THE EFFECTS OF MASTERY LEVEL, FREQUENCY OF SMARTPHONE USAGE, AND SLEEP DISTURBANCES ON LIFE SATISFACTION OF MALAYSIAN UNIVERSITY STUDENTS

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Abstract: This study aims to determine whether mastery level, frequency of smartphone usage, and sleep disturbances could influence Malaysian university students' life satisfaction. Specifically, it examines which variable has the most contribution to life satisfaction. To test the hypotheses that all predictor variables have a significant impact on life satisfaction, an online survey was distributed randomly to university students across Malaysia (N = 228). Measurement tools included the Satisfaction with Life Scale (SWLS), the Pittsburgh Sleep Quality Index (PSQI), Pearlin Mastery Scale (PMS). The answers were analysed using multiple regression analysis. The results showed small effects of mastery level and frequency of smartphone usage on life satisfaction however, sleep disturbances did not support the hypothesis. The multiple regression analysis demonstrated that mastery level has the most contribution to life satisfaction. Furthermore, this study discovered a piece of valuable information on factors that resulted in disturbed sleep which can be utilised for future research. Lastly, limitations and implications from this study and future research recommendations were also included in this paper.

Keywords: Smartphone Usage, Mastery, Sleep Disturbances, Life Satisfaction, University Students

INTRODUCTION

Life satisfaction

Satisfaction with life is considered the extent to which an individual evaluates the quality of his/her life positively (Veenhoven, 1996). It is also one of the components in subjective well-being which can be defined as cognitive evaluation in terms of mood, attachment styles, and self-

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perceived ability to adapt to one's daily life. The factors that contribute to people's life satisfaction also might vary depending on what they seek in their life. The characteristics that an individual deems personally essential in their own life are used to create subjective life satisfaction measures. Hence, one's life contentment will not be decided by a characteristic that is not personally relevant and meaningful to them.

Achieving a highly positive level of life satisfaction could be advantageous in many aspects of life. For example, people with a higher level of life satisfaction are known to have lesser long-term health conditions and better physical health (Siahpush, Spittal & Singh, 2008). Another research found that students with a higher level of life satisfaction scored favourably on studies (Antaramian, 2017). Based on the biopsychosocial approach developed by George L. Engel (1997), not only biological factors but psychological and social factors should also be considered to understand one's medical condition and wellness. To put it simply, mastery level, smartphone usage, and sleep disturbance are fit to this approach as the current study aims to examine the effects of these variables on life satisfaction.

Locus of control and mastery
People's locus of control refers to the degree to which they feel that they have control over the events that influence their lives. According to this approach, internal people believe that their behaviours and actions control their lives while external people believe that erratic events happened through interaction with the environment as beyond their control. On the other hand, mastery can be understood as control over something or someone, which is quite like the definition of locus of control by Rotter. If a person has great mastery, he or she may have a high internal locus of control in which he or she perceives that one's behaviour and action control the life.

Smartphone use
During this Covid-19 pandemic, people are not allowed to go out even for job matters or socializing causes the shift of many employees from certain industries to work from home (Amit & Karen, 2020). Educational institutions, for example, schools and universities were affected and forced to conduct classes through online platforms until now for certain countries. Therefore, higher time is consumed on a smartphone to deal with job

demands and online learning. Not to mention, the use of smartphones by students has increased during the lockdown period (Tejedor, et al., 2020), thus disrupts the students' health. This means that uncontrolled smartphone use might probably impact students' life satisfaction because several aspects of their lives are negatively influenced.

Sleep disturbances

Sleep is known to be a complex phenomenon. It serves a vital function to the human body and mind. However, humans may suffer from several sleep disturbances ranging from lifestyle and environmental aspects to sleep disorders and other medical conditions. It is also perceived as one of the symptoms of sleep disorders that comprises a wide range of clinical demonstrations which include a diversity of emotional, behavioural, and physiological abnormalities (Riley, 1985). As a matter of fact, sleep disturbances may lead to other hassles. For instance, reduced psychosocial health and academic performance, reduced quality of life, and increased stress susceptibility (Medic, Willie & Hamels, 2017). It can therefore be said that individuals' life is impacted in various aspects due to sleep disruptions.

Self-Determination Theory

Based on this theory, people are motivated to grow and change by three core psychological needs which are autonomy, competence, and relatedness (Deci & Ryan, 1985). This theory explains the motivation behind choices people make without any external interference. Motivation is a state of mind or energy that propels an individual to pursue self-centred or directed goals within a company (Sundjoto, 2017). Autonomy can be defined as people's desire to feel in control of their behaviours and goals which will result in helping people feel self-determined. Moreover, competence is a need in which people seek mastery of tasks and control the outcome (White, 1959) while relatedness is a need in which people experience a sense of connection and caring for others (Baumeister & Leary, 1995).

As the theory stresses the importance of the needs, it distinguishes between intrinsic and extrinsic motivations and their consequences. Intrinsic motivation is the innate drive to gain new possibilities or seek challenges (e.g. learn a new language, participate in hiking club) because one will get

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personal satisfaction from it whereas extrinsic motivation is something an individual does to gain external rewards (e.g. salary, awards).

