Bedtime Smart Phone Usage and its Effect on Student's Academic Performance

BY

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It is hereby certified that ***Ting Zhe Wei*** (ID No: ***18ACB04279)*** has completed this final year project entitled "*Bedtime Smart Phone Usage and its Effect on Student's Academic Performance*" under the supervision of Ts Soong Hoong Cheng (Supervisor) from the Department of Digital Economy Technology, Faculty of Information and Communication Technology.

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ABSTRACT

Mobile device had become an indispensable and effective tool for everyone to interact with others around the world. The evolution of mobile device appears many students rather than workers in every single day, this represented there might some factors of cause poor academic performance of student due to the addiction use of smartphone such as social media, short- messaging and mobile-based game during their sleeping time. This research is investigated to study the effect of bedtime smartphone usage on the academic performance of student which according to their sleep, cognitive function and daily smartphone use. A sample of 103 UTAR students will be selected to answer the online questionnaire. After that, analyse the data by using Statistical Package for the Social Sciences (SPSS) and examine the result of data. Before starting the research formally, the pilot studying for survey should be conducted in this project to assess the reliability of the variables and items in the questionnaire. 36 students were selected for this pilot study and the tool used for testing reliability which is SmartPLS to generate the model and analyse the data which have been collected.

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β	beta

LIST OF ABBREVIATIONS

GPS	Global Positioning System
GPA	Grade Point Average
GAS-SF	Game addiction scale short form
PSQI	Pittsburgh Sleep Quality Index
SPSS	Statistical Package for Social Sciences
AVE	Average Variance Extracted
KABC-II	Kaufman Assessment Battery for Children-second edition
TOVA	Test of Variables of Attention
WRAT-3	Wide Range Achievement Test-third edition
MC-HOME	Middle Childhood Home Observation for the Measurement of the Environment
ISI	Insomnia severity index
ESS	Epworth sleepiness scale
HADS	Hospital anxiety and depression scale

Chapter 1- Introduction

1.1 Background

Smartphone is a mobile device that provide the advanced technologies with capability resemble to the computer device. By the development of technological advancement, the smartphone not just used for phone-call and text-messaging and also provide many advanced technologies such as 4G/5G LTE, GPS (Global Positioning System) and Bluetooth, so these features are making people more convenience and easier to communicate with others even though long distance. In this 21st century, smartphone is very indispensable for everyone that needed to fulfill human's daily life, leisure-time, work use and study use. This is because, the appearance of smartphone is useful and effective for everyone to increase productivity and knowledge. Take an example of university student, they able to browse to the internet for finding material for study use and discuss assignment in via mobile application such as WhatsApp and WeChat. Consequently, they reduce a lot of time and cost to achieve their goals effectively by simple clicking on smartphone. Therefore, [1] pointed out the usage of the smartphone is getting higher rapidly especially among teenagers within 15 past years. Although the cost of smartphone is becoming more expensive by the improvement of development in technology, but people are still willing to purchase those highly cost of smartphone including adolescents because they always try to keep up with fashion. This is because, they were born in this generation and grow up with these advanced technologies so that they act as digital natives. Moreover, they are interested in new technologies and easier to get use to the operation of these advanced technologies than adults such as use many kinds of mobile application, share their idea in online space and look for emotional support and relationship. According to [2], smartphone have become a well-known of social and education connection. Advantage of smartphone usage in higher education academy state that the communication between students is exchange document, tutorial such as lecture note and tutorial video, as well as discuss assignment effectively. Fertile literature was proved that negative influence of overuse of smartphone on university student academic performance, means that the high level of smartphone addiction is harmful student's academic performance.

Sleep is one of the necessary and important fundamental to face the social, cultural, psychological, and biological requirements of a human and it is linked directly with healthy and quality of lifestyle. [3] . pointed out the quantity and quality of sleep might bring a strong effect on physical and mental health. Take some examples which bring a lot of negative to body health and lifestyle quality are obesity, spirit disorders and increase accidents occurred. This is the reason that due to the duration and quality of regular sleep improve the emotional and spirit welfare of the personality. In teenager, duration of sleep requirement is between 8 and 9 hours to have good preparation for the next day, but most of the students are not following it nowadays [4]. Sleep disturbance is a significant and hidden problem for many studying teenagers because it can be harmful on physical and mental health. In addition, poor sleep quality directly related to emotional and mental disorder. If student does not preserve a good sleep habit and quality, then it is easier feel stress and depression when face their academic. This is because, they lack confidence and persistence to face the difficulties and challenges on academic. Therefore, the aim of this study is to analyze how use of smartphone leads to poor quality of sleep and leads to poor academic performance.

1.2 Problem Statement

Smartphone addiction among students is considered as the incompetence to control the use of smartphone even it brings a lot of negative to users. The reason that due to, using smartphone not only reduce feelings of depression and pain as well as produce delight such as watching drama and gaming. [5] pointed out, most of the adolescents have their own smartphone nowadays and this affect their body and mental health because they are more addicted to the smartphone than adults. This is because teenagers have lower level of self-restraint and lacking the awareness of effect on overuse mobile phone, thus the teenagers are easier to be addicted to the smartphone. The main problem does not ascend in smartphone usage among student, but they overuse of smartphone especially at night. As consequent, this problem influence on their physical and psychological health. Besides that, smartphone is one of the blue light-emitting devices which is the most lightweight compared to others device. Based on [6], bedtime blue light-emitting-device bring some disadvantage that effect on sleep because the brightness of short blue wavelengths light emitted harm to sleep hygiene and sleep quality. Therefore,

smartphone essence and usage are directly related to the academic performance of student if they become addicted on smartphone.

Moreover, late sleep at night and late awake on morning are common appearances to the adolescence in this generation due to the overuse of smartphone which harmful to their sleep quality. The intemperate use of smartphone decreases the sleep time and lead to an unhealthy lifestyle such as lack of exercise. In addition, poor sleep quality lead to mental health damaged because maladaptive smartphone use cause some omen of psychological harass and mental disturbance. [7] stated that sleep deficit is directly affected to the concentration and attention of student during class and the student is unaware to balance between sleep and use smartphone. Therefore, mental disturbance and sleep problem seriously impact to poor academic performance and extravagant daytime sleepiness on student.

[8] stated out the consequence of lacking sleep during school week. This is because of environmental factors and biological maturity cause the sleep latency of teenagers. Furthermore, overuse of electronic product has been considered one of the environmental factors that delay the time to rest. Physically, sleep disturbance can harass circadian rhythms that cause metabolic disorders and sleep pattern in people's daily life. On the other hand, they also pointed out the strong light generated by high-quality modern mobile phones disturb the natural rhythm of body physically like trick people' brain into believe it is still daytime, especially the blue light which is main affect to sleep disturbance and stimulate the cells in the eye.

The advance development of smartphone and Internet bring students into the addiction of social media through the psychological effect of dopamine produced by neuron in the human's brain, which not only spend the productive time of students but also cause to poor sleep habits by using smartphone at bedtime. In addition, students must take at least 8 hours to sleep at night for regain their energy. However, this is something most of the student do not follow nowadays. These insomnia habits indirect influence to their attention in class which resulting to a decline in academic performance [9].

In conclusion, overuse of smartphone among student negatively impacts the sleep quantity and quality. This is because, they are not aware on importance of sleep and cause themselves use smartphone at bedtime. As a result, poor sleep quality influence on their productivity, physical and psychological health which are needed be prepared for coming day. For example, their concentration and interaction with lecturer could be affected negatively during studying and cause the knowledge that lecturer teach in class might not be receive completely by student. As stated above, smartphone addiction directly causes the arise of appearance of poor academic performance among students.

1.3 Motivation

Motivation behind this research is to control the smartphone usage with appropriate method among student according to the association and relationship between bedtime smartphone usage and sleep as well as depression. This is because, this research is to study the smartphone usage when sleeping whether bring the positive or negative effect to the academic performance to student. Consequently, students able to increase awareness of using smartphone and use smartphone appropriately during bedtime. Therefore, their sleep quality can be avoided to deteriorate as well as feeling no depression and more confidence to face their academic.

1.4 Project Scope

This research proposed that academic performance is important and fundamental requirement to every student. However, most of the students are neglecting the importance of academic performance nowadays because of the smartphone existence. This is because, they addicted and overuse of smartphone and not pay attention on study. In addition of worse example, some of student deprive their sleeping time to use smartphone such as watch drama and movie, chatting as well as play mobile game. Consequently, these situations harmful to their sleep quality and duration as well as influence their sleepiness during daytime. On the other hand, sleep is necessary and important to every people including student, it enables to repair body and mental health when people are resting. The reason why sleep is important, for example, people gain

better concentration and productivity prepared for the next day, reduce the risk of body weight gained, avoid depression and better interaction and emotional intelligence. As a result, sleep quality and duration are directly affected to the mental health of student. If students have these criteria such as loss concentration on lecture or feel stressful and depression when facing academic, consequence the poor academic performance of the students.

1.5 Project Objectives

The purpose of this research is to investigate the association of smartphone usage with student's academic performance, and to study the relationship between bedtime smartphone usage and sleep quality as well as sleep duration in order to tackle the problem of poor academic performance among students. In this research, I propose a framework of relationship between the exogenous variables like Social Media Addiction, Excessive of watching drama or movie and Playing Mobile Game on student. Furthermore, endogenous variable like Sleep Deprivation and Cognitive Function linked to the student academic performance level. In the end of research, the estimation of the research result is to prove that academic performance is affected by the social media addiction, excessive of watching drama or movie and playing mobile game on smartphone of student and hypothesize that the increased of smartphone usage, the higher risk of sleep deprivation, the lower cognitive function of student, therefore resulting the appearance of poor academic performance increased.

1.5.1 General Objectives

- To explore how smartphone usage affect sleep quality among students
- To study effect of smartphone usage on student's academic performance

1.5.2 Specific Objectives

- To explore how Social Media Addiction affect Sleep Deprivation
- To explore how Excessive of Watching drama or movie affect Sleep Deprivation
- To explore how Playing Mobile Game affect Sleep Deprivation

- To study the factor and effect of Sleep Deprivation influence Cognitive Function of students
- To study the effect of Cognitive Function influence Academic Performance of student

1.6 Impact

In this study, there is a significant relationship between social media addiction, excessive of watching drama or movie, mobile game and sleep, as well as there is a significant relationship between sleep and cognitive function of student, which resulting the academic performance of student.

1.7 Significance

This study could be used as a reference to foundation and undergraduate student for university because this study would show which variable that I focus on affect the most on sleep which related to the academic performance. There are more features of smartphone that have an effect, but this study would focus on the adolescent group which is university student.

1.8 Contribution

Contribution of this research exposed that sleep disturbance negatively influence to academic performance of student as well as feature of smartphone use during bedtime has bring some disadvantages to the sleep quality and duration. According to this finding, student must be more emphasize the importance of academic performance among themselves and also raise the awareness of excessive smartphone use so that the probability of negative effect such as mental disorder and poor academic performance can be reduced. In addition, students able to deepen knowledge about appropriate smartphone use in their daily life. Although student personality behaviour is the main root that affect themselves, but parents also act as one of the important characters in their life. Therefore, parents must be educated about the possible relationship between these factors to enhance well-being of their children during the growing years.

1.9 Research Question

What is the factor of bedtime smartphone usage and effect on academic performance among students?

1.10 Research Layout

The chapter layout of this study contained five chapters. The first chapter is overview of research which introduce the research topic and provide research background and interpret the problem statement of research. It consists of introduction, background, motivation of study, project scope, study objectives, impact of study, significance of study, contribution of study and research question. Chapter 2 is Literature Review which involve the review of published research that access the independent variables and dependent variables. Not only that, the review of relevant conceptual framework and proposed theoretical model. In addition, the hypotheses development of this study is included at the last part of Chapter 2. Furthermore, Chapter 3 is methodology which contained the research design, data collection, data sampling, data processing, questionnaire design, measuring scale of questionnaire and technique of data analysis. Moreover, Chapter 4 is data analysis which provide and analyse the statistical result which result is generated after the reliability test. After that, compare the result with the hypotheses and discuss the thesis. The last chapter which is Chapter 5 provide the conclusion of data collection and analysis, discussion of whole study, mentions the limitation of this study and recommendation for future researchers.

1.11 Conclusion

In conclusion, this chapter provides an overview of the study. As the topic stated, Bedtime Smart Phone Usage and its Effect on Academic Performance among student and it need to be invested by different factor and effect to examine the result. This research uses the theories of other researchers as the basis of research and consideration of student on bedtime smartphone usage toward their academic performance.

Chapter 2 – Literature Review

2.1 Literature Review

2.1.1 Social Media Addiction

Social networking or social media is perhaps the most important influencers on the sleep of adolescent because smartphone and online media device have been integrated into our social structure, therefore it is important to understand whether some adolescents are vulnerable on problematic social networking use and resulting poor sleep. A study by [10] stated out many students spend more time and attention on social media than they spend on their academic and lead to the failure in their examination. Therefore, it shows that social media use can lead to lower academic performance, low self-awareness and loss motivation among students. The survey was conducted 197 students in university of Ghana and the data investigated shows that 38.3% of the respondents are indulged in social media use which influenced their academic and 51.7% shown that online networks diverted their attention from academic. Hence, this represented that most students would become addicted on social media networks unwittingly.

According to [11], the teenagers are growing dependency on social network and some adolescents like to have social interaction with peers via communication technology 24/7 which affect the ability to have good quality sleeping. They also stated out teenagers need to take 9 hours of sleep every day and poor sleep brings bad effect to them such as loss motivation, which represented that they usually posting or browsing on social networking sites before going to sleep at night. In their study, the survey was conducted 1886 students from 32 high school which investigate the relationship between problematic social networking use, sleep and school satisfaction. The result shown problematic social networking use have stronger effect on student satisfaction in school through sleep disturbance.

Based on [9], the impact of social media on the academic performance may be positively and negatively because it is according to the responsibility of students who use social media. In addition, social media has grown into an effective form of communication that allows people to interact with friends and social interactions between different groups. They pointed out the excessive use of social media can cause addiction and have serious effect for student's academic progress such as poor time management, illness, undernourishment, and low academic performance. Although social media is an effective tool that used for academic purposes by sharing resources, communicating with teachers to clarify questions, which indicated that student should be liable for using social media. The researcher gathered 160 students from distinct courses to participant the questionnaire. The result of the study shows that overuse of social media on smartphone bring harmful affect to academic performance of student, level of interaction and concentration with teachers based on the student who excessive use social media and the reason of wrong sleep habit cause these situations. They create a graphical framework and three hypotheses to conduct experiment which are use social media on smartphone extravagantly will negatively affect sleeping hours, sleeping duration positively impact to the interaction with teacher as well as sleeping length negatively affect to the student's concentration when studying and directly cause bad emotional such as stress and depression. In the end of research, the researchers provide the recommendations and impression of this study stated that the purpose of social media is to be communicated with friends online. We cannot guilt these advancement technologies as an obstruction to the growth and academic of students. The impact of smartphone uses in positive, or negative is depending on how they use smartphone. The students should aware the proper way to use smartphone and prioritize in their life, they should realize use smartphone social media in suitable and effective way with limited and spend more time on their productive hours for targeting good grades in their academic performance.

