (p-values) of the moderating structure model

Discussion

A significant factor relevant to academic procrastination among undergraduate students is their level of internet addiction. Many of these young adults who have just left their homes and stayed with their peers are easily addicted to the Internet for the pleasure of getting immediate gratification (Thatcher et al., 2008). Another factor accordant to procrastination is grit personality. This is evident in one of the past studies, which concluded that grittier individuals are less likely to have the problem of procrastination (Wolters & Hussain, 2015). Nonetheless, since no study reported the relationships triangulated these three variables, the first aim of this study is to examine the connection between procrastination, grit level, and internet addiction. Furthermore, by engaging the essentialist and contextual perspectives as a research framework (Caspi et al., 2005), the second aim is to investigate whether grit personality is a mediator or a moderator for the effects of internet addiction on procrastination.

According to the findings of the first research question, as predicted, both internet addiction and grit are significant predictors of procrastination. Internet addiction is positively associated with procrastination while grit is negatively associated. These findings are not surprising as they are consistent with the analysis from other studies (Reinecke et al., 2018; Wolters & Hussain, 2015; Wszyńska et al., 2017).

However, different from previous studies, the study found that internet addiction is only negatively associated with the consistency of interest but not with the perseverance of efforts. This is parallel with the findings of research conducted by Culin et al. (2014). They suggested that internet addiction only affects passion but not the motivation factors in grit personality. Perseverance is positively associated with pursuing engagement; however, consistency is inversely related to pursuing pleasure. Nonetheless, another study conducted by Siah et al. (2018) suggested that consistency has a long-term effect on academic performance than perseverance. To simply put, consistency is found to be associated with cumulative grade point average (CGPA) while perseverance is linked with grade point average (GPA). It is expected that the motivation of study among undergraduate students who were addicted to the internet would be affected because inevitably they would lose the passion for study in the long term.

As for the second research question, the results of structural equation modeling implied that grit is a statistical mediator rather than a statistical moderator for the effects of internet addiction on procrastination. In other words, the findings reject the essentialist perspective but confirm the contextualist perspective that one's personality could be changed by the social context one dwelled in. In this study, the social context of using the Internet for a long period would change the formation and development of the participant's grit level that

causes procrastination. As mentioned in the introductory section of this research, undergraduate students are found to spend more time surfing the Internet as a way to cope with their loneliness, personal relationships, and stress (Reinecke et al., 2018). The participants of this study were recruited from a university located in a rural area whereby fewer entertainments could be found and no students' hostels were provided by the authority. This social context is, therefore, more likely to increase their time of surfing the Internet when coping with their emotional needs, especially when they were free from the monitoring of parents and dormitory supervisors. Therefore, students' passion for the study was altered by immediate gratification from the Internet and this has increased the chance of procrastination of their academic demands. To sum it up, the findings also indicate that social context is important in influencing the formation and development of personality. It is suggested that the university should set up a more positive social environment for the students, hosting more social and community activities and providing a conducive living environment to the students.

Additionally, the findings asserted that consistency is the sore statistical mediator of the effects of internet addiction on procrastination. Though perseverance is negatively associated with procrastination, internet addiction does not show any significant relations with perseverance. On the other hand, consistency is negatively associated with procrastination, and internet addiction does show significant negative relations with consistency. These findings advocated that internet addiction would only reduce the consistency of interest among undergraduate students in their academic endeavors.

Nonetheless, it can be expected that the weakening of their consistency of interest would further increase their chance of procrastination in the long term. As mentioned above, the consistency of interest is relevant to an individual's passion while perseverance of effort coexists with one's motivation (Perez, 2015). Therefore, even grittier undergraduate students would have higher motivation to persevere in their study, their passion for study might be reduced because of the pleasure of surfing the internet. In a long term, the loss of passion would affect their motivation to study and thus the problem of procrastination might become even serious. This finding has strengthened the importance of including the consistency factor in the concept of grit, though some studies suggested that perseverance is a much better predictor of performance and it should be treated as a distinct construct (Credé, Tynan, & Harms, 2017).

Overall, the main implication of this study is to highlight the importance of providing undergraduate students a supportive context so that they would be able to retain the passion and motivation to study well, and eventually, it would improve their academic performance (Tezci, Sezer, Gurgan, & Aktan, 2015). Since they are undergoing a transitional period of life and need to adjust themselves to cope with challenges faced in their academic

performance, providing them a conducive environment in the university would be essential. The students would develop a positive personality and overcome the challenges proactively if they were granted comprehensive assistance.

Therefore, to increase the self-regulation of internet usage among undergraduate students, it is recommended to promote awareness of internet usage and help them to understand the negative impacts of internet addiction through various campaigns. In addition, extracurricular activities such as community events, hobbies, and sports clubs could be other alternatives supplementary to internet surfing. Furthermore, educators and policy makers should consider the enrichment of the ecological system in the university so that undergraduate students can develop a grittier personality and eventually reduce the problem of academic procrastination in this transitional point.

In conclusion, the findings of this study clarify the relationship between internet addiction, grit personality, and procrastination, which was not examined in past studies. Moreover, the study further explores the role of grit personality playing in-between internet addiction and procrastination. Concurrently, it also highlights the importance of catering a positive and contextualized environment for the undergraduate students, providing accommodation of hostels or dormitories on the campus to avoid them from chances of engaging themselves in other entertaining activities, such as internet café and game entertainment centers. More activities should also be regulated to these undergraduate students in hopes of improving their positive personalities and developing their social life.

Nonetheless, the interpretation of this study should be cautious as the current sample is taken from a university in the rural area where fewer entertainments are available and no accommodation on campus is provided. The participants in this context are therefore more likely to spend their time on the Internet for entertainment purposes. Thus, the impacts of internet addiction on procrastination and personality might be more overt in the current sample than undergraduate students in other contexts, where accommodation is provided and more variety of entertainment is available. Therefore, the findings of the study may not be able to generalize to other universities located in urban areas with a more conducive campus environment for their students. Future studies may consider recruiting undergraduate students from different backgrounds, such as age groups, different ethnicity, and locations to examine the contextual effects on the results. In addition, a cross-sectional design was used in this study and thus the cause-effect explanation should be cautious. However, a longitudinal or successive design may be adopted in future studies. Lastly, future studies may consider conducting a qualitative study or using the focus group method to find out reasons why undergraduate students are easily distracted by the Internet.

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