Intrinsic motivation can be enhanced by a feeling of competence due to feedback on work or rewards. Deci discovered that positive feedback enhanced human's intrinsic motivation while negative feedback weakened it (1975). Behaviours of extrinsically motivated can be integrated into oneself by internalization. This process is highly likely to happen when there is a sense of competence satisfaction and autonomy satisfaction (Vansteenkiste, Ryan, & Soenens, 2020).

By logical thinking, when an individual has an internal locus of control, the person would be easier to perform a behaviour based on the inner drive which eventually produces high satisfaction. A study supported this statement which internal employees are more motivated compared to external employees (Kamdron, 2015) because they can feel less dependent and more in charge of the demands of the workplace. It might be that internals have the willingness to work depending on their needs may be understood as fundamental of self-motivation which acts as an inner drive to achieve satisfaction from what they do.

Problem Statement

Mastery and life satisfaction
The concept of mastery can be explained as the extent to which people feel to be in control of the significant events in their life. Does having great control over their life make a difference from those who have lesser control in terms of satisfaction with life? A Turkish study found that male college students have the highest mastery level compared to other groups because they are mostly affected by the university environment which makes them autonomous (Yetim, 2003). The finding clearly showed the environmental factors affect their autonomy to become independent in their lives and it is interrelated with a high level of life satisfaction. Therefore, the current study aims to investigate whether a high level of mastery does make people achieve a high level of life satisfaction or the other way around.

Smartphone use, mastery, and life satisfaction
The association of smartphone usage among college students should consider with their life satisfaction. Smartphone serves several functions

depending on the users. According to Park, Kim, Shon, and Shim (2013), motivations for smartphone use and mastery are the factors affecting smartphone use. Considering that both motivations (social inclusion and instrumental use) would more likely to increase their time spent on a smartphone, their mastery also should be taken into account. It could be that if students can manage their time using smartphones wisely, they are more likely to be internal. Hence, this study is keen to identify at which level of frequency of smartphone use and which level of mastery should be considered to achieve good life satisfaction.

Sleep disturbances and life satisfaction
There are numerous reasons why people do not get good sleep. This factor could lead to shorter sleep times. Other external factor, such as the condition of the place they sleep and internal factors such as one's thoughts and feelings might probably impact their sleep. Consequently, these factors could lead to shorter sleep time and their psychological well-being is negatively affected. Thus, the correlation raises the question of whether or not students need to fix their disturbed sleep-in order to obtain a high level of life satisfaction.

Research Question
- Among all predictor variables, which one has the highest impact on Malaysian university students' level of life satisfaction?
- Which level of mastery could result in a high level of life satisfaction?
- Does high frequency of smartphone usage influence Malaysian university students' life satisfaction?
- Does a high level of sleep disturbances impact Malaysian university student's life satisfaction?
- What are the factors that influence Malaysian university students' sleep?

Objectives
The aim of this study is first, to examine whether mastery level, frequency of smartphone usage, and sleep disturbances have any impacts on the life satisfaction of Malaysian university students. This study also intends to determine which variable contributes the highest on life satisfaction as well as to identify what other factors that contribute to trouble sleeping aside from the given options.

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Literature Review

Life satisfaction

Life satisfaction has been reviewed by many scholars from different angles. Several studies reported that university students showed satisfaction with college life has positively impacted their life satisfaction (Arslan & Akkas, 2014; Sirgy et al., 2010). From these studies, it was proven that social context (satisfaction with college life) is as important as other facets in life that can contribute to overall life satisfaction. Apart from that, Bailey and colleagues (2007) claimed that an individual's mood and attitude have a significant impact on their perception of their life satisfaction which hope, and optimism are two correlating emotions that may influence the way people perceive their lives.

Furthermore, Sam (1998) claimed mastery and cultural context also plays an important part in influencing one's level of life satisfaction which Chilean adolescents from immigrant families were discovered to be the most satisfied with their lives compared to Vietnamese (Sam, 1998). In another study by Aboalshamat, Alsiyud and Al-Sayed (2018), showed that the relationship between life satisfaction and resilience are positively related among private college students in Jeddah, Saudi Arabia.

Other facets that contribute to life satisfaction level in life are income, religion, and health. Research revealed that both income and religious belief were positively predicted life satisfaction (Plouffe & Tremblay, 2017). Wealthier and more religious people reported higher life satisfaction levels than less wealthy and less religious individuals. On top of that, another research discovered that a higher level of life satisfaction is associated with various positive health and well-being outcomes such as mortality, physical functioning limitations, and sleep problem onset (University of British Columbia, 2021).

Life satisfaction, mastery level, and smartphone use

As expected, many facets of life might contribute to a low or high level of life satisfaction. Some of it is the level of mastery a person holds in certain situations as well as the prevalence of smartphone use in a particular period. Research on self-control skills and satisfaction of psychological needs found that greater satisfaction in school increases the ststudent'serceived ability to exert self-control skills (Orkibi & Ronen,

2017). Based on the self-determination theory, this past study recognized that competence had the strongest link with school satisfaction. Another research by Lepp, Barkley and Karpinski (2014) identified that students with a higher frequency of smartphone usage are inclined to have lower satisfaction with life compared to their friends who use their smartphones less often. In support of the prior research, other research from Li et al. (2015) proposed that internal people should be able to control their smartphone use in situations where it is appropriate to do so while external people, on the other hand, have greater difficulty controlling their use. Their study has supported the expectations which externals have less control over their smartphone use and hence are more susceptible to negative outcomes (e.g. poor sleep quality and subjective well-being due to excessive use).