Based on [12], the growth amount of time teenagers spend using social media has aroused concerns on its potential negative impact on the health and well-

being of them, including sleep. The purpose of their study is to understand the impact of social media use on the sleep of teenagers, they separate this study into two parts and collected 2708 student from 6 different secondary school. First, they examined the influence of frequency of social media use and problematic social media use on bedtime and sleep quality among teenagers Second, they hypothesized whether parent's rules on using Internet in an hour before going to sleep. The first hypothesis is the frequency of social media use and problematic social media use will cause bedtime delayed and perceived poor sleep quality, as well as second hypothesis is these consequences will be alleviated if parents set strict regulation on the use of Internet. In the result of study, frequency of social media use and degree of problematic social media use is a critical character which delay teenagers' bedtime and restricting rules of use Internet seems to be an effective way to improve sleep time, but this way only effective for some teenagers who are overuse social media. On the other hand, there is limitations from this study which is data collected were based on teenager's self- report. Therefore, objective measurement of social media use and sleep habits are valuable.

2.1.2 Excessive of Watching drama or movie

The concept of 'binge-viewing' is described as watching more than one episode of the same TV show at once whether on laptop, desktop, smartphone, tablet or TV screen. People can stream media through Internet, use streaming platform such as YouTube and Netflix. Based on [13], binge viewing is a relatively new mode of behavior and its popularity has been rising since 2013, eventually becoming one of the most common ways to spent time among young people. Their study aims to introduce the current understanding and psychological status of binge viewing by investigating 28 articles which published between 2013 and 2020, and discussing different ways of defining this behavior, different motivation, personality characteristics and the hazard of excessive binge viewing. The result signifies that there are two points of view in understanding of binge viewing. First, it is related to positive value,

entertainment, awareness and spending leisure time. Second, it emphasizes the negative consequences of binge viewing and behavioral addiction symptoms.

A study from [14], young people have binge-watching with poor sleep quality, wearier and suffer to sleep because binge-watching often happens unintentionally. This study collected 423 teenagers who were age group in 18 to 25 to complete survey of estimate their binge-watching, sleep quality. In the result, more than 80% of teenagers recognized themselves as a binge-viewer and they were reported more symptoms of suffer to sleep, wearier and weaker sleep quality.

A study from [15], 423 teenagers who aged 18 – 25 years old and also Facebook user were collected to conduct an online survey by assessing their binge-viewing, sleep quality which is Pittsburgh Sleep Quality Index, fatigue scale, insomnia scale as well as pre-sleep arousal scale. This study is to survey the binge viewing, its relationship with sleep and show arousal as a potential mechanism of this phenomenon relationship. In the result of study, it proved the binge viewing brings negative impact to overall sleep quality and defined awareness of pre-sleep arousal by providing initial evidence. In addition, the result shows the higher numbers of binge-viewing was related to weaker sleep quality, high insomnia, and fatigue. However, as in all cross-sectional studies, they unable to determine the relation of factor therefore it is possible to make opposite like poor sleep quality leads to grow in number of binge viewing. Furthermore, they conducted this research by collecting a sample of Facebook user only. Although they did not specify the focus of research but recruiting through one social media may introduce self-selection bias.

According to [16], binge watching comparatively new phenomenon that emerged with the ascend of online streaming service. He conducted this cross-sectional survey research by collecting 329 adolescents which to investigate the association between Compensatory Health Belief (CHB) and sleep as well as

consequence of binge watching. In the result of study, the existing association between CHB and sleep does not appear to be affected by the frequency of binge watching. On the other hand, some characteristics of binge watching at night has negative impact on sleep. For example, binge watching at night will reduce the actual sleep time which relationship is in line with the expectation and resulting binge watching in daytime has lesser impact on sleep. However, there was a limitation of this research which not all field that may be related to the title of binge watching have been considered. Therefore, the suggestion provided to future research is further obverse on characteristics of binge watching may be very interesting, by asking respondents about possible factors and effect of binge watching.

2.1.3 Playing Mobile Game

A study from [17] set to investigate the consequence of school closures on the main lifestyle aspects of students, especially their free time and sleep during the lockdown on Covid-19 pandemic. In addition, he also stated that mobile phone games are the overall top choices of students during suspension of classes.

[18] pointed out there are more and more students are addicted to play online mobile game, the amount of time students plays online mobile game and type of game that they play at home or school have great impact on their academic performance. In this study, it investigated the relationship between duration of spent on mobile game, how often does student play mobile game, reason of play mobile game and attitude of playing mobile game as well as academic performance. Through a purposeful sampling of young people who use mobile phone to play game, which random sample is drawn from 134 students. The result of this study exposed that the duration of hours that students spend on playing online mobile game at home is significantly related to their academic performance which represented the direction of relationship was opposite, means that the longer duration hours student spent on playing online mobile game corresponds to the decline of academic performance. In addition,

respondents' overall attitude towards playing online playing mobile game was stated as less favorable which means not very good.

[19] stated out there was a new type of addictive behavior which is addiction of mobile game and different from traditional desktop computer game addiction. In this study, they investigated the association between mobile game addiction and social anxiety, stress and loneliness among teenagers. The sample of 600 students in high school participated the survey which measure their mobile game scale, stress scale, loneliness scale and social anxiety scale. The result shown that addiction of mobile game has positive related with social anxiety, stress, and loneliness, especially for male teenagers because they are quite possible to experience high degree of stress, social anxiety and loneliness after they excessive use on playing mobile game. On the other hand, the limitation is cross-sectional design used for this research, therefore they cannot determine the causal relationship between the research variables. Hence, the recommendation for future investigations is to use experimental design to create the causal relationship between the research variables.

A study from [20] , mobile games can be downloaded easily on wireless device and most of the games are free of charge compared to others DVD games which are more expensive. This research aims to show that gaming is related to sleep disorders, which represented that addiction of gaming is associated with emotional disorder that directly related to sleep disorders. They distributed total 53,634 questionnaire sample to potential respondents and the final sample concluded in 10,566 responses .They use various of measurement to survey the participants which are game addiction scale and gaming duration to evaluate problematic of gaming and measure the time spending on gaming in a week respectively, insomnia severity index to evaluate the insomnia and sleep quality, sleepiness scale to assess their awareness during daytime, lastly anxiety scale to measure their stress level. The result of this study stated that there is a significance relationship between gaming and sleep disturbance and mental

symptoms. According to the findings, they pointed out that game might affect sleep and depression of teenagers and university students as they mentioned that sleep and depression are strongly related to their cognitive function like concentration, memory and alertness. Especially their circadian rhythm might be disordered because of the light of device when playing game at night.

2.1.4 Sleep Deprivation

A study from [21], sufficient sleep strongly affect psychological function, thereby affecting the performance of student and final examination result. They conducted a study aims to determine the student pharmacists sleep pattern and rate of daytime sleepiness to evaluate the correlation between the sleep time and academic performance. This survey was conducted on 364 respondents who was Year 1 to Year 3 student in pharmacy school. The questionnaire was compiled by 3 sections which are characteristics of student, sleep habit during school week and the night before examination as well as daytime drowsiness. The result shown that more than half of the respondents (54.7%) have less than seven hours to sleep at night during school week and most of them (81.7%) the night before examination. Nearly half of them (47.8%) had drowsiness on daytime. Lastly, the longer sleep time taken on previous night is correlated with better grades and higher-grade point average (GPA). There was a limitation from this research which lacking the analysis of daytime nap therefore it is not clear whether students with shorter bedtime sleep duration at night can make up for it by naps during daytime, which may benefit cognitive functioning.

A study from [6], bedtime blue light-emitting-device bring some disadvantage that effect on sleep because the brightness of short blue wavelengths light emitted harm to sleep hygiene and sleep quality. This study aims to investigate the consciousness of sleep disorders because of these devices use before going to bed is persistent with better and healthier sleep quality. They conducted an online survey on 294 medical students which questionnaire separated into two main parts. First part of questionnaire, characteristics of device use during bedtime is to assess their consciousness of sleep disorders, the second part is

Pittsburgh Sleep Quality Index (PSQI) to evaluate their sleep quality within the previous month. The result shown 97.3% of the respondents are blue light-emitting device user and 35.3% of them had poor sleep quality. Therefore, this research proves that the relationship between the use of blue light-emitting devices during bedtime and harmful habits related to poor sleep quality which influence to cognitive functioning during daytime among male and female on medical students.

According to [8], the smartphone have become the mainstream media in the healthcare field. This is because, it can access medical information quickly and effectively, improve the learning ability of student in clinical environment and increase knowledge score. Therefore, they conducted research to investigate the relation between bedtime mobile application usage and pattern of sleep as well as academic performance among medical students. In this research, they only targeted medical student in a university and collected 504 participants to conduct a questionnaire. The first section of questionnaire is to categorize the socio-demographic of responders by their gender, age group, study year, religion, and ethnicity. Furthermore, the following section is to measure the frequency of distribution for smartphone usage student such as frequency of educational application in smartphone, duration of bedtime smartphone use and length of time required to fall sleep. In the result of this study, there was a correspondence relation between average total duration smartphone used at bedtime and feeling sleepy after waking up in morning. In conclusion, the researchers pointed out even if student academic performance was not majorly related with the smartphone use but the higher of smartphone application usage, the lower sleep quantity and quality in their daily life.

According to [22], suitable sleep quantity and quality are vital requirement for physical and psychological well-being. Thus, the researchers decided to carry out research to investigate many college students are sleep disorder, improper sleep habits and encounter poor sleep quality. In order to prove that reduced

sleep quantity and quality may badly affect body health, cognitive working and emotional well-being, they conducted an experiment to examine the relationship of smartphone usage and sleep quality as well as sleep duration among college students. They collected 350 college students as volunteers to participate the survey about the Sleep Habits Survey, Sleep Quality Index, Short Messaging Service (SMS) Problem Use Scale, Mini International Personality Item Pool (IPIP). Sleep Habits Survey section is to collect the characteristics of sleep among responders, Sleep Quality Index is to measure the scale that the responders might or not be experiencing sleep issue, SMS Problem Use Scale is to test the level of smartphone messaging addiction among responders, Mini IPIP is to measure the main five personality which are Agreeableness, Neuroticism, Conscientiousness, Intellect and Extraversion. In the result of research, there are various appearance of smartphone use such as addictive message texting, issue of smartphone uses those related to the sleep condition. In addition, the findings also point out the important relationship between personality and some types of smartphone use. Therefore, this study also recommended to the students who not very united to the sleep hygiene like never daydream during studying, constraint their sleep place for sleeping only, so the recommendation of target responder is students who have poor sleep quality to get more accurate response on smartphone use during the late-night hours. However, there is a limitation stated which is the data collection is according to self-reports, because they cannot decide whether the reported behavior consider as actual behavior. Although this study comprehended some self-report about sleep quality and behavior of smartphone user, but the problem of sleep hygiene was ignored comparatively. Based on this limitation, the researchers recommended not only focus on sleep duration but also more focus on the sleep quality. This is because, there is more specific direction to measure the sleep quality and smartphone use. Hence, the researchers hope to expand more objective between communication technology and sleep-related to evaluate the relationship of smartphone use and sleep more exactly and clearly.

[23] pointed out teenagers enlarge their chance for building social relationship by using smartphone. Smartphone has included as one of the major components in academic institute. However, the bigger availability of smartphone the higher probability of excessive smartphone usage for young people. Hence, the researchers defined to conduct research to investigate the smartphone addiction among students, stress and depression associated by excessive of smartphone use as well as quality of sleep affected by smartphone addiction. In this research, they suggested to conduct cross-sectional research to evaluate use of smartphone and sleep disorder. They collected 469 responders to conduct questionnaire for data collection and they created a structured questionnaire that including details of demographics, aim of using smartphone, academic status etc. Moreover, they separated the question into three main sections in survey which are Smartphone Addition Scale (SAS), Pittsburgh Sleep Quality Index (PSQI) and Depression Anxiety Stress Score (DASS). Smartphone Addition Scale (SAS) section is to measure level of smartphone addiction among responders followed by Pittsburgh Sleep Quality Index (PSQI) section is to test subjective sleep quality among responders and last section is Depression Anxiety Stress Score (DASS) in order to evaluate the severity of core symptoms Anxiety, Depression and Stress. In the study result showed that the relationship between smartphone usage, personal psychological factor, overuse of smartphone and the association between different gender. However, they thought this study meet some limitations which are the 469 responders from polytechnic college cannot be widespread to the population of teenagers and the data was cross-sectional which limit the ability to draw the basic inference especially those about the direction of link between smartphone addition and mental behavior risk factors.

2.1.5 Cognitive Function

[24] emphasized the association between sleep and processes of learning as well as memorize ability, which analyze the consequence of sleep distressed on learning capability and academic performance of student seems to be inherent. In addition, the increasing of sleepiness during daytime caused by the poor sleep quality which strongly damage cognitive function and performance of students.

A study of [25], in different areas of cognitive function, concentration and memory are strongly related to smartphone use. The flashlight-emitting devices during nighttime can have negative consequence on concentration and oral memory. The smartphone use at night causes the reduction of mental concentration and weaken in other domains of cognitive abilities because of the feeling of sleepiness and fatigue. They conducted a survey on 385 undergraduate students to investigate the association between bedtime smartphone use, cognitive function, sleep quality and academic performance. The findings from this research are the high rate of bedtime smartphone use was correlated with low academic performance and poor sleep quality.

According to [26], their research aims to investigate the impact of sleep disorder on cognitive function and academic performance among college students. This research used cross sectional design to conduct a survey on 150 first year to final year college student. In this questionnaire, first section is parameter of sleep disorder to measure the respondent regular sleeping hour, how long the time taken to fall asleep and sleepiness during class. The second section is concentration on cognitive function and performance to evaluate whether their sleep is well or lack of sleep, lastly grade point average (GPA) is to record their academic result. The result shown most of the students do not take 7-8 hours for actual sleep at night which is recommended sleep duration each night for students. 149 of the respondents who are not in first class in GPA, out of 118 respondents were sleep disordered which represented that less insufficient sleep has better GPA than more insufficient sleep among students. Thereby, 132 of them face the difficulty of staying awake or concentration during class which

only 18 of them able to concentrate on class because adequate sleep. Hence, sleep distressed brings negative impact to the academic performance and cognitive function of student, which pointed out the proper sleep is an indispensable part of better academic performance and cognitive function.