Sleep disturbances and life satisfaction
Many kinds of research have been conducted to prove the interrelation of human sleep and life satisfaction. For example, Lacruz et al. (2016) found that the samples reporting lower life satisfaction encountered an increased prevalence of suffering from sleep disturbances compared with samples reporting higher life satisfaction. A similar finding from Howell and Sweeny (2019) showed that students with lower satisfaction of all three needs (competence, relatedness, and autonomy) were associated with greater sleep disruption.

A piece of evidence from a study by Campbell et al. (2015) which apply the self-determination theory perspective discovered that one of the poor sleep quality facets is sleep disturbance has negative relation with psychological need satisfaction. Undoubtedly, they explain that individuals with satisfying psychological needs are less likely to have worries when falling asleep and more likely to encounter positive thoughts. To add, sleep disturbances have a detrimental influence on the life satisfaction of older adults (Kim & Ko, 2018) as well as adolescents (Medic, Wille & Hemels, 2017).

In contrast, Shin and Kim (2018) discovered that people who get enough sleep are more satisfied with life. In older adults, a stronger sense of meaning in life is linked to improved sleep quality, protect against sleep apnea and restless leg syndrome symptoms (Turner, Smith & Ong, 2017). Additionally, fear and anxiety of COVID-19 were shown to be

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substantially linked to psychological suffering, sleep disturbance, and life
satisfaction among Vietnamese university students (Duong, 2021).

Conceptual Framework

"The effects of mastery level, frequency of smartphone usage, and sleep
disturbance on life satisfaction of Malaysian university students" has been
selected to be the topic of this study. Based on this topic, the independent
variables in this study are "mastery level", "frequency of smartphone
usage", and "sleep disturbances" while the dependent variable is "life
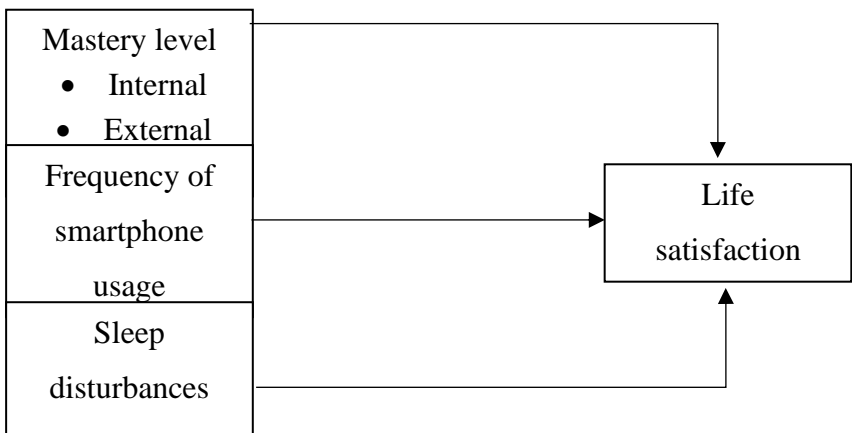satisfaction".

Figure 1: Conceptual framework.

Hypothesis

Ha.1: Mastery level has a significant impact on the life satisfaction of
Malaysian university students.
Ha.2: Frequency of smartphone usage has a significant impact on the life
satisfaction of Malaysian university students.
Ha.3: Sleep disturbances have a significant impact on the life satisfaction
of Malaysian university students.

METHODOLOGY

Research Design

To satisfy the objectives of the study, quantitative research was selected. This study aims to examine Malaysian university students. The technique in choosing the respondents is random sampling through the survey method. The data is collected through several instruments compiled into one set of a self-report online questionnaire (Google Form).

Respondents and Location

The respondents of this study are Malaysian university students enrolled in a college or university whether from public or private institutions. This study does not restrict to only one category of student, which the respondents may be undergraduates or graduates. Also, this study chose Malaysia as the location of the research.

Instruments

The survey was constructed of five separate parts: (1) demographic information, (2) the Pearlin Mastery Scale (PMS), (3) the frequency of smartphone usage, (4) the Pittsburgh Sleep Quality Index (PSQI), and (5) Satisfaction with Life Scale (SWLS).

Part A: Demographic Information

This part acquires information of respondents' demographic information comprised of questions about sex, age, ethnicity, type of university (e.g. public and private), and state of the respondents.

Part B: Mastery Level

In this part, this study evaluates the students' mastery level by using Pearlin Mastery Scale (PMS) (Pearlin &Schooler, 1978). Respondents are asked to rate how much they agree or disagree with self-descriptive sentences. The 6-item scale comprises five negatively worded items (e.g. "I have little control over the things that happen to me") and one positively worded item (e.g. "What happens to me in the future mostly depends on me"). The scale also uses a 4-point Likert scale from strongly disagree to strongly agree. The PMS score demonstrated good internal consistency (Cronbach's α = .86) in the study by Chen et al. (2013).

Part C: Smartphone Usage Frequency

With the aim of assessing the students' frequency of smartphone usage, a single item is used which was adapted from Li et al., (2015). The item used to measure the total daily smartphone use that consists of two questions.

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The first item is "As accurately as possible, please estimate the total amount of time you spend using your mobile phone each day. Please consider all users except listening to music. For instance, consider calling, texting, Facebook, e-mail, sending photos, gaming, surfing the Internet, watching videos, and all other uses driven by apps and software". Respondents were then required to fill in a blank for total hours of smartphone usage per day. The greater number of hours shows a higher frequency of smartphone usage. The second question is "At what time in a day do you spend the most time using your smartphone?". The possible choice of answers is morning, afternoon, evening, and night.

Part D: Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse and friends (1989) which used to measure sleep quality over the past month. This scale is a 19-item self-report that consisted of seven subscales that measure different aspects related to sleep quality. However, only one subscale is used in the current study which is sleep disturbance aspect (e.g. "During the past month, how often have you had trouble sleeping because you have bad dreams"). The scoring for this subscale is ranging from 0 to 3 (0 = not during the past month, 1 = less than once a week, 2 = once or twice a week, 3 = three or more times a week). The global PSQI score displayed strong internal consistency (Cronbach's α = .83).

Part E: Satisfaction with Life

The Satisfaction with Life Scale was established by Diener, Emmons, Larsen, and Griffin (1985). This 5-item scale is designed to measure global cognitive judgements of one's life satisfaction (e.g. "I am satisfied with my life"). By answering to this scale, respondents indicate how much they agree or disagree with each of the 5 items using a 7-point Likert scale (ranging from strongly disagree to strongly agree). The past study proved that the SWLS has strong internal consistency (Cronbach's α = .87) and good test-retest reliability (r = .82) (Lepp et al., 2014; Taş & İskender, 2017 & Siahpush et al., 2008).

Research Procedure

Before the study is carried out, the data collected for this study is categorized into two, primary and secondary data. The primary data is the first-hand data collected by the researcher whereas the secondary data is the findings collected by past researchers.

In the first instance, the self-report questionnaire was distributed through a Google form link via online platforms (e.g. WhatsApp, Twitter). The instructions for each part of the questionnaire were briefly explained in every section as well as the informed consent form.

Next, the secondary data is gathered by exploring and reading related information or literature review to this topic by assessing from several sources e.g. journals, research articles, and books. Finally, both data are combined to achieve the results of the study.

Data Analysis
The IBM Statistical Package for the Social Sciences software (SPSS V. 26) was used to quantify descriptive statistics for the demographic profile of respondents and to perform correlation analysis in order to assess relationships for all variables preceding evaluating the hypothesis by using correlation coefficient and multiple regression analysis.

The reliability of the instruments was verified using internal consistency with Cronbach's alpha. Construct validity of the instruments was evaluated by correlating the SWLS with the PMS, and the PSQI. It was predicted that scores on the SWLS will significantly and positively correlate with the scores on the PMS for convergent validity and it was expected that scores on the SWLS for discriminant validity to have a low correlation.

Reliability and Validity
Table 1 shows the reliability and validity of scales used in this research. The data were collected from 228 Malaysian university students and the reliability of PMS, PSQI and SWLS were analysed using Cronbach's α.
The overall Cronbach's α for PMS is .656, PSQI is .780 and SWLS is .849 (see Table 1). The results demonstrate that PMS and PSQI scales have moderate reliability and SWLS has good reliability.
The convergent validity correlates the SWLS score and PMS score which the results found the significant correlation is low ($r = .401$, $p < .05$). Discriminant validity was tested by correlating the PSQI score with both the PMS and SWLS scores. The results indicate that both scores of PMS ($r = -.253$) and SWLS ($r = -.123$) have negative and low correlations with scores of PSQI however, SWLS score has a non-significant correlation with PSQI score.

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Table 1: Reliability and Construct Validity of PMS, PSQI, and SWLS
Scales

Scales	1	2	3	Cronbach's α
1. PMS	1			.656
2. PSQI[a]	-.253[**]	1		.780
3. SWLS	.315[**]	-.123	1	.849

Note. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05
level (2-tailed).

a. only for sleep disturbances dimension.

RESULTS

Demographic Profile Characteristics

Descriptive statistics for the demographic profile characteristics were
illustrated in Table 2. Of the 228 participants, most of them are female
(80.7%). Also, most of the participants were between the age of 19 and 28
(95.6%). Since nearly all university students in Malaysia enrol at the age
of 19 to 28, the percentage of participants aged more than 28 years old was
just 4.4%. The survey was majorly answered by Malay students (81.1%).
As the survey was distributed nationwide, most of the data were collected
from Johor (24.1%) and Selangor (20.6%).