A study of [27] targeted to determine what kind of cognitive abilities are correlated to academic performance of children because of problematic on nervous system involvement. In this study, they collected 62 children who have history of problematic on nervous system involvement to evaluate their cognitive skills such as memory of working, inferring, learning, concentration and visuospatial skills as well as academic performance such as counting, studying and spelling. Linear regression is applied to each academic performance score in which five cognitive skills score are input as predictor. The adjustment factors in this analysis are age, gender, nourishment, education and family environment. Structural equation modelling (SEM) and Exploratory factor analysis (EFA) are applied to identify the nature of the relationship between cognitive abilities and academic performance. For the relationship between working memory with reading and spelling ($p < 0.01$) respectively, the relationship between visuospatial skills with counting and learning with reading ($p < 0.05$) respectively. In addition, EFA identified an underlying cognitive ability and SEM shown a strong correlation between this underlying cognitive ability and each academic performance indicator ($P < 0.0001$), resulting memory, visuospatial skills and learning are the most valuable to predict the academic performance. In short, academic performance is closely related to the underlying variables which is cognitive ability, stated that working memory, visuospatial skills and learning are the best combination for predicting the academic performance.

2.1.6 Academic Performance

Academic performance is significant for an institution because it can lead to future job performance, it is not impacted by age, sex and place living. Actually the academic performance is based on the student's own effort, if they want to enhance themselves then they will achieve their goal. [28] highlighted that more and more students are not graduating on time which means that students are not performing well in their academic. This research aimed to determine the association and main factors that related to academic performance in undergraduate study. The study was done by using questionnaires which were conducted on students according to the name of lists offered by head of faculty, participated undergraduate students are from 4^{th} and 5^{th} semesters. In this study, the main factors of academic performance as independent variables are teaching and learning process, family and peer group impact as well as financial of student to predict the academic performance as dependent variable. Through the analysis, the results shown the highest value of independent variable is teaching and learning process which most influence to predict the academic performance.

[29] defined that some researchers debated the differently on smartphone application of addition concept. On the other hand, several researchers used this addition concept in personal behaviors. In this research, they developed research for finding the factor that influence the student academic performance by level of smartphone addiction. He collected a total of 247 student to join in the questionnaire for gathering data and analyzed them. The result of the research proves the factors of smartphone addiction like disorderedness daily lifestyle, withdrawal of course subject or study, cyber-friendship, intolerance, and positive anticipation. Therefore, they used five main variables in this research which are Daily-life Disturbance, Positive Anticipation, Withdrawal, Cyber-Friendship, and Impatience. Daily-life Disturbance is the main factor affected with smartphone addiction such as their relationship with family and daily work, Positive Anticipation is another factor of smartphone addiction which means that smartphone users feel confident in using smartphone even overuse as well as they think the more smartphone, they use the more stress reduced, so this

kind of phenomenon lead they feel that life is meaningless without smartphone. Withdrawal is one of the important smartphone addiction factors means that feel worried about not receiving important message or call and loss self-control on smartphone use, Cyber-friendship factor is involved which meaning a frequently checking social media and relationship between user and smartphone closer compared to people. The last variable is impatience that means use of smartphone consumes most of the precious time, so the impatience increased among student in daily activities. In addition, the researcher generated five hypotheses for the research purpose which are cyber-friendship effect on academic performance of student due to smartphone addiction, daily-life negatively disordered by overuse of smartphone, positive anticipation of student increased, bad attitude of student exposed, and withdrawal increased. However, this study did not involve the element that related to the smartphone use but more focus on psychological and personality aspect. Furthermore, this study only focuses on the business student from private university in Bangladesh, so the research received few data collection for his research. Therefore, the research recommended be distinct courses such as Information Technology, Science, Engineering and so on to gain wider knowledge and data. Other than that, this research suggested on more concentrate on smartphone use based to conduct the experiment because there is not only psychological matter effect on academic performance, but also digital technologies based included. In short, the recommendation of this study is broader the target of responder from different courses and more focus on technology based to conduct this research.

A study of [30] targeted to identify the factor influencing the academic performance of nurses who students study in fourth grade, which may effectively help to improve the students and teachers. There are many reasons for the factors that affect the academic performance of students. In this study, they used descriptive survey to conduct on 74 nursing students, the self-reporting questionnaire was applied to collect data on factors influencing the academic performance of respondents including personal status, habits of study, teacher-related, family-related aspects and school-related aspects. According to

the survey result concluded that the most influential factor to academic performance is teacher related among the five domains, habits of study and school related aspects are drop behind teacher related aspects. Nevertheless, these two factors are still considered having high influence. On the contrary, personal status and family-related have little effect on the academic performance of nursing student.

2.2 Review of Relevant Theoretical Framework

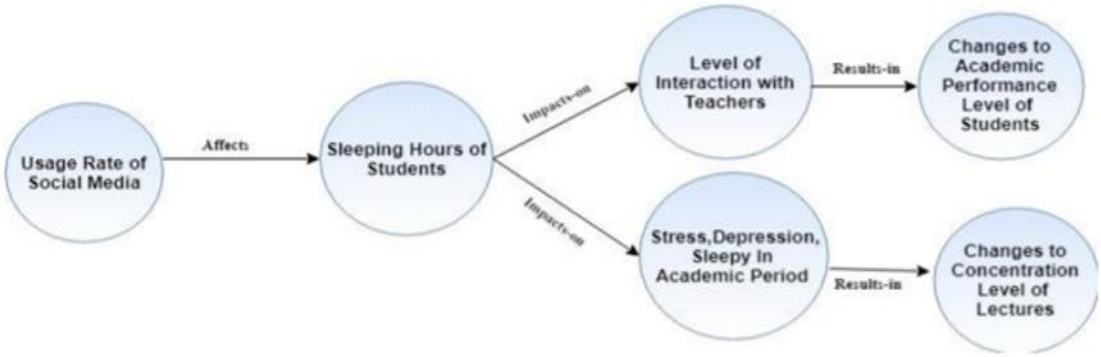


Figure 2.1: Conceptual Framework1 for literature review

Adopted from: A. F. A. A, S. Sudha, and S. Ajit, "Social Media Impact on Students Academic Performance Based on Sleeping Hours," Int. J. Recent Technol. Eng., vol. 8, no. 4S2, pp. 968–971, 2019, doi: 10.35940/ijrte.d1184.1284s219.

The framework above is developed by [9] to investigate on the relationship between four independent variables which are usage rate of social media, sleeping hours of student, level of interaction with teachers as well as stress and sleepy in academic period, and two dependent variables which are changes of academic performance level of student and changes to concentration level of lectures. This framework shows that usage of social media influences the sleeping hours of students negatively which associated to the interaction level and stress, depression and sleepiness that resulting the concentration level and academic performance among students.

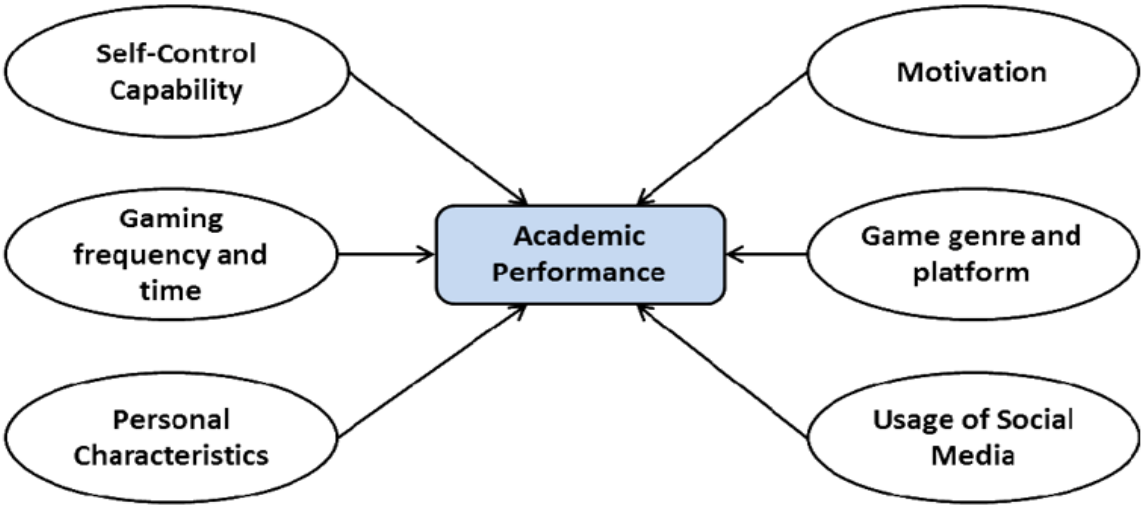


Figure 2.2: Conceptual Framework2 for literature review

Adopted from: C. H. Ku, M. Kwak, K. Yurov and Y. Yurova, "A Study of the Influence of Gaming Behavior on Academic Performance of IT College Students," 20th Americas Conference on Information Systems, AMCIS, pp. 1 – 5, 2014.

This study model above is generated by [31] to study the association between behaviour of student and their academic performance. There are six independent variables used for this research which are self-control capability, gaming frequency and time, personal characteristics, usage of social media, game genre and platform and motivation as well as the dependent variable which is academic performance.

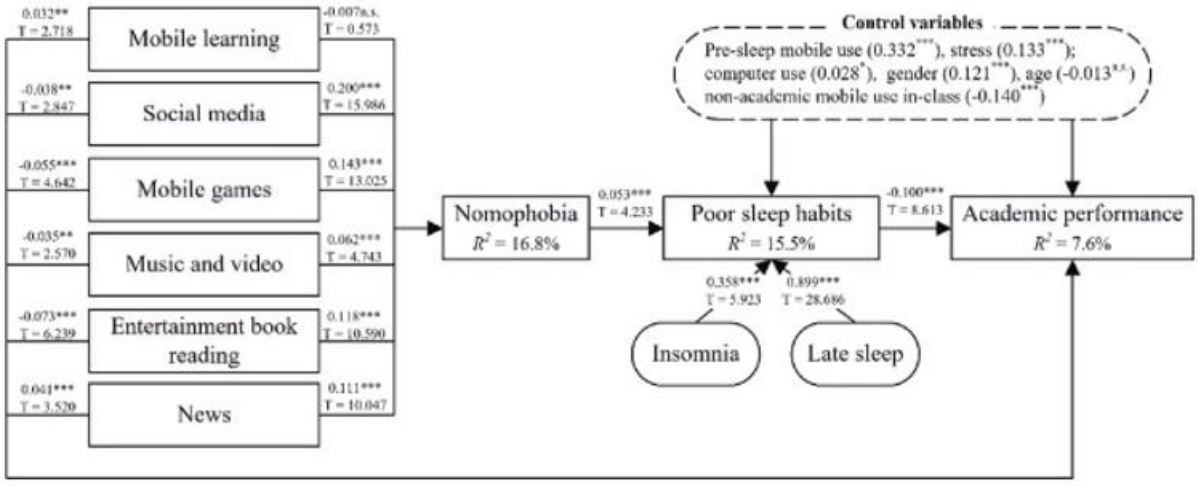


Figure 2.3: Conceptual Framework3 for literature review

Adopted from: Y. Lin, Y. Liu, W. Fan, V. K. Tuunainen, and S. Deng, "Revisiting the relationship between smartphone use and academic performance: A large-scale study," *Comput. Human Behav.*, vol. 122, no. April, p. 106835, 2021, doi: 10.1016/j.chb.2021.106835.

The framework above is created by [32] to study the relationship by examining the difference among mobile application. They investigate the effects of using six different mobile applications on academic performance of student and test their indirect influence mediated by smartphone and behavioral habits. In addition, two types of poor sleep are investigated which are late sleep and insomnia. In the study result, they proved that mobile learning and news application affect positively to the student academic performance. Howerver, other applications such as social media, mobile game, music and video as well as entertainment book-reading influence negatively to the academic performance.

2.3 Literature Review Summary Table

Author	Objective	Number of studied variables	Methodology	Sample Domain
[10]	1. To determine the level of exposure of students at University of Ghana to social media sites 2. To purpose of using social media sites students 3. To determine how the use of social media has affect the academic work of students	2 variables: - Social Media - Academic Performance	-200 students randomly selected from the population of 38,000 in 8 halls - Using cluster sampling method of probability sampling - Using simple random sampling technique	197 students in university of Ghana
[11]	1. To study the possibility of a developmental mismatch between teenagers who need adequate, uninterrupted sleep and adequate sleep	4 variables: - Problematic Social Networking Use - Sleep Disturbance - Sleep Quality	- Questionnaire distributed to participants during classroom - Collect responses through laptop or completed paper	A sample of 1886 student who 12 to 1 years old

	quality to successfully navigate the school and their desire to socially network online	- Sleep Satisfaction		
[9]	1. To study the overuse of social media has a consequence on the student academic performance 2. To investigate the interaction level of students who overuse social media. 3. To determine that students' poor sleep habits caused by social media directly affect their concentration in class.	6 variables: - Social Media Usage - Sleeping Hours - Interaction level with teacher - Stress and Sleepy to Academic Period - Academic Performance - Concentration Level of Lecture	- Descriptive research design - Using non-probabilistic convenient sampling method - Questionnaire is developed consisting of 24 questions developed from - Pearson's correlation of partial and bivariate on various variables on SPSS V23	160 students of 87 males and 73 females
[12]	1. To study the frequency and problematic of	4 variables:	Using computer-based questionnaire	

	social media use predicted bedtime and quality of sleep among teenagers. 2. To study the protective effect of parents on surfing the Internet and using smartphones one hour before going to bed	- Problematic Social Media Use - Frequency of Social Media Use - Sleep - Parental rules about using the Internet in the hour before going to sleep		
[13]	1. To introduce all the recent research on the phenomenon of binge-viewing		- Systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses	
[14]	1. To examine over-watching in teenagers with, more fatigue, increased insomnia and poorer sleep quality			423 young adults who were 18 to 25 years old

	2. To associate this relationship is increased cognitive			
[15]	1. To study the association of binge viewing and sleep	5 variables: - Sleep Quality Insomnia - Fatigue - Pre-Sleep Arousal - Binge-Watching	Online survey to assess: - Pittsburgh Sleep Quality Index - Fatigue Assessment Scale - Bergen Insomnia Scale - Pre-Sleep Arousal Scale Mediation analysis was performed using PROCESS Macro.	423 adults who aged 18–25 years old
[16]	1. To investigate the relationship between Compensatory Health Beliefs and sleep and the mediating influence of over-watching	- Compensatory Health beliefs - Binge-watching - Sleep	Cross-sectional survey study: - Compensatory Health beliefs scale - Television-viewing	329 young adults

			- MOS sleep scale	
[17]	1. To study the effect on lockdown and school closure among children's lifestyle, especially their sleep pattern during the pandemic	6 variables: - Visiting friends or family - Being visited by friends or family - Shopping or visiting shopping centers - Entertainment and outside activities - Sleep - Attitude	Online questionnaire was distributed: - Students' adherence to quarantine during the COVID- 19 pandemic school closures - Sleep hours - Attitude and activities of the students	20,200 participants
[18]	1. To assess the gaming profile towards Online Mobile Game and its association to the academic performance	4 variables: - Commonly Played Online Mobile Game - Reason of play Online	- Administered the survey questionnaire - Perform data analysis by using MS Excel	134 students

	2. To study the relationship between hours of student's spent on playing Online Mobile Game	Mobile Games - Attitude on Playing Online Mobile Game - Academic Performance	- Correlation analysis by using IBM SPSS	
[19]	1. To study the association between mobile game addition and social anxiety, depression, and loneliness among teenagers.	4 variables: - Mobile Game Addiction - Depression - Loneliness - Social Anxiety - Gender Difference	Questionnaire distributed to their parents to assess: - Mobile Game Addiction Scale - Depression Scale - Child Loneliness Scale - Child Social Anxiety Scale	578 of junior high school
[20]	1. To determine the prevalence of, mood, sleep disorders and gaming	5 variables - Insomnia - Sleepiness - Anxiety and Depression	- Insomnia severity index (ISI) - Epworth sleepiness scale (ESS)	10,566 gamers

		- Game Addiction - Game Period	- Hospital anxiety and depression scale (HADS) - Game addiction scale short form (GAS-SF) - Gaming period	
[21]	1. To study sleep patterns and frequency of daytime sleepiness 2. To evaluate the relationship between sleep duration and academic performance among student pharmacists	4 variables: - Sleep Pattern - Sleep Duration - Frequency of Sleepiness During a Typical School Week - Academic Performance	Cross-sectional design and self-administered paper questionnaire were used.	364 pharmacy students
[6]	1. To assess among medical students, if the perception of sleep disturbances because bedtime use of these	2 variables: - Blue-light-device bedtime habits and symptom - Sleep Disturbance	Voluntary cross-sectional study and answered an electronic questionnaire:	294 medical students

	devices is consistent with healthier habits and a better sleep quality		- Smart device bedtime before sleep - Pittsburgh Sleep Quality Index (PSQI)	
[8]	1. To investigate whether the use of mobile apps at night is related to sleep patterns and academic performance 2. To obtain socio-demographics data of the respondents. 3. To evaluate the type and duration of mobile applications usage for academic and non- academic purposes. 4. To identify the relationship	3 variables: - Mobile Application Usage - Sleep Quality and Quantity - Academic Performance	- Questionnaires were developed and computed as the variables of this study - SPSS version 23.0 was used for data analysis.	215 medical students involved Year-2 till Year-5

	between the smartphone application use and academic performance. 5. To study relationship between the survey respondents' use of smartphone applications and their sleep patterns			
[22]	1. To investigate the relationship between sleep quality, time and smartphone use among college students. 2. To investigate the impact that smartphone use on college students' sleep habits and its potential impact on sleep duration and quality	4 variables: - Sleep - Mobile Phone Use - Personality - Academic Performance	Questionnaire was adminisried: - Sleep Quality Index - SMS Problem Use Scale - Mobile Phone Problem Use Scale - Mini International Personality Item Pool version (Mini IPIP)	350 students

			- Grade Point Average (GPA)	
[23]	1.To study the extent of smartphone addiction among adolescent students. 2. To determine whether overuse of smartphone is associated with anxiety and depression in adolescent students. 3. To determine whether overuse of smartphone is associated with quality of sleep-in adolescent students. 4. To give suitable recommendations based on the study	3 variables: - Smartphone Addiction - Sleep - Depression	Structured questionnaire was administered: - Smart phone addiction scale - Pittsburgh sleep quality index - Depression anxiety stress score 21	469 adolescents studying in Government Polytechnic college

[25]		3 variables: - Mobile Phone Use - Sleep - Attention and Verbal Memory - Academic Performance	Cross-sectional study: - Bedtime mobile phone use - Pittsburgh Sleep Quality Index -Cambridge Neuropsychological Test Automated Battery (Attention and verbal memory) Statistical Package for Social Sciences (SPSS) to perform statistical analyses	385 undergraduate students
[26]	1. To understand the impact of sleep deprivation on college students's the academic performance and cognitive functions.	3 variables: - Sleep Deprivation - Cognitive Function - Academic Performance	Cross-sectional design. Self-administered paper questionnaire was administered: - Parameters of sleep deprivation - Focus on Performance and Cognitive Function	150 students

			- Grade Point Average	
[27]	1. To identify which cognitive abilities are associated with academic performance in children after malaria with neurological involvement	2 variables: - Cognitive Ability - Academic Performance	- Kaufman Assessment Battery for Children-second edition (KABC-II) - Test of Variables of Attention (TOVA) - Wide Range Achievement Test-third edition (WRAT-3) - Middle Childhood Home Observation for the Measurement of the Environment (MC-HOME)	62 Ugandan children
[28]	1. To determine which cognitive abilities are related to the academic performance of children	4 variables: - Teaching and Learning - Family and Peer Influence	- Cross-sectional study and questionnaires were distributed - Statistical Package for the	Degree students involved were from semester 4 and 5.

		- Student's Financial - Academic Performance	Social Science (SPSS)	
[29]	1. To study the factors that affect students' smartphone addiction levels and impact on their academic performance	- Positive Anticipation - Impatience - Withdrawal - Daily-life Disturbance - Cyber friendship - Academic Performance	- Questionnaire with 5-point scale applied - Data analysis by using SPSS software	247 questionnaires were collected from the business students of a private university of Bangladesh
[30]	1. To identify the factors impacting the academic performance of nurses in fourth grade	6 variables: - Personal Conditions - Study Habits - Home-related - School-related	- Quantitative-descriptive design was utilized - Self-reporting questionnaire	74 fourth year nursing students consisting of 8 males and 66 females.

		- Teacher-related - Academic Performance		

Table 2.1: Summary of Literature Review

2.4 Hypotheses Development

Hypotheses 1

H_0: There is no significant relationship between social media addiction and sleep deprivation.

H_1: There is a significant relationship between social media addiction and sleep deprivation.

Hypotheses 2

H_0: There is no significant relationship between excessive of watching drama or movie and sleep deprivation.

H_2: There is a significant relationship between excessive of watching drama or movie and sleep deprivation.

Hypotheses 3

H_0: There is no significant relationship between playing mobile game and sleep deprivation.

H_3: There is a significant relationship between playing mobile game and sleep deprivation.

Hypotheses 4

H_0: There is no significant relationship between sleep deprivation and cognitive function.

H_4: There is a significant relationship between sleep deprivation and cognitive function.

Hypotheses 5

H_0: There is no significant relationship between cognitive function and academic performance.

H_5: There is a significant relationship between cognitive function and academic performance.

Chapter 3 – Research Methodology

3.0 Chapter Description

This chapter is going to interpret the methodology that used in this study which included the data collection and data analysis method. The methodology used to explain and examine the research question and hypotheses. This chapter consists of research design, data collection techniques, sampling design, data processing, variable measurement, data analysis techniques and conclusion.

3.1 Design specification

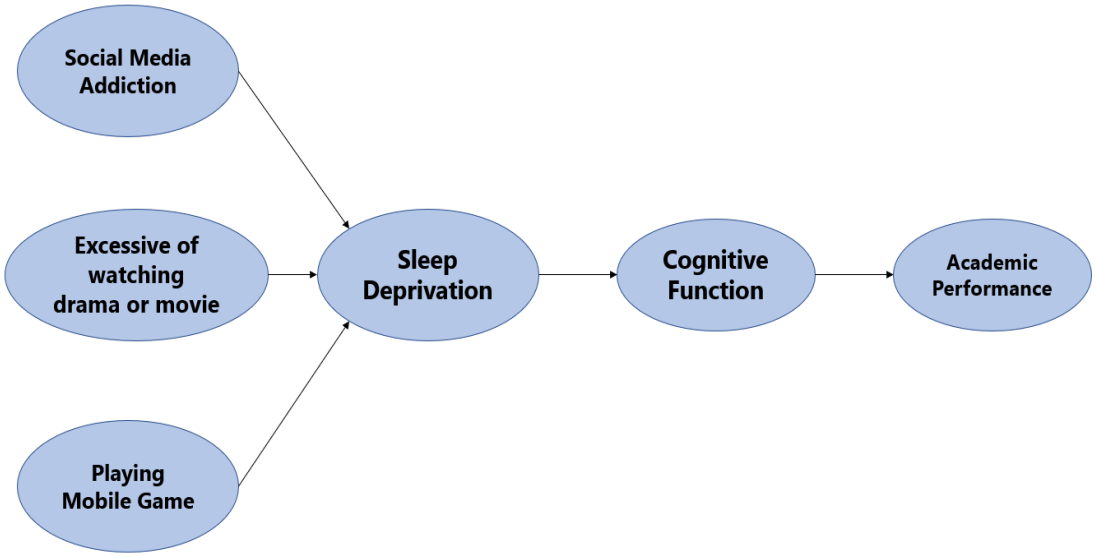


Figure 3.1: Conceptual Framework of Bedtime Smart Phone Usage and its Effect on Student's Academic Performance

The figure above is the conceptual framework that I develop as foundation for this research project. Based on the research, I found that there are several factors and effects will influence academic performance on university students. Therefore, the purpose of this research is to examine the relationship among six variables. Among five variables, social media addiction, excessive of watching drama or movie, playing mobile game, sleep deprivation and cognitive function are categorized to independent variables which are the factors and effects might affect to academic performance and academic performance categorized to dependent variable which predicted by the five independent variables.

3.2 Research design

The research design is defined by how the data is collected and analysed and aims to combine the relevance of the research purpose so that useful information can be obtained. This study uses quantitative research methods to quantify the data and provide conclusive evidence, which is based on a representative and typically some form of statistical analysis. It is used to obtain information from the interviewee to determine the causal interaction between variables. Therefore, it is suitable for this research and can generalize the results from the sample to the overall interest. Therefore, proper research has been used to avoid errors in data collection.

3.3 Data Collection Method

In this research, there are two types of data used which are primary data and secondary data. These data were collected for this study presented to the researcher from the research environment. Each study is based on the analysis and interpretation of data to collect the information. Both data will be used to answer hypotheses and research questions.

3.3.1 Primary Data

Primary data is the data developed based on first-hand experience to use for the specific objectives of research. Consequently, the people implicated in data analysis are familiar with the process of data collection and the research design. Researchers use raw data known as primary data to solve specific problems and perform their own analysis on the data they collect. The research questions asked by the researchers are tailored to obtain data that will help them in their research. The data collection methods are using surveys and interviews which represent that immediate relationship between researcher and respondents. The entire research decided to use Google Form to develop a survey questionnaire form to easier summarize the data analysis and save of printing survey paper. At the same time, the participants may answer the questionnaire via online. Furthermore, I will share the Google Form link to the foundation and undergraduate students after the questionnaire has been created successfully. Lastly, I will send out the survey link via social media such as WhatsApp,

Facebook Messenger, WeChat and so on because it is effective to target my audience.

3.3.2 Secondary Data

Secondary data usually easy to obtain which defined as the information collected of the intention for research project completion. It is the data collected from sources to provide preliminary and better understanding on research question. This data is collected from external sources like journals, books, articles and online database. The journals are obtained from different internet database such as ProQuest and Google Scholar. Information obtained from secondary sources is often cheap or free of charge which can be analysed in short period. Once the secondary data is found out which obtained useful information for this research project, I need to cite the data source and extract the necessary and useful information. Furthermore, the data is collected completely, I able to spend more time to analyse the data.

3.4 Sampling Design

The target population of this study will be aimed on the university students who related to social media addiction, excessive of watching drama or movie, playing mobile game, sleep deprivation, cognitive function that influence academic performance. The target samples are the male and female students who are over 18 years of age. The reason why needs to target this group of people for this study is because nowadays university students having more freedom and self-control life to use more smartphone and their academic performance in university is more important compared to primary and secondary school students. In fact, this segment of students indicates the teenagers who are frequently use smartphone in their daily life, control their sleeping time which reflect to the cognitive function and resulting their academic performance. Therefore, this sample can help to more accurately analyse the factors that affect their academic performance. A sample size of 103 respondents was selected from University Tunku Abdul Rahman in Kampar Campus who have experience of using smartphone. Besides that, they also completed the survey which being distributed via Google Form link for the pilot study. The respondents were guided to answer the questions according to their

behaviour of using smartphone, sleeping, awareness of cognitive function. Questionnaire play as an important tool to achieve responses from the respondents due to it is a free-cost way to collect data from possibly huge amount respondents. In addition, questionnaire via Google Form brings benefit and safety to the respondents and me during this Covid-19 pandemic and save more time in data collection.

3.5 Questionnaire Design

The questionnaire is designed in the international language which is English to convenient for the respondent while reading and answering the questions. In the beginning of survey, the purpose of this questionnaire will be briefly introduced to the respondents. The questionnaire is separated into seven sections which are Section A – E. The question set in Section A is accessing the **demographic information** of respondents, Section B is collecting their **behaviour of using smartphone** (Social media addiction, Excessive of watching drama or movie, Playing mobile game), Section C is evaluating their **sleep** (Sleep deprivation), Section D is rating their **loss of cognitive function** (Cognitive function) which mentioned above are the independent variable and Section E is collecting their **latest GPA score** (Academic performance) as the dependent variable.

3.5.1 Adaptation of Questionnaire from Published Research

Variable	Adopted from
Social Media Addiction	- [10]
Excessive of Watching drama or movie	- [15] - [16]
Playing Mobile Game	- [18]
Sleep Deprivation	- [3] - [21]
Cognitive Function	- [26]
Academic Performance	- [26]

Table 3.1: Summary of Questionnaire Adaptation

3.6 Measuring Scale

By performing the data analysis, it is important to understand the independent and dependent variable and what should be measured with these variables. According to [33], measurement scale refers to the method of defining and categorizing variable which term is used in wider and more accurately to classify for data analysis. Each scale of measurement has specific characteristics which examine the appropriateness of data analyses. There are two measurement scale applied in this research which are nominal and interval scale.

3.6.1 Nominal Scale

Nominal is classification data used as identifier which indicate a nominal measurement scale. Nominal data involve the compilation of variable information which can be clustered into two or more group that are composite and mutually exclusive. In this research, the nominal scale applied in Section A which is demographic part. For example, Gender is one of the items in demographic section which collect the sex of respondent whether male or female. Therefore, I will code male as 1 and female as 2 when performing data analysis and the number of 1 and 2 is representing the data classification.

3.6.2 Interval Scale

Interval is one of the most common used in questionnaire which defined as rating scale which annotate differences between the variables. The variable with calculable, familiar and constant differences are categorized using interval scale. In this study, all the item measurement scale in Section B – E is using interval scale. For instance, from strongly disagree to strongly agree and another question like “I usually spent _____ on one excessive of watching drama or movie session” which option provided for the respondents are “Less than 1 hour”, “1 – 2 hours”, “2 - 3 hours”, “3 – 4 hours” and “More than 4 hours”. Hence, I will code “Less than 1 hour” and strongly disagree as 1and so on until “More than 4 hours” and strongly agree as 5.