Table 2: Demographic Characteristics of Participants

Characteristics		Frequency	Percentage	Mean	Std. Deviation
Gender	Male	44	19.3	1.81	.396
	Female	184	80.7		
Age	From 19 to 28 years old	218	95.6	22.7105	4.00159
	From 29 to 38 years old	6	2.6		
	From 39 to 48 years old	2	0.9		
	Over 48 years old	2	0.9		
Ethnic	Malay	185	81.1	1.4737	1.03856
	Chinese	7	3.1		
	Indian	7	3.1		
	Others	29	12.7		

States	Kuala Lumpur	8	3.5	8.8509	4.37903
	Putrajaya	2	0.9		
	Labuan	2	0.9		
	Johor	55	24.1		
	Melaka	3	1.3		
	Negeri Sembilan	7	3.1		
	Perak	8	3.5		
	Pahang	12	5.3		
	Selangor	47	20.6		
	Kedah	10	4.4		
	Kelantan	7	3.1		
	Pulau Pinang	9	3.9		
	Terengganu	15	6.6		
	Sabah	35	15.4		
	Sarawak	8	3.5		
Time most spent on smartphone	Morning	17	7.5		
	Afternoon	25	11.0		
	Evening	33	14.5		
	Night	153	67.1		

Note. $N = 228$

The descriptive statistics for each study variable were calculated using the built-in data analysis tool; the results are shown in Table 3. The average score for life satisfaction was 21.36 (SD = 5.86). Based on the cut-off value, the participants have a slightly satisfying life. The mean for the predictor variables' mastery level was 15.78 (SD = 3.10). The results demonstrated that on average, students use their smartphones for 8.64 hours a day (SD = 4.32), and sleep disturbances was 7.66 (SD = 5.07). Accordingly, 67.1% of participants use their smartphones during the night and the rest in the evening (14.5%), afternoon (11.0%) and morning (7.5%) correspondingly.

Table 3: Summary of Survey Variables

	Minimum	Maximum	Mean	Std. Deviation
Life Satisfaction	5.00	35.00	21.36	5.86
Mastery Level	8.00	23.00	15.78	3.10
Smartphone Frequency	2.00	24.00	8.46	4.32
Sleep Disturbances	.00	24.00	7.66	5.07

Note. N = 228

Before validating the model, a Pearson's correlation analysis was conducted on the study variables. The results of the correlation analysis between variables are shown in Table 4. In general, a correlation coefficient of $p < .05$ implies that it is statistically significant. Life satisfaction was significantly correlated to mastery level ($r = .315$, $p < .01$) and smartphone frequency ($r = -.173$, $p < .01$). The analysis also found a

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significant correlation between mastery level and sleep disturbance ($r = -.253$, $p < .01$). Nonetheless, several correlations were found to be statistically non-significant. The first correlation was between life satisfaction and sleep disturbance ($r = -.123$, $p = .064$) and second was the correlation between smartphone frequency and mastery level ($r = .028$, $p = .679$) and sleep disturbance ($r = .035$, $p = .595$).

Table 4: Pearson's Correlations Between Study Variables

	1	2	3	4
1. Life Satisfaction	-	.315**	-.173**	-.123
2. Mastery Level		-	.028	-.253**
3. Smartphone Frequency			-	.035
4. Sleep Disturbances				-

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

Table 5 shows the multiple regression analysis of mastery level, frequency of smartphone usage, and sleep disturbances on satisfaction with life among Malaysian university students. The adjusted R^2 value of .122 revealed that the predictors explained a 12.2% variance in the outcome variable with $F(3, 224) = 11.503$, $p < .001$. The findings revealed that mastery level positively predicted satisfaction with life ($\beta = .31$, $p < .001$), lending support for the first hypothesis. With a 1% increase in the mastery level, the satisfaction with life will increase by 0.587% (B value). The frequency of smartphone usage also has a significant but negative effect on satisfaction with life ($\beta = -.18$, $p < .05$), confirming the second hypothesis. With a 1% increase in the smartphone frequency, the satisfaction with life will decrease by 0.245%. On the other hand, there is no significant change in satisfaction with life due to sleep disturbances ($\beta = -.03$, $p > .05$). Unexpectedly, this result did not support the third hypothesis, which sleep disturbances has a significant relationship with life satisfaction. With a 1% increase in sleep disturbances, the satisfaction with life will decrease by 0.044%. Based on the multiple regression analysis, showed that mastery level has the strongest contribution to the outcome variable compared to the other predictors. The alternative hypotheses are accepted except for predictor sleep disturbances.

Table 5: Regression Coefficients of Mastery Level, Smartphone
Frequency and Sleep Disturbances on Satisfaction with Life

						95% CI for B	
Variables	B	SE	β	t	p	LB	UB
Constant	14.509	2.253		6.441	.000	10.070	18.948

Mastery	.587	.122	.310	4.822	.000	.347	.827
Smartphone Frequency	-.245	.085	-.180	-2.891	.004	-.411	-.078
Sleep Disturbances	-.044	.074	-.038	-.590	.556	-.191	.103

Note. R^2_{adj} = .122. $F = (3, 224)$. $p < .001$

Table 6: Data Analysis from Open-ended Question in Sleep Disturbances Variable

Variable	Category	Frequency
Sleep disturbances	Psychological issues	29
	Study issues	14
	Irregular sleep schedule	11
	Physical pain	7
	Electronic devices	6
	Have other roles than student	1

On the PSQI scale, an open-ended question aimed to identify other factors that disturb participants' sleep ("During the past month, how often have you had trouble sleeping because of other reasons stated before?"). To answer one of the research questions, this data obtained various answers from the open-ended question. The findings revealed that some of the answers could be classified into some categories and it was finalized 6 prominent categories need to be highlighted (see Table 6). The most-reported answers were psychological issues (e.g. insomnia, overthink, anxiety, sleep paralysis) with the frequency of 29 followed by study issues (e.g. assignments, examination) with the frequency of 14, irregular sleep schedule (n = 11), physical pain (n = 7), electronic devices (n = 6), and have another role than the student (n = 1) respectively.

DISCUSSION
The purpose of this study was to examine the effects of mastery level, frequency of smartphone usage, and sleep disturbances on satisfaction with life. Therefore, in this chapter, the discussion below described how the current study could answer every research question stated earlier on in chapter one.

Research question 1: Among mastery level, frequency of smartphone use, and sleep disturbance, which one has the highest impact on Malaysian university students' level of life satisfaction?
The multiple regression analysis showed that among all predictor variables, mastery level has the highest impact on Malaysian university students' level of satisfaction. In other words, mastery level was positively

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predicted students' life satisfaction. This result was in line with previous studies which claimed that mastery level is one of the facets in determining the level of life satisfaction (Yetim, 2003; Orkibi & Ronen, 2017; Bhamu et al., 2018).

Compared to the other predictor variables, mastery level is said to be the most contributing factor in determining one's level of life satisfaction is because the mastery skills cover several aspects of life. Mastery skills can be utilized in different kinds of circumstances that need individuals to be in control of their own life. For instance, determining a career path for oneself, participating in desired tasks, and finding a suitable partner. Having a sense of control over one own's life undeniably affects how the person perceives their life especially the decision made is for their entire life. Even though the situation is temporary, it still could affect their judgement on life satisfaction at that moment.

Research question 2: Which level of mastery could result in a high level of life satisfaction?
The finding suggested that those with a higher level of internal control showed a higher level of life satisfaction. Though the mastery level has a weak impact on life satisfaction, the finding was in line with the hypothesis, which significantly impacted the outcome variable. A study conducted among Indian college students demonstrated that internal locus of control is highly associated with life satisfaction (Bhamu et al., 2018) which infers that those who believe they have control over their lives experience satisfying life, which contributes to the formation of a productive, happier, and healthier living in the future. The finding fits with the self-determination theory i.e. people are motivated to change by autonomous facet. This idea may also explain the contribution of mastery level on life satisfaction among university students because it would be easier for participants to do certain activities that rely on their inner drive, which would result in greater satisfaction from the action completed.

The competence facet also managed to explain how an individual experiences mastery. People are more inclined to perform particular activities that will help them accomplish their goals if they believe they have the required skills. Sense of competence in oneself gives insight that fulfilling one of the psychological needs links with experiencing satisfaction with life. A study found a significantly positive relationship

between satisfaction with life and level of social skills (Malinauskas et al., 2014). The study described social skills as one of the most vital measures of a person's social competence. Given these points, clearly prove that students with a higher level of mastery or can be inferred as internal locus of control experience a higher level of satisfaction with life in support with autonomy and competence facets of self-determination theory compared to students who are externally oriented.

Research question 3: Does the high frequency of smartphone usage influence Malaysian university students' life satisfaction?
Apart from that, the frequency of smartphone usage showed a significant yet weak effect on the participants' life satisfaction. The results revealed that mean of total hour spent using smartphones per day is quite high (8.46 hours). Compared to past research, students were reported to spend approximately 4.6 hours a day using their smartphones (Lepp et al., 2014). It can be summarized that the sample in the current study has a higher frequency of smartphone usage compared to previous researches.

Most of the activities included in the question of smartphone use comprisonline-baseded activities such as surfing the internet, Facebook, e-mail, as well as other uses driven by applications. Online applications nowadays are mainly for connecting with friends and to stay keeping up with the most recent news especially during the COVID-19 pandemic. All information (e.g. daily updates of COVID-19 and mental health issues) simply can be accessed through numerous online platforms hence, the reason why the frequency of smartphone usage is high among participants during this pandemic.

As humans, to stay socially connect with others means to satisfy the instinctive need yet the stay-at-home order in some way has become one of the barriers for humans to achieve the need. Based on self-determination theory, relatedness is one of the psychological needs that is essential for psychological well-being. Relatedness in the context of leisure activities appeared to be the most significant psychological need for adolescents' life satisfaction (Leversen et al., 2012). As being socially distant, physical activities turn out to be prohibited hence, online platforms are the only ways people could use to substitute those activities.

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Excessive smartphone use in the long term would probably contribute to smartphone addiction. The current finding seems to be consistent with past research which proved that smartphone addiction has a statistically significant negative relationship with life satisfaction (Kula, Ayhan & Soyer, 2020). Therefore, this study answered the research question as well as supporting the hypothesis which students with a higher level of frequency of smartphone usage would have a lower level of life satisfaction and the other way around.