3.7 Sample Item of Questionnaire

Factor	Sample Item
Social Media Addiction	1. I am addicted to social networks and this is a challenge that affect my academic life. 2. Online social networks distract me from my studies. 3. Time spent on social media can never be compared to time spent on my studies. 4. There is no improvement in my grades since I became engaged into these social networking site**s.**
Excessive watching drama or movie	1. How often have you engaged in binge viewing during the past month? 2. I usually spent _____ on one binge watching (excessive watching drama or movie) session. 3. How many episodes did you usually watch in one binge watching (excessive watching drama or movie) session? 4. After I studied for a long while I can treat myself by watching multiple episodes of a series. 5. I will compensate myself with watching multiple episodes of a series tonight if I study extra hard tomorrow.
Playing Mobile Game	1. I prefer to play online mobile games rather than go out with classmates to have a group study. 2. I used to get low grades in most of my subjects because of playing online mobile games. 3. I have less sleep because of playing online mobile games.

	4. I am unable to complete my assignments in university on time because of playing online mobile games 5. I am unable attend classes on time because of playing online mobile games.
Sleep Deprivation	1. I take _____ for my actual sleep at night during typical school week. 2. I take _____ to fall asleep at night. 3. I felt tired during class time. 4. I felt sleepiness during daytime.
Cognitive Function	1. I am unable to stay awake or focused during class. 2. I am unable to focus during examination. 3. Most of the time I feel less energetic and motivated. 4. I think my academic performance is hindered.
Academic Performance	1. What is your latest GPA?

Table 3.2: Sample Item for Reliability Test

3.8 Data Processing

[34] stated out preliminary screening of the survey which is data editing and coding important for the researchers. This must be consistent with practical work because data collected should be entered into excel file. It is significant for the collection of actual data especially which is accomplished by a team or outsourced to more than one person is distributed to gather primary data. This is done by manipulated by the researcher which means that the researchers might collect partially filled surveys. This is because, it may be possible that certain data of questionnaire is missed or in the inappropriate order.

3.8.1 Questionnaire Reviewing

Before starting this process, I exported the survey analysis by using a functionality which Google Form provided to ease for the researcher to export the survey analysis into Microsoft Excel. Questionnaire reviewing is the process of reviewing and checking data collected to make sure that the questions is adequate, and data is engaging the ideal quality level. All the data collected will be filtered to avoid error and the incomplete questionnaire will be checked in this process. In this questionnaire, there is a section which is the last section provided to respondents to reflect their evaluation of the survey. This section is important because it is significant to capture the respondent understanding on this survey. Take some question from this section as example, a closed ended question like "Do you understand all the vocabulary when you answering this survey?" and one of the open ended questions as "Please point out the question(s) that confuse you or do not understand. Kindly specify the reason why it confuse you." provided in this section to accessing the understanding of respondent. Therefore, I able to easier find out their understanding on this questionnaire and improve this question according to their feedback.

3.8.2 Data Editing

Data Editing is process of adjusting and correcting errors found in the questionnaire before performing the data analysis. It helps to check incomplete, ambiguous, illegible or inappropriate response. The data collected might often include the mistake of respondent and non-respondent error and these non-sampling error influence the research reliability and validity. Therefore, it is important to process data editing in research.

3.8.3 Data Coding

Data coding is a systematic way to separate massive data sets into distributed cooperatively and mutually exclusive to facilitate for data analysing. The process by which oral data are classified by using numerical number, alphabets or symbol, thus the data can be entered in Microsoft Excel for further

explanation. Each item in questionnaire will be differentiated by using different numbers and alphabets. On the other hand, each response will be distinguished by using different numbers. These number and alphabets known as code can be used to represent column position and so on. This is because, alphabets and numerical numbers able to simplify the process of recording data. Take some examples of coding item, the first item in Section A (Social Media Addiction) categorized as SMA1 and the second item in Section E (Cognitive Function) classified as CF2. Besides that, examples of responses coding, Age in Section A using number "1" to indicate "18-20", "2" to indicate "21-25", "3" to indicate "26-30" and "4" to indicate "Above 30". For other section, rating of "strongly disagree" to "strongly agree" can be coded subsequently from "1" to "5" for clustering in data analysis.

3.9 Data Analysis

I used Google Form Analytics, Microsoft Excel, SmartPLS 3 and SPSS software to perform data analysis in this research, for generating the model assessment result according to the result of the questionnaire. For more accurate figures and details will be stated in chapter 4 and 5.

3.9.1 Descriptive Analysis

[35] highlighted descriptive analysis is summary of data with the purpose which describing what happened in sample. Descriptive analysis can be used for comparison sample from research with another research and it helps the research identify possible sample characteristics that might affect the conclusion. For example, graph, percentage and frequency are used to interpret the data measurement in Section A such as gender, age, program, which brand of smartphone are you currently using and what kind of OS (Operating System) are you using in your smartphone.

3.9.2 Scale Measurement (survey reliability)

According to [36], pilot study of the questionnaire can be defined as an preliminary study of research which test the research variable, data collection instrument and other research techniques for preparation of larger studies. Before the implementation throughout the whole research period, it is important to conduct pilot study in research because this study is to identify potential weakness and problem in description and instrumentation of probability sample. The advantage of pilot study is to improve the questionnaire and items which are not associated to this research that should be removed to make better data analysis. 36 respondents have been chosen to process the pilot study who study in UTAR. I have distributed 36 set of questionnaires link through social media. After the end of collecting 36 set of questionnaires, there are some responses are collected from the respondents about the error like grammar mistake, unclear vocabulary and comment for improvement of this questionnaire. Lastly, these 36 data sets will be analysed by using SmartPLS for pilot study.

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Figure 3.2: Rule of thumb for interpreting alpha from [37]

Cronbach’s alpha defined as a statistic which measure the internal consistency between a set of questionnaire items and it is a reliability measurement in wide range. [37] mentioned that the Cronbach’s alpha which equal or greater than 0.9 that the internal consistency is excellent. Besides that, the Cronbach’s alpha which smaller than 0.9 and equal or greater than 0.8 than the reliability is good.

Furthermore, the Cronbach's alpha which smaller than 0.8 and equal or greater than 0.7 is considered the internal consistency is acceptable. Moreover, the Cronbach's alpha which smaller than 0.7 and equal or greater than 0.6 than the internal consistency is questionable which means that this reliability of variable is weaker. Below 0.6 of Cronbach's alpha is considered very weak reliability which represented as poor or unacceptable.

According to [38], average variance extracted is to measure the variance calculated by the indicators connection to the error of measurement and loading value higher than 0.5 was suggested to interpret the use of the variable. This is because, recommended AVE obtained at least 0.5 for fully converge which means the AVE of less than 0.5 represents that the variable justified as more errors in the construct. Therefore, there is important that AVE should be computed for each variable and should be equal or greater than 0.5.

Variable	Cronbach's alpha	AVE	Number of Items
Social Media Addiction	0.776	0.588	4
Excessive of Watching Drama or Movie	0.720	0.272	5
Playing Mobile Game	0.876	0.672	5
Sleep Deprivation	0.743	0.557	4
Cognitive Function	0.681	0.498	4
Academic Performance	1.000	1.000	1

Table 3.3: Reliability Test (Cronbach's Alpha & Average Variance Extracted)

In the pilot study, the Cronbach's alpha, Average variance extracted and Item reliability test results are shown in the next chapter and each variable were tested separately. From the table above, it shows most of the variables are greater than 0.7 of Cronbach's alpha which represent these variables are good and acceptable that proved the responses in the questionnaires are inter consistent and reliable. However, there is a variable which obtained 0.681 of Cronbach's alpha which means that the reliability is questionable, therefore this situation will be further investigate in the coming chapter. On the other hand, for Average variance extracted, there are two Average variance extracted lesser

than 0.5 which mean that the variable justified as more errors in the construct. Therefore, it should be adjusted and further explanation in Chapter 4.

3.9.3 Correlation Coefficient

Correlation is to measure the covariation or association between the variables. [39] mentioned that a change in the size of one variable is related to a change in the size of another variable which represent in the positive correlation(same) or negative correlation (opposite). In most cases, the correlation is used in the linear relationship between two variables and declared as Pearson correlation. The Pearson correlation coefficient is often used to combine normally distributed data. This correlation helps us to provide the determination of the relationship among one variable to another variable. Correlation coefficient known as *r* is between the range of -1.0 and +1.0. If the *r* value is in a range of 0 to 1.0 which means it is positive value and linear relationship. Meanwhile, if the *r* value is in a range of -1.0 to 0, which represent it is negative value and linear relationship. In addition, if the *r* value is exactly 1.0 or -1.0 which indicated as perfect positive or perfect negative linear relationship respectively. However, there is 0 as *r* value in correlation which represent no relationship between the variables and no linear correlation. Based on [40], different range of *r* value indicates different strength of correlation which distinguish into 5 levels of strength. 0.00 – 0.19 shows "very weak", 0.20 – 0.39 represents "weak", 0.40 – 0.59 indicates "moderate", 0.60 – 0.79 means "strong" and 0.80 – 1.0 proved as "very strong". This analysis is used in this research to test the association between the independent variables which are Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game, Sleep Deprivation and Cognitive Function as well as the dependent variable which is Academic Performance.

3.9.4 Single and Multiple Regression Analysis

Regression analysis is a technique used to approximate the relationship between variables with cause-and-effect relationships. The purpose of single linear regression is to analyse the relationship between a dependent variable and independent variable and generate an equation for the linear relationship among the dependent and independent variables. On the other hand, the regression model with single dependent variable and more than one independent variables which known as multiple linear regression [41]. For this research, the regression analysis separated into three parts which are one multiple regression and two single regressions. Firstly, the multiple regression is to calculate the relations between three independent variables (Social Media Addition, Excessive of Watching drama or movie, Playing Mobile Game) and dependent variable (Sleep Deprivation). Next, the second regression is to examine the relationship of the independent variable (Sleep Deprivation) with dependent variable (Cognitive Function) which is single regression. Lastly, the second single regression is to evaluate the independent variable (Cognitive Function) and one dependent variable (Academic Performance).

Single Regression Analysis model is formulated as below:

$$y = B_0 + B_1 x_1 + E$$

y = dependent variable

x_i *= independent variable*

B *= parameter*

E *= Error*

Multiple Regression Analysis model is formulated as below:

$$y = B_0 + B_1 x_1 + \ldots + B_n x_n + E$$

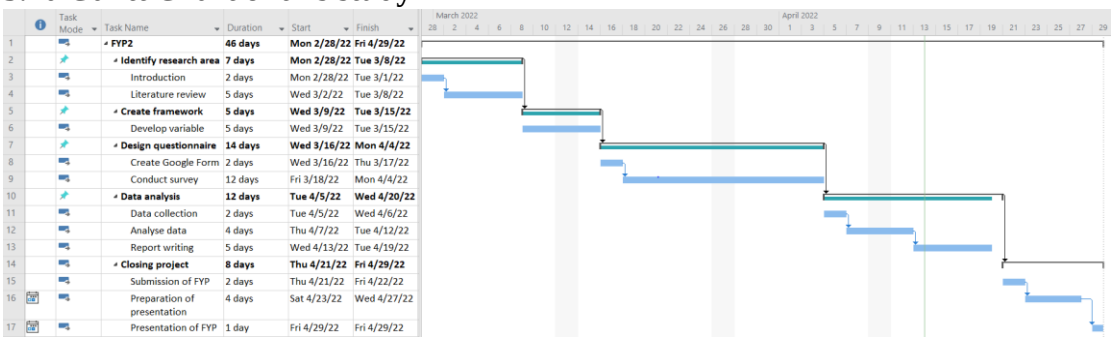
y = dependent variable

x_i *= independent variable*

B *= parameter*

E *= Error*

3.10 Gantt Chart of this study



	Task Mode	Task Name	Duration	Start	Finish
1		**FYP2**	**46 days**	**Mon 2/28/22**	**Fri 4/29/22**
2		**Identify research area**	**7 days**	**Mon 2/28/22**	**Tue 3/8/22**
3		Introduction	2 days	Mon 2/28/22	Tue 3/1/22
4		Literature review	5 days	Wed 3/2/22	Tue 3/8/22
5		**Create framework**	**5 days**	**Wed 3/9/22**	**Tue 3/15/22**
6		Develop variable	5 days	Wed 3/9/22	Tue 3/15/22
7		**Design questionnaire**	**14 days**	**Wed 3/16/22**	**Mon 4/4/22**
8		Create Google Form	2 days	Wed 3/16/22	Thu 3/17/22
9		Conduct survey	12 days	Fri 3/18/22	Mon 4/4/22
10		**Data analysis**	**12 days**	**Tue 4/5/22**	**Wed 4/20/22**
11		Data collection	2 days	Tue 4/5/22	Wed 4/6/22
12		Analyse data	4 days	Thu 4/7/22	Tue 4/12/22
13		Report writing	5 days	Wed 4/13/22	Tue 4/19/22
14		**Closing project**	**8 days**	**Thu 4/21/22**	**Fri 4/29/22**
15		Submission of FYP	2 days	Thu 4/21/22	Fri 4/22/22
16		Preparation of presentation	4 days	Sat 4/23/22	Wed 4/27/22
17		Presentation of FYP	1 day	Fri 4/29/22	Fri 4/29/22

Figure 3.3: Gantt Chart

The figure above is the Gantt chart developed for this study, there are five main task to complete in the period of 28th February until 29th April which are identify research area, create study framework, questionnaire design, data analysis and close project. Each task is set by a timeline to finish to avoid the delay of FYP completion.

3.11 Conclusion

In conclusion, Chapter 3 interpreted the methodology which applied to perform the design specification, research design and the method of data collection which divided into primary and secondary data, sampling design, questionnaire design which include adaption from published research, measuring scale which applied two types of scale namely nominal and interval scale. Besides that, the sample items of questionnaire before pilot studying provided and data processing which have three phrase to perform questionnaire reviewing, data editing and data coding as well as data analysis which include descriptive analysis, scale measurement and correlation coefficient. The responses from questionnaire known as data collected is export into Microsoft Excel and apply into SmartPLS for pilot test whereby SPSS for analysis which will be analysed in Chapter 4. The reason why use different analysis software in this study is SPSS is useful for data screening, descriptive statistics and so on. On the other hand, SmartPLS is useful to assess the reliability and validity. Therefore, I decided to use SmartPLS for reliability test whereby SPSS for research analysis. The next chapter is going to explain in detail the results obtained from the responses of questionnaire that had been distributed.

Chapter 4 – Data Analysis & Result

4.0 Chapter Description

This chapter is going to interpret and perform the analysis of the questionnaire survey from the respondents. Google Form Analytics, Microsoft Excel, SmartPLS software are used for processing the pilot study which collected 36 responses. Whereby, Statically Package for Society Science (SPSS) software is used for analysing data collected from 103 responses. The statistical test involved in this chapter is descriptive analysis which covered the demographic and general information of the respondent, reliability test by using scale measurement, correlation coefficient and multiple regression analysis.

4.1 Descriptive Analysis

4.1.1 Demographic Section

In this questionnaire, the demographic of the respondents had been requested in Section A which involved the gender, age group and course program studying.

Category	Frequency (N)	Percentage (%)
Gender		
Male	64	62.1
Female	39	37.9
Age		
18 – 20	12	11.7
21 – 25	88	85.4
26 – 30	3	2.9
Above 30	0	0
Faculty		
CFS	10	9.7
FAS	7	6.8
FBF	35	34
FICT	29	28.2
FEGT	5	4.9
FSC	2	1.9

ICS	7	6.8
FAM	5	4.9
FCI	3	2.9
LKCFES	0	0
FMHS	0	0

Table 4.1: Frequency Table

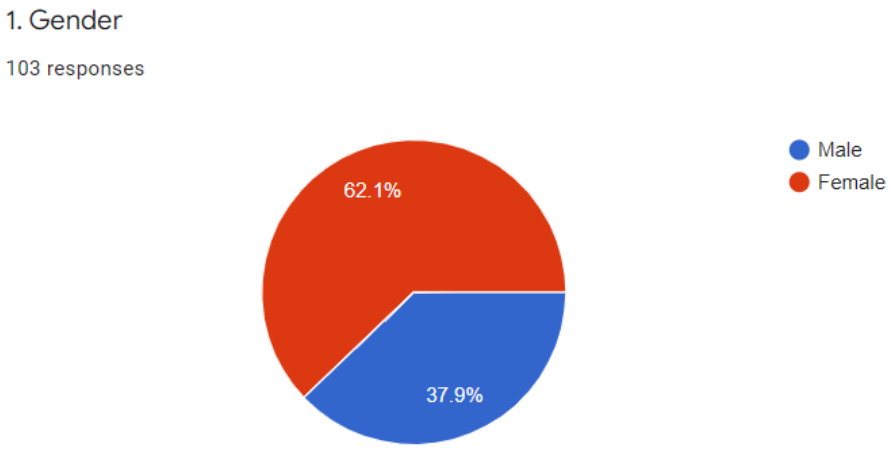


Figure 4.1: Gender

From Table 4.1 and Figure 4.1 above, the gender segmentation of the respondents who is participated in this questionnaire. Based on the result, most of the respondents are female which consists of 62.1% of total respondents and 64 respondents out of 103 respondents. Meanwhile, the male respondents having 37.9% of total respondents which is 39 respondents.

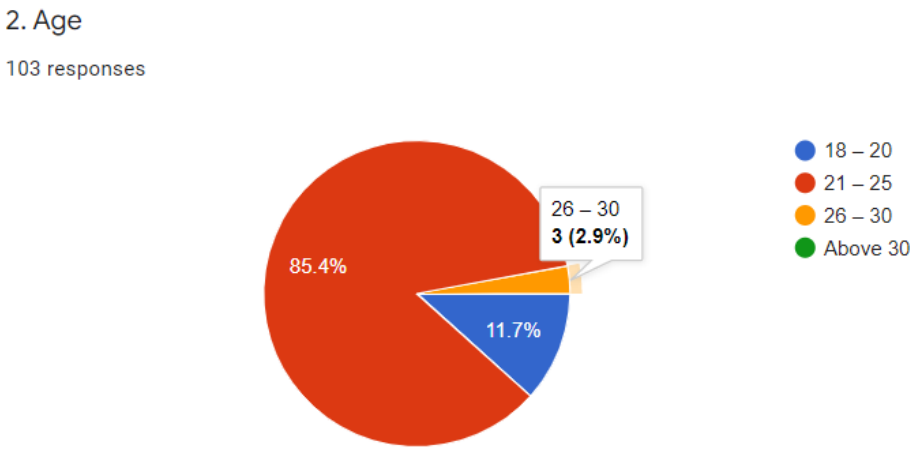


Figure 4.2: Age

According to Table 4.1 and Figure 4.2, most of the respondents are in the age group of 21 – 25 which represent 85.4% and 88 respondents are between 21 and 25. Moreover, 12 out of 103 are from the age group 18 to 20 which occupied 11.7% of all respondents. Furthermore, there are 3 respondents aged between 26 and 30 which obtained 2.9% of all respondents. Lastly, there is no respondents fall into the above 30 age group.

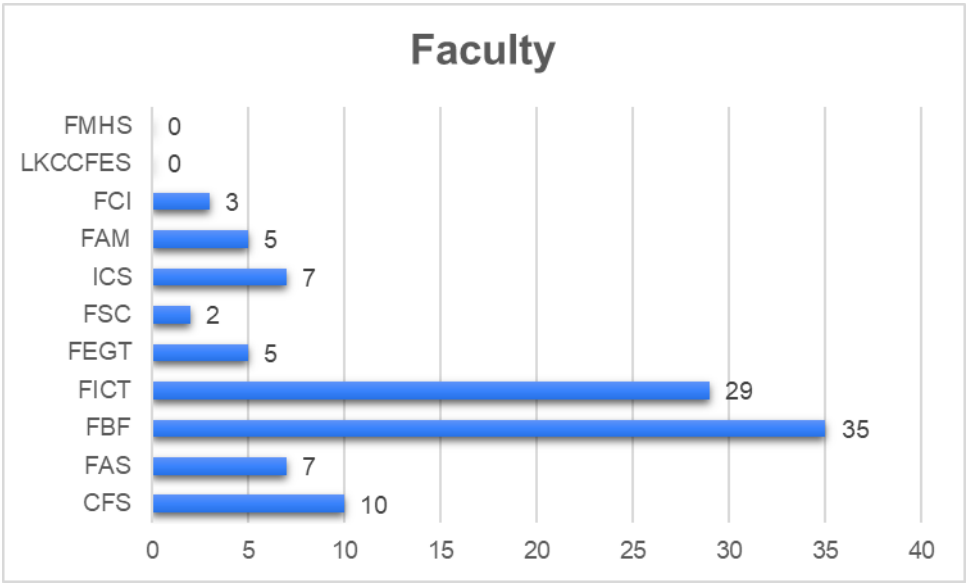


Figure 4.3: Faculty

Based on Table 4.1 and Figure 4.3, most of the respondents from Faculty of Business and Finance (FBF) which consists of 34% and 35 out of 103 respondents. Besides that, 29 respondents come from Faculty of Information and Communication Technology

(FICT) and 10 respondents from Centre for Foundation Studies (CFS) which obtained 28.2% and 9.7% of all respondents respectively. On the other hand, there are faculties obtain same numbers of respondents which 7 out of 103 respondents and 6.8% out of 100%, that is Faculty of Arts and Social Science (FAS) and Institute of Chinese Studies (ICS). Meanwhile, Faculty of Engineering and Green Technology (FEGT) and Faculty of Accountancy and Management (FAM) obtain 5 respondents and occupied 4.9% of all respondents. Furthermore, 3 respondents come from Faculty of Creative Industries (FCI) and 2 respondents come from Faculty of Science (FSC) which 2.9% and 1.9% out of all respondents respectively. Lastly, there is no respondent from Lee Kong Chian Faculty of Engineering (LKCFES) and Faculty of Medicine and Health Sciences (FMHS).

4.1.2 General Information

In this questionnaire, there are two questions have been requested for the general information in Section A. The questions involve the brands of smartphone and operating system (OS) to assess the information about smartphone.

Question	Frequency (N)	Percentage (%)
Which brand of smartphone are you currently using?		
Apple	31	30.1
Samsung	17	16.5
Huawei	20	19.4
Oppo	12	11.7
Vivo	8	7.8
Xiao Mi	12	11.7
Redmi	1	1.1
Realme	2	1.9

What kind of OS (Operating System) are you using in your smartphone?		
IOS	31	30.1
Android	68	66
Harmony	4	3.9

Table 4.2: General Information

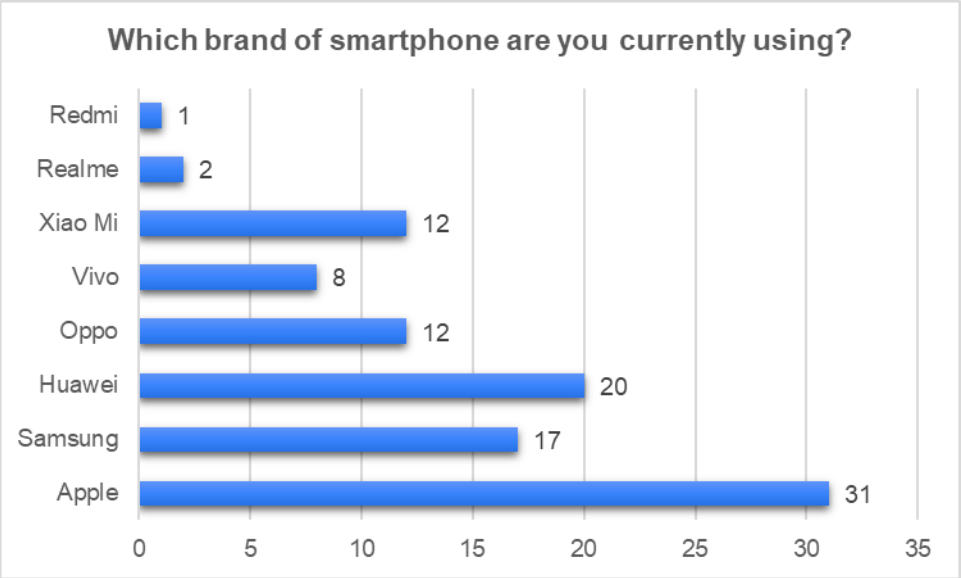


Figure 4.4: Smartphone Brand

According to Table 4.2 and Figure 4.4, most of the respondents are currently using Apple smartphone which consists of 30.1% and 31 respondents out of 103 respondents. Moreover, there are 20 respondents using Huawei and 17 respondents using Samsung which occupied 19.4% and 16.5% out of all respondents. Furthermore, there are two brands of smartphone consist of same respondents which are Xiao Mi and Oppo, both of them having 11.7% and 12 out of 103 respondents. Besides that, Vivo smartphone obtained 7.8% of total respondents and 8 respondents. On the other hand, there are 2 respondents categorized in using Realme smartphone which is 1.9%. Lastly, there is one respondent using Redmi which obtained 1.1%.

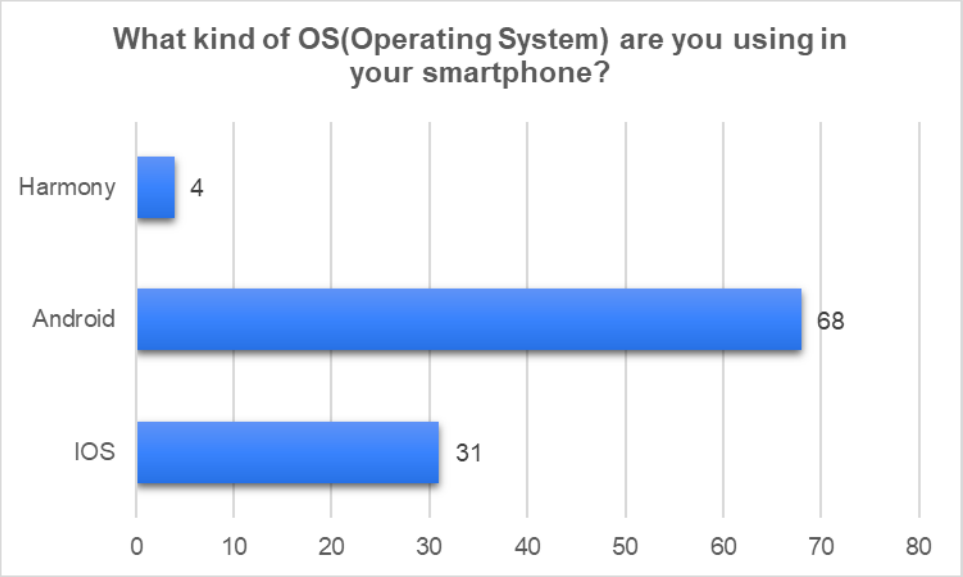


Figure 4.5: Operating System

From Table 4.2 and Figure 4.5, there are only three kinds of operating system used from the respondents which are IOS, Android and Harmony. For IOS user, there are 30.1% of total respondents and 31 out of 103 respondents. On the other hand, the majority of them are Android user which consists of 68 respondents and 66% of total respondent. Lastly, there are 4 respondents are Harmony user which occupied 3.9% of all respondents.

4.1.3 Central Tendencies Measurement of Variables

Variables	Frequency	Mean	Standard Deviation	Ranking
Social Media Addiction	103	4.000	1.058	1
Excessive watching drama or movie	103	3.657	1.329	2
Playing Mobile Game	103	3.161	1.501	6
Sleep Deprivation	103	3.434	1.336	4
Cognitive Function	103	3.495	1.333	3
Academic Performance	103	3.262	1.088	5

Table 4.3: Descriptive Statistic on Variables

According to Table 4.3, there is a descriptive statistic of Social Media Addiction, Excessive watching drama or movie, Playing Mobile Game, Sleep Deprivation,

Cognitive Function and Academic Performance. This statistic refers to a set of responses that summarizes the data provided by the sample. From the table above, the mean of Social Media Addiction obtained the highest value, which is 4.000, followed by Excessive watching drama or movie, Cognitive Function, Sleep Deprivation, Academic Performance which are 3.657, 3.495, 3.434 and 3.262 respectively. On the other hand, Playing Mobile Game having the lowest mean value among these six variables which is 3.161. Consequently, majority of the respondents agreed that Social Media Addiction is an important role which influence to their Sleep Deprivation, Cognitive Function and Academic Performance. Meanwhile, most of the respondents disagreed that Playing Mobile Game is not act as an important role in affecting their Sleep Deprivation, Cognitive Function and Academic Performance.

Standard deviation is a statistic that measure the dispersion of a set of data relative to the mean. Playing Mobile Game obtained the highest standard deviation value of 1.501, which shows that the data of Playing Mobile Game are diffuse apart to the large value and data collected are different from each other. In addition, the standard deviation of Sleep Deprivation, Cognitive Function, Excessive watching drama or movie and Academic Performance are 1.336, 1.333, 1.329 and 1.088 respectively. Meanwhile, the lowest value of standard deviation is Social Media Addiction as 1.058 which indicate that the data collected of Social Media Addiction is similar to each other and very close to the same value.

4.2 Scale Measurement for Pilot Study

4.2.1 Model Assessment before Adjustment

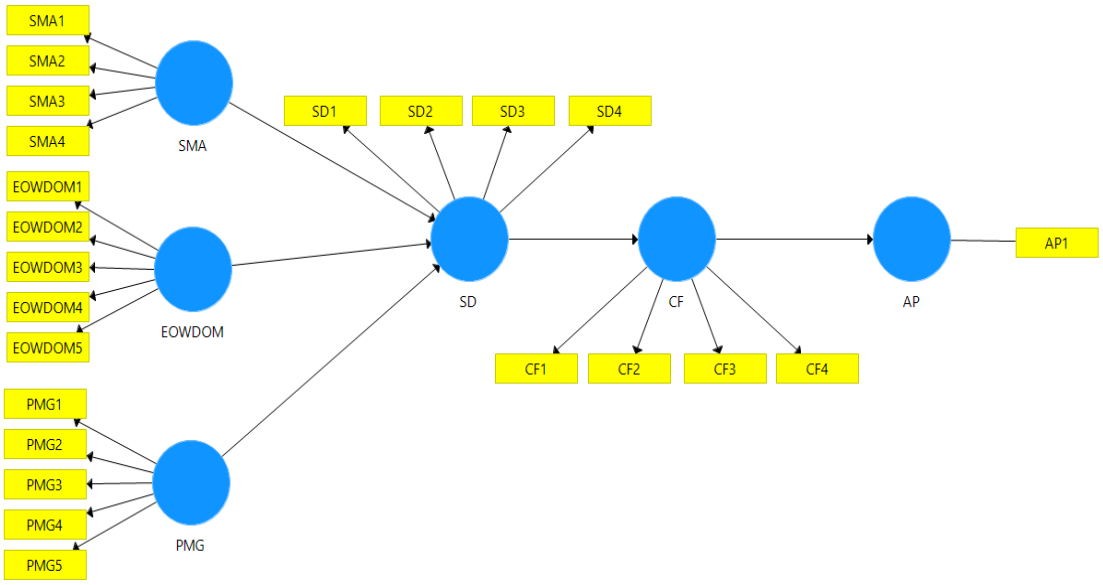


Figure 4.6: Initial Model Assessment

After applying all the variables and items into SmartPLS to generate the model, the variables and items is renamed by using different construct and item identifiers. For example, Social Media Addiction is named as SMA and its items named as SMA1, SMA2, SMA3 and SMA4 which mean there are four items in this variable. Then, run the PLS Algorithm for the next measurement.

4.2.2 Fornell-Larker Criterion before Adjustment

Construct	AP	CF	EOWDOM	PMG	SD	SMA
AP	1.000					
CF	-0.133	0.705				
EOWDOM	-0.187	0.394	0.521			
PMG	-0.097	0.320	0.313	0.820		
SD	-0.171	0.448	0.197	0.349	0.747	
SMA	-0.241	0.460	0.078	0.300	0.348	0.767

Table 4.4: Discriminant Validity before adjustment

The criterion of Fornell-Larker is often used to check the degree of variance shared between the latent variables in model. Based on [42], the way for assessing the degree of variance is compare the square root of Average variance extracted with correlation

of latent variables. They also mentioned the square root of each Average variance extracted must obtain a greater value than the correlation with other latent variables. Take example from the table above, the data in second column which AP to AP obtained 1.000 as square root of Average variance extracted and all the value below it which are -0.133, -0.187, -0.097, -0.171 and -0.241 known as correlation of latent variables, these values are smaller than 1.000. According to Table 4.4, all the correlation of latent variables are smaller than each square root of Average variance extracted.

4.2.3 Item Reliability before Adjustment

Construct / Item	SMA	EOWDOM	PMG	SD	CF	AP
SMA1	0.837					
SMA2	0.778					
SMA3	0.668					
SMA4	0.774					
EOWDOM1		0.045				
EOWDOM2		0.808				
EOWDOM3		0.641				
EOWDOM4		0.503				
EOWDOM5		0.205				
PMG1			0.751			
PMG2			0.818			
PMG3			0.695			
PMG4			0.916			
PMG5			0.896			
SD1				0.730		
SD2				0.568		
SD3				0.809		
SD4				0.848		
CF1					0.810	
CF2					0.722	

CF3					0.506	
CF4					0.747	
AP1						1.000

Table 4.5: Item Reliability before adjustment

According to Table 4.5, the item reliability result of Social Media Addiction, Excessive of watching drama or movie, Playing Mobile Game, Sleep Deprivation, Cognitive Function and Academic Performance shown above. Social Media Addiction as SMA obtained four items as SMA1, SMA2, SMA3 and SMA4 and there are four reliability values that are 0.837, 0.778, 0.668 and 0.774 respectively. Besides that, Excessive of watching drama or movie identified as EOWDOM which having 0.045, 0.808, 0.641, 0.503 and 0.205 in the five items as EOWDOM1, EOWDOM2, EOWDOM3, EOWDOM4 and EOWDOM5 respectively. Furthermore, Playing Mobile Game known as PMG obtained five items as PMG1, PMG2, PMG3, PMG4 and PMG5 whereas the reliability values are 0.751, 0.818, 0.695, 0.916 and 0.896 respectively. Moreover, Sleep Deprivation known as SD obtained four items as SD1, SD2, SD3 and SD4 while each reliability values are 0.730, 0.568, 0.809 and 0.848 respectively. In addition, Cognitive Function identified as CF which has four items as CF1, CF2, CF3 and CF4 whereas their reliability values are 0.810, 0.722, 0.506 and 0.747 respectively. Lastly, the reliability value is 1.000 because there is only one item in Academic Performance which is AP1.

4.2.4 Reliability Test before Adjustment

Construct	Cronbach's alpha	AVE	Number of Items
Social Media Addiction	0.776	0.588	4
Excessive of Watching Drama or Movie	0.720	0.272	5
Playing Mobile Game	0.876	0.672	5
Sleep Deprivation	0.743	0.557	4
Cognitive Function	0.681	0.498	4
Academic Performance	1.000	1.000	1

Table 4.6: Reliability Test for Pilot Study

Based on Table 4.6 above refers the result of reliability test before adjustment which completed by the five independent variables which are Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game, Sleep Deprivation and Cognitive Function as well as one dependent variable which is Academic Performance. However, there are two Average variance extracted are lesser than 0.5 which variables are Excessive of watching drama or movie and Cognitive Function. Therefore, it should be adjusted for better reliability.

4.2.5 Adjustment for Better Reliability

In the previous chapter, I have interpreted how Cronbach's alpha and Average variance extracted is being analysis. The excellent reliability is categorized in the Cronbach's alpha which greater than 0.9. In addition, good reliability is classified in the Cronbach's alpha which in the range of 0.8 to 0.9 whereas Cronbach's alpha value which in between 0.7 and 0.8 that examined as acceptable reliability. Besides that, the value of Cronbach's alpha obtained in the range of 0.6 to 0.7 is considered as questionable reliability. However, Cronbach's alpha obtained lesser than 0.6 which represent that is weak reliability. Therefore, I conclude that the higher Cronbach's alpha the more reliable internal consistency. According to the Table 4.6, it supposedly showed that all the values of Cronbach's alpha for each variable are greater than 0.6. Therefore, the internal consistency of the measures adopted in this research is considered as acceptable.

On the other hand, the value of Average variance extracted is fixed which value must be equal or greater than 0.5. From Table 4.6 above, there are two Average variance extracted are lesser than 0.5 which variables are Excessive of watching drama or movie and Cognitive Function. In the pilot testing, I need to remove some items which obtained lesser item reliability value in certain variable. From the Table 4.5, there are two indicator reliability value lesser than 0.5 which are EOWDOM1 and EOWDOM5 in Excessive of watching drama or movie which variable identifier as EOWDOM. Therefore, I tend to remove these two items from this construct. Not only that, the Average variance extracted value of

Cognitive Function also lesser than 0.5. According to Table 4.5, I removed CF3 which obtained the smallest value of item reliability in Cognitive Function as CF. After performing the adjustments, I repeat the same procedure of apply variables and items into new SmartPLS project and run the PLS algorithm to investigate the difference between original and new model.

4.2.6 Model Assessment after Adjustment

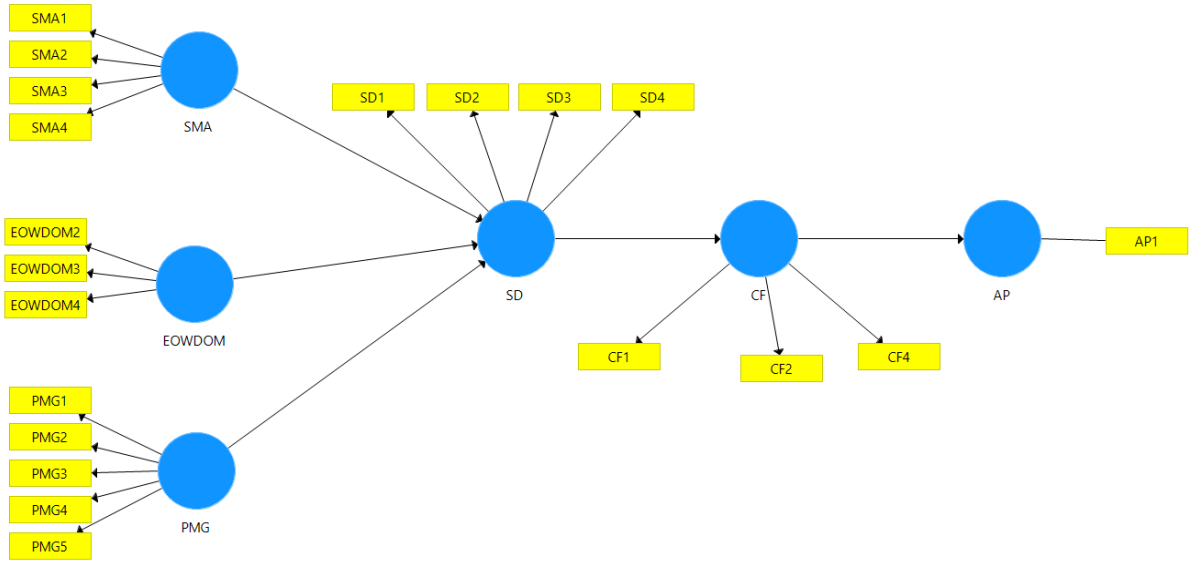


Figure 4.7: Final Model Assessment

After the adjustment and applying all the variables and items into new project, the model assessment shows the number of items has reduced compared to the previous model. For EOWDOM, there are two items have been removed which are EOWDOM1 and EOWDOM5. Meanwhile, CF3 has been deleted from CF.

4.2.7 Fornell-Larker Criterion after Adjustment

Construct	AP	CF	EOWDOM	PMG	SD	SMA
AP	1.000					
CF	-0.165	0.769				
EOWDOM	-0.030	0.346	0.764			
PMG	-0.095	0.304	0.119	0.820		
SD	-0.162	0.449	0.202	0.352	0.746	
SMA	-0.238	0.485	0.168	0.302	0.356	0.767

Table 4.7: Discriminant Validity after adjustment

According to Table 4.7, all the correlation of latent variables are smaller than each square root of AVE.

4.2.8 Items Reliability after Adjustment

Construct / Item	SMA	EOWDOM	PMG	SD	CF	AP
SMA1	0.836					
SMA2	0.777					
SMA3	0.673					
SMA4	0.774					
EOWDOM2		0.892				
EOWDOM3		0.733				
EOWDOM4		0.646				
PMG1			0.749			
PMG2			0.818			
PMG3			0.700			
PMG4			0.915			
PMG5			0.896			
SD1				0.717		
SD2				0.558		
SD3				0.836		
SD4				0.838		
CF1					0.835	

CF2					0.698	
CF4					0.768	
AP1						1.000

Table 4.8: Item Reliability after Adjustment

Table 4.8 shows the items reliability after performing the adjustment. Social Media Addiction as SMA obtained four items as SMA1, SMA2, SMA3 and SMA4 and there are four reliability values that are 0.836, 0.777, 0.673 and 0.774 respectively. Besides that, Excessive of watching drama or movie identified as EOWDOM which having 0.892, 0.733 and 0.646 in the three items as EOWDOM2, EOWDOM3 and EOWDOM4 respectively. Furthermore, Playing Mobile Game known as PMG obtained five items as PMG1, PMG2, PMG3, PMG4 and PMG5 whereas the reliability values are 0.749, 0.818, 0.700, 0.915 and 0.896 respectively. Moreover, Sleep Deprivation known as SD obtained four items as SD1, SD2, SD3 and SD4 while each reliability values are 0.717, 0.558, 0.836 and 0.838 respectively. In addition, Cognitive Function identified as CF which has three items as CF1, CF2 and CF4 whereas their reliability values are 0.835, 0.698 and 0.768 respectively. Lastly, the reliability value is keeping as 1.000 because there is only one item in Academic Performance which is AP1.

4.2.9 Reliability Test after Adjustment

Construct	Cronbach's alpha	AVE	Number of Items
Social Media Addiction	0.776	0.588	4
Excessive of Watching Drama or Movie	0.633	0.583	3
Playing Mobile Game	0.876	0.672	5
Sleep Deprivation	0.743	0.557	4
Cognitive Function	0.674	0.592	3
Academic Performance	1.000	1.000	1

Table 4.9: Reliability Test for Actual Research

Although compare the test result between Table 4.6 and 4.9 which is before and after adjustment, the Cronbach's alpha and AVE of Excessive of watching drama or movie

and Cognitive Function have changed after the reliability test, which two Cronbach's alpha value have a little bit dropped but both Cronbach's alpha value is still in fair reliability. Besides that, the Average variance extracted of Excessive of watching drama or movie and Cognitive Function have increased to the value that greater than 0.5. Consequently, there is better reliability test result showed in Table 4.9. In other words, it supposedly showed that all the values of Cronbach's alpha for each variable are greater than 0.6 and all the AVE value are greater than 0.5. Therefore, the internal consistency of the measures adopted in this research is considered as acceptable and good for fully converge.

4.3 Sample Items of Questionnaire for Actual Research

Factor	Sample Item
Social Media Addiction	1. I am addicted to social networks and this is a challenge that affect my academic life. 2. Online social networks distract me from my studies. 3. Time spent on social media can never be compared to time spent on my studies. 4. There is no improvement in my grades since I became engaged into these social networking site**s.**
Excessive watching drama or movie	5. I usually spent _____ on one binge watching (excessive watching drama or movie) session. 6. How many episodes did you usually watch in one binge watching (excessive watching drama or movie) session?