Research question 4: Does a high level of sleep disturbances impact Malaysian university student's life satisfaction?
The current findings showed that sleep disturbances were unable to prove its contribution to students' life satisfaction thus, rejected the alternative hypothesis which students with a higher level of sleep disturbances would likely experience a lower level of life satisfaction. The data might give some conception on why sleep disturbances could not affect one's life satisfaction. One reason might be that the list of answers specified in the questionnaire is solely based on physical conditions (e.g. feel too hot/cold, cannot breathe comfortably, get up to use the bathroom, etc) when in fact, the disturbances might be in different kind of aspects e.g. psychological conditions, health problems, and chronic medical conditions (Ford & Kamerow, 1989). The current study also inferred that disrupted sleep might be because of environmental temperature that is too cold or too hot, which can be somewhat uncomfortable for some people who is sensitive to temperature changes. Based on these lists of disturbances, the study concluded that such disturbances could not strongly influence students' life satisfaction. This is because, for a person to feel satisfied with his or her life, these kinds of disturbances somewhat failed to significantly impact their perception of life satisfaction.

Most of the previous studies proved that sleep disturbances would significantly influence an individual's life satisfaction level (Campbell et al., 2015; Lacruz et al., 2016; Kim & Ko, 2018). However, there was one outstanding research that could support the current finding, which sleep disturbances does not correlate with life satisfaction (Duong, 2021). This infers that sleep disturbances perhaps could not be one of the important aspects that determine how one's perceived life satisfaction. Even so, disrupted sleep would result in adverse impacts on one's health in terms of physical and psychological.

Long term adverse effects of sleep disturbances would highly likely influence students' health conditions. Generally, sleep acts as a period for a human to recharge and gain energy. An individual with good sleep would probably result in proper daily functioning. As sleep disturbances is one of the dimensions of sleep quality, it can be deduced that sleep disturbances would highly likely affect one's sleep quality. Hence, one could not properly function if his or her sleep quality is low.

On the other hand, a research found that reduced quality of life, stress responsivity, cognitive and performance deficits and emotional distress are the short-term consequences of sleep disruption (Medic et al., 2017). This explains that disrupted sleep can impact how an individual's tendency to respond to a stressor. Being university students during this pandemic might be more challenging for them to cope with the new norms i.e. adapt to new norms causes stress thus lead to disrupted sleep. According to a study, due to the instability of the circadian clock, many college students' sleep health has been severely damaged (Smit et al., 2021).

To sum up, though the current finding failed to provide a definite answer whether a high level of sleep disturbances would impact university students' life satisfaction, a detailed explanation has been discussed on why this predictor variable might have serious consequences on health. Eventually, their life satisfaction is at stake due to poor health conditions.

Research question 5: What are the factors that influence Malaysian university students' sleep?
Regardless of the noticeable factors stated in the items of the PSQI scale, a single open-ended question has provided numerous responses of other factors that might trouble participants' sleep. Those responses have been categorized into several categories for better comprehension.

Firstly, the category of the psychological issue has the highest frequency among the participants in which this category comprises abnormal thoughts and feelings i.e. the participants tend to overthink and feeling anxious and worry which hinder them from getting an adequate amount of sleep. Additionally, the survey found interesting data in which the participants reported suffering from insomnia, obsessive compulsive disorder (OCD), sleep paralysis, as well as hear a voice calling. All these reasons could be considered as serious sleep disturbances. People suffering

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from stress, anxiety, and insomnia regularly encounter intrusive and frantic thoughts that make it more difficult to sleep than any physical discomfort or pain (Harvey, 2001; Espie, 2006).

Next, most of them reported to encounter study issues which the assignments and examinations cause them to sleep less. One of the participants said texting friends for assignments late at night became one factor that disturbed her sleep. A study among nursing students in Jordan revealed they experienced sleep disturbances despite from any majors (Suleiman et al., 2013). Moreover, academic demand could be a hassle for students to keep up with their studies. Most of the participants who reported that the academic workload disturbed their sleep also experienced stress as they have to accomplish all those work in the given time. A study among undergraduate students of Universiti Putra Malaysia found that stress is significantly linked to academic achievement (Elias et al., 2011). Subsequently, some participants mentioned online learning disturb their sleep.

Due to the COVID-19 pandemic, some of the participants could not adapt to the online learning style. Undoubtedly, online learning gave a major turnover not only for educators but also for students. As a consequence, those who could not adapt to online learning have difficulty in understanding and spending extra time for studies which eventually contribute to sleep deprivation. Moreover, irregular sleep schedule has become one factor that causes sleep disturbances among university students (n = 11) which is associated with disturbed circadian rhythm. The recommended duration of sleep for adults is between 7 to 9 hours per night (Hirshkowitz et al., 2015). This factor describes that sleep can be either excessive or lack of sleep time, sleep during the day and wake up at night (Kang & Chen, 2009), or because of stimulants (Daniello, Fievisohn & Gregory, 2012).

Besides, some of the participants reported they experienced sleep disturbances because of physical pain e.g. headaches, sore eyes, and side effects of the AstraZeneca vaccine injection. A research found a bidirectional relationship between headaches and sleep disturbances (Fernández-De-Las-Peñas et al., 2018) meaning that increased risk of headaches reported higher sleep disturbances and vice versa. According to

National Health Service (2021), the common side effects of vaccines include sore arm, headache, feeling tired and achy.

Another notable response is having another role than being only a university student, which is the role of a mother Having dual roles could be challenging especially infants that require special care and full-time attention from the parents. This statement is supported by Taukeni (2014) who found that student-mothers encountered difficulty managing time for studying and parenting roles.