	7. After I studied for a long while I can treat myself by watching multiple episodes of a series.
Playing Mobile Game	8. I prefer to play online mobile games rather than go out with classmates to have a group study. 9. I used to get low grades in most of my subjects because of playing online mobile games. 10. I have less sleep because of playing online mobile games. 11. I am unable to complete my assignments in university on time because of playing online mobile games 12. I am unable attend classes on time because of playing online mobile games.
Sleep Deprivation	13. I take _____ for my actual sleep at night during typical school week. 14. I take _____ to fall asleep at night. 15. I felt tired during class time. 16. I felt sleepiness during daytime.
Cognitive Function	17. I am unable to stay awake or focused during class. 18. I am unable to focus during examination. 19. I think my academic performance is hindered.

Academic Performance	20. What is your latest GPA?

Table 4.10: Sample Items after Reliability Test

4.4 SPSS Result

4.4.1 Pearson Correlation Analysis

		SMA	EOWDOM	PMG	SD	CF	AP
SMA	Pearson Correlation	1	.260**	.652**	.463**	.672**	-.302**
	Sig.(2-tailed)		.008	<.001	<.001	<.001	<.002
EOWDOM	Pearson Correlation		1	.262**	.447**	.295**	-.248*
	Sig.(2-tailed)			.008	<.001	.002	.012
PMG	Pearson Correlation			1	.533**	.826**	-.353**
	Sig.(2-tailed)				<.001	<.001	<.001
SD	Pearson Correlation				1	.581**	-.321**
	Sig.(2-tailed)					<.001	<.001
CF	Pearson Correlation					1	-.356**
	Sig.(2-tailed)						<.001
AP	Pearson Correlation						1
	Sig.(2-tailed)						

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

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

Table 4.11: Pearson Correlation

Pearson correlation analysis is to calculate the strength of relationship among independent variables and dependent variable. According to Table 4.11, each independent variables (Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game, Sleep Deprivation, Cognitive Function) are significant at the 0.01 level or 0.05 level(2-tailed) to the dependent variable (Academic Performance) in correlation. Based on the correlation between SMA (Social Media Addiction), EOWDOM (Excessive of Watching drama or movie) and PMG (Playing Mobile Game) to SD (Sleep Deprivation), their *r* value show 0.463, 0.447 and 0.533 respectively which means the correlation are positive. Therefore, these three independents variables have moderate correlation to Sleep Deprivation whereby Playing Mobile Game has the strongest significant

relationship to Sleep Deprivation followed by Social Media Addiction and Excessive of Watching drama or movie. Furthermore, the correlation *r* value between Sleep Deprivation and CF (Cognitive Function) is 0.581 which represent it is positive correlation and moderate correlation. Lastly, the *r* value of Cognitive Function to AP (Academic Performance) shows -0.356 which indicates it is negative correlation and weak correlation. In short, the independent variables (SMA, EOWDOM & PMG) are positively related to another independent variable (SD) which means the increase of SMA, EOWDOM and PMG, the increase of SD. Other than that, there is positive correlation between the SD and another independent variable (CF) which represent the increase of SD, the increase of CF. However, there is a negative correlation between CF to AP which indicates the decrease of CF, the increase of AP that means the lower of cognitive function the higher GPA students get. Meanwhile, the correlation of five independent variables (SMA, EOWDOM, PMG, SD, CF) to dependent variable (AP) are negative relationship which *r* values stated as – 0.302, - 0.248, - 0.353, -0.321 and -0.356.

4.4.2 Single & Multiple Regression Analysis

This analysis is used to measure and examine the relationship of independent variables and dependent variable. In this study, there are two single regression analysis and a multiple regression. The first regression is multiple regression which evaluate the relationship between Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game as independent variables and Sleep Deprivation as dependent variable. After that, the next regression is single regression to test Sleep Deprivation as independent variable and Cognitive Function as dependent variable. Lastly, another single regression is to examine Cognitive Function as independent variable and Academic Performance as dependent variable. All the single and multiple regression analysis able to successfully be conducted because all the variable and item are measured by the Likert scale.

4.4.2.1 Multiple Regression (SMA, EOWDOM, PMG & SD)

The first regression is to examine the relationship of four variables which are Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game as independent variables and Sleep Deprivation as dependent variable.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.632^{a}	0.399	0.381	0.62696

Table 4.12: Model Summary of Multiple Regression Analysis (SMA, EOWDOM, PMG & SD)

According to Table 4.12, R square value obtained 0.399 in this relationship which represents there is 39.9% of the dependent variable (Sleep Deprivation) able to be explained by the three independent variables (Social Media Addiction, Excessive of Watching drama or movie & Playing Mobile Game). In other words, there is 39.9% has been significantly explained by these three independent variables whereby other 63.1% have explained by other variables which indicates there are other variables that not included in this study are important to interpret Sleep Deprivation. Other than that, R value shown in the table is 0.632 which means that their correlation is strong and positive. Therefore, H1 of hypotheses 1,2,3 are reasonable as there is a significant relationship between SMA, EOWDOM, PMG and SD.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.831	3	8.610	21.905	$< 0.001^{b}$
	Residual	38.914	99	0.393		
	Total	64.745	102			

a. Predictor: (Constant), Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game

b. Dependent variable: Sleep Deprivation

Table 4.13: ANOVA of Multiple Regression Analysis

Based on Table 4.13, F value is 21.905 and the significant value is < 0.001 which is lesser than the alpha value (0.05). Thus, the overall regression model

with these three predictors as Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game are well explained the variation in Sleep Deprivation.

Model		**Unstandardized Coefficients**		**Standardized Coefficients**		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.242	0.363		3.420	<0.001
	SMA	0.150	0.103	0.151	1.455	0.149
	EOWDOM	0.254	0.065	0.316	3.886	<0.001
	PMG	0.210	0.062	0.352	3.398	<0.001

Table 4.14: Coefficients of Multiple Regression Analysis

Output from Table 4.14, equation is formed as below:

Sleep Deprivation = 1.242 + 0.15 (Social Media Addiction) + 0.254 (Excessive of Watching drama or movie) + 0.21 (Playing Mobile Game)

Based on the linear equation above, it shows that is a significant positive relationship between Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game and Sleep Deprivation. The unstandardized coefficients value of SMA, EOWDOM, PMG are $\beta = 0.15$, $\beta = 0.254$, $\beta = 0.21$ respectively. Firstly, the most significant predictor is Excessive of Watching drama which obtained the highest β value as 0.254 compared to other two variables. In other words, it able to be interpreted by a frequency increase in Excessive of Watching drama or movie affect to an increase of 0.254 in Sleep Deprivation. In addition, the significant value of EOWDOM obtained $p < 0.001$ which means that it is lesser than the significant level of 0.05 and also this sample data provides enough evidence to reject null hypothesis which is H0.

Besides that, Playing Mobile Game ranked as the following significant factor to influence Sleep Deprivation which obtained the second highest of β value = 0.21. Therefore, a number increase in Playing Mobile Game cause an increase of 0.21 in Sleep Deprivation. Furthermore, the significant value of PMG is lesser than 0.001 which represents it is lesser than the significant level of 0.05 and also accept the alternative hypothesis which is H3.

Moreover, Social Media Addiction obtained the lowest important factor in affecting Sleep Deprivation. This is because, the table above shows that the β value of SMA is 0.15 which is the smallest value compared to the other two variables. However, the significant value of SMA obtained 0.149 which is greater than the significant level of 0.05. Therefore, the null hypothesis which is H0 is accepted because SMA is no effect was observed with the dependent variable which is SD.

4.4.2.2 Single Regression (SD & CF)

The second regression is to evaluate the relationship of Sleep Deprivation as independent variable and Cognitive Function.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.581^{a}	0.337	0.331	0.96828

Table 4.15: Model Summary of Single Regression Analysis (SD & CF)

Based on Table 4.15, R square value is 0.337 in this relationship which means independent variable (Sleep Deprivation) able to explain to 33.7% of the dependent variable (Cognitive Function). Hence, there is 33.7% has been significantly explained by the independent variable. On the other hand, other 66.3% have interpreted by other variables that never cover in this research. In addition, the table shows that the R value is 0.581 which represents that the correlation between SD and CF is moderate and positive. Thus, H1 of hypotheses 4 is proved due to there is a significant relationship between Sleep Deprivation and Cognitive Function.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	48.164	1	48.164	51.370	$< 0.001^b$
	Residual	94.695	101	0.938		
	Total	142.859	102			

a. Predictor: (Constant), Sleep Deprivation

b. Dependent variable: Cognitive Function

Table 4.16: ANOVA of Single Regression Analysis (SD & CF)

According to Table 4.16, it shows the F value is 51.37 and the significant value is lesser than 0.001 which value is lesser than the alpha value (0.05). Therefore, the overall regression model with Sleep Deprivation is well interpreted the variation in Cognitive Function.

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.533	0.424		1.256	0.212
	SD	0.862	0.120	0.581	7.167	<0.001

Table 4.17: Coefficient of Single Regression Analysis (SD & CF)

Output from Table 4.17, equation is formed as below:

Cognitive Function = 0.533 + 0.862 (Sleep Deprivation)

From the linear equation above, the relationship between Sleep Deprivation and Cognitive Function is significant positive. The unstandardized coefficient value of Sleep Deprivation is β value of 0.862. In other words, it can be explained as a number increase in Sleep Deprivation cause to an increase of 0.862 in Cognitive Function. Other than that, the significant value known as p value of SD is < 0.001 which indicates that it is lesser than the significant level of 0.05 and it is proved to reject the null hypothesis which is H0.

4.4.2.3 Single Regression (CF & AP)

The last regression is to examine the relationship of Cognitive Function as independent variable and Academic Performance as dependent variable.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.356^{a}	0.127	0.118	1.027

Table 4.18: Model Summary of Single Regression Analysis (CF & AP)

From Table 4.18, R square value is 0.127 in this relationship which indicates that the 12.7% of dependent variable (Academic Performance) able to be explained by the independent variable (Cognitive Function). Thus, there is 12.7% has been significantly interpreted by the independent variable which means that there is other 87.3% interpreted by other variable that not included in this study. Besides that, R value in this relationship is 0.356 which represents the correlation is weak and negative. Hence, H1 of hypotheses 5 is reasonable because there is a significant relationship between Cognitive Function and Academic Performance.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.486	1	15.486	14.695	$< 0.001^{b}$
	Residual	106.436	101	1.054		
	Total	121.922	102			

a. Predictor: (Constant), Cognitive Function

b. Dependent variable: Academic Performance

Table 4.19: ANOVA of Single Regression Analysis (CF & AP)

Based on Table 4.19, it shows F value is 14.695 and the significant value is < 0.001 which is lesser than the alpha value of 0.05. Thus, the overall regression model with Cognitive Function is well explained the variation in Academic Performance.

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.413	0.317		13.931	<0.001
	CF	- 0.329	0.086	- 0.356	- 3.833	<0.001

Table 4.20: Coefficient of Single Regression Analysis (CF & AP)

Output from Table 4.20, equation is formed as below:

Academic Performance = 4.413 – 0.329 (Cognitive Function)

Based on the linear equation above, the relationship between Cognitive Function and Academic Performance is significant negative. The unstandardized coefficient value of Cognitive Function is β value of - 0.329. Therefore, it able to be interpreted as a frequency increase in Cognitive Function affect to decrease of 0.329 in Academic Performance. Other than that, the p value known as significant value of CF is < 0.001 which represents that it is lesser than the significant level of 0.05 and this result is proved to accept the alternative hypothesis which is H5.

4.5 Test of significant

Hypotheses 1

H_0: There is no significant relationship between social media addiction and sleep deprivation.

H_1: There is a significant relationship between social media addiction and sleep deprivation.

The significant value knows as p value of Social Media Addiction is 0.149. It is greater than the significant level of 0.05. Therefore, H_1 is rejected and accepted H_0 which is proved there is no significant relationship between social media addiction and sleep deprivation.

Hypotheses 2

H_0: There is no significant relationship between excessive of watching drama or movie and sleep deprivation.

H_2: There is a significant relationship between excessive of watching drama or movie and sleep deprivation.

The p value of Excessive of Watching drama or movie is < 0.001 which is smaller than 0.001. This value is lesser than the significant level of 0.05. Hence, H_2 is accepted and it shows there is a significant relationship between excessive of watching drama or movie and sleep deprivation

Hypotheses 3

H_0: There is no significant relationship between playing mobile game and sleep deprivation.

H_3: There is a significant relationship between playing mobile game and sleep deprivation.

The significant value of Playing Mobile Game is < 0.001 which is lower than the significant level of 0.05. Thus, H_3 is accepted and it proves that there is a significant relationship between playing mobile game and sleep deprivation.

Hypotheses 4

H_0: There is no significant relationship between sleep deprivation and cognitive function.

H_4: There is a significant relationship between sleep deprivation and cognitive function.

The p value of Sleep Deprivation is lesser than 0.001 which is lower than the significant level of 0.05. Therefore, H_4 is accepted and it shows that there is a significant relationship between sleep deprivation and cognitive function.

Hypotheses 5

H_0: There is no significant relationship between cognitive function and academic performance.

H_5: There is a significant relationship between cognitive function and academic performance.

The significant value of Cognitive Function is < 0.001 which lower than the significant level of 0.05. Hence, H_5 is accepted and it proves that there is a significant relationship between cognitive function and academic performance.

4.6 Summary of Hypotheses

NO	Hypothesis	Result
H_1	There is a significant relationship between social media addiction and sleep deprivation	REJECTED
H_2	There is a significant relationship between excessive of watching drama or movie and sleep deprivation	ACCEPTED
H_3	There is a significant relationship between playing mobile game and sleep deprivation	ACCEPTED
H_4	There is a significant relationship between sleep deprivation and cognitive function	ACCEPTED
H_5	There is a significant relationship between cognitive function and academic performance	ACCEPTED

Table 4.21: Summary of hypotheses

In short, Social Media Addiction has no significant effect on Sleep Deprivation, but Excessive of Watching drama and Playing Mobile Game as their significant value greater than 0.05 which represent that there is a significant influence on Sleep Deprivation. Next, Sleep Deprivation has significant influence on Cognitive Function because its significant value greater than 0.05. Lastly, Cognitive Function is proved that has significant effect on Academic Performance as the p value < 0.05.

4.7 Conclusion

In conclusion, the demographic and general information of the respondents is analysed by using frequency analysis in the descriptive analysis part. Besides that, in central tendency of six variables section, the mean and standard deviation are used to analyse. In addition, the measurement scale of reliability test for the six variables and the results prove that the items are acceptable and the reliability is good for the larger scale of research. Other than that, Pearson Correlation Analysis, Multiple Regression Analysis, Single Regression Analysis are used to calculate the strength of correlation and significant effect between independent variables and dependent variable. Therefore, the overall study will be summarized and discuss in the coming chapter. Lastly, the result that acquired in this chapter provide resources to us for making recommendation on this research.

Chapter 5 – Conclusion

5.1 Statistical Analysis Summary

5.1.1 Descriptive Analysis

According to the demographic information, most of the respondents are female which consist of 64 respondents out of 103 respondents and 62.1% of total respondents. On the other hand, the male respondents having 37.9% of total respondents which is 39 respondents.

Besides that