All in all, this finding managed to note several factors of sleep disturbances based on a single open-ended question. The responses have provided adequate information on how these factors could be considered as negative disturbances.

CONCLUSION

According to Diener (1985), life satisfaction is a global evaluation of one's quality of life at a certain point in time or simply put refers to what people feel about their life in general. Being satisfied with life takes a robust measure of one's well-being which is linked with better health physically and mentally, stronger social connections, and accomplish life goals. Indeed, this study took into account biopsychosocial aspects in order to determine its influence on one's life satisfaction. Therefore, this study emphasizes mastery level, frequency of smartphone use, and sleep disturbances as the aspects that could determine one's satisfaction with life.

The correlation analysis revealed three relationships were found to be statistically significant i.e. life satisfaction-sleep disturbances, mastery level-smartphone frequency use, and smartphone frequency use-sleep disturbances. Among three predictor variables, mastery level has the highest contribution to determining students' life satisfaction. However, only sleep disturbances have a non-significant relationship with life satisfaction.

Implication of the Study

The data contributes to a clearer understanding of mastery level as one of the predictors of students' life satisfaction. The findings are consistent with previous research (Bhamu et al., 2018; Sundjoto, 2017; Ponto, 1999)

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which postulate internals have higher satisfaction in their lives compared to externals.

The previous research may examine how sleep quality levels affect life satisfaction however, in this study, the sleep disturbances dimension was specifically observed. Regardless that sleep disturbances have no significant relationship with life satisfaction unlike the previous research (Campbell et al., 2015; Kim & Ko, 2018; Ness & Saksvik-Lehouillier, 2018), surprisingly, this issue should be emphasized more because the data gained several responses that demonstrate the disturbances are not only from superficial factors, but it is much deeper than that i.e. social context, physiological and psychological issues should be taken into account in apprehending sleep disturbances.

A study by Kaya, Bostanci Daştan and Durar (2020) only observed the general duration of smartphone use but the current study aimed to add the prevalence of smartphone usage occurs the longest in a day. The descriptive data showed that more than half of the participants spent time on their smartphones at night. This information might help future research to find out whether different periods spent on smartphones would affect one's daily functioning, health and satisfaction with life.

Based on the findings, the correlation between sleep disturbances and life satisfaction was found to be contradicted by other studies. The current data showed to be statistically insignificant, and the sleep disturbances variable failed to prove its contribution to university students' life satisfaction. The study hypothesized that other factors could be the reasons why this relationship was non-significant.

The study chose self-determination theory to aid in discussing in-depth knowledge regarding the effects of mastery level, frequency of smartphone use, and sleep disturbances on life satisfaction among Malaysian university students. The findings seem to support the chosen theory which self-motivation acts as an inner drive for internal oriented students to gain satisfaction. Additionally, autonomy and competence facets of this theory managed to explain how both facets can contribute to a higher mastery level which eventually leads to a higher level of life satisfaction. The relatedness facet also managed to explain the rise of frequency of smartphone usage amid the pandemic to fulfil social needs.

Limitations of the Study

While this study has provided additional findings, there were limitations to discuss. First, although the generalizability is applied, the university students were from nationwide, the sample size is considered small (n = 228) hence, it was difficult to find a strong correlation and prediction towards the outcome variable from the data. Even though the previous study has mentioned the restriction to generalize due to the sample collected only from a specific university, the current study failed to include one important question, type of university enrolled, to the participants. By asking this question in the survey, the study might get a new insight into whether there is a difference between how university students from public and private perceive their level of life satisfaction.

Next, as methodological problems, the current study used a single item to measure the frequency of smartphone usage. The use of smartphones is becoming essential nowadays, thereby social influences might play a role in smartphone usage. Therefore, a thorough examination i.e. more questions on what causes participants to spend more time using smartphones such as social norms might provide detailed explanations for the use of smartphones. The item used in the sleep disturbances variable only consists of noticeable disturbances and there was only one item that examines other reasons participants had trouble sleeping. Thus, further accounts on how it could happen should have been asked in the survey.

Recommendations for Further Studies

Several recommendations for future research are as follows. First, future research could address the limitations of the current study by including required questions in the survey for further understanding and gain in-depth knowledge on every variable examined. By including the type of university students enrol in, future research might distinguish any variation or similarity between those types. Indeed, generalizability is achieved.

Second, expand the framework that has been made in the current study. As the current study only examines the effects of predictor variables on the outcome variable, a better insight could be obtained by expanding the framework. Probably the predictor variables themselves can be influential

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towards each other. To add, broaden the theory for the study might help to explain the findings better.

Third, as the result revealed that sleep disturbances has no significant effect on life satisfaction, future research might reassess the research problem. By identifying what would cause the insignificant effect, the factors would be a piece of valuable knowledge for researchers to construct any interventions that can help students overcome their troubled sleep, hence acquire better sleep quality.

By way of conclusion, this chapter has summarized the findings and how this study might be important for further research. Nevertheless, several limitations have been distinguished that were beyond the researcher's control and influenced the interpretation of the findings from the current study. To overcome those limitations, some recommendations were issued to aid as well as expand future research.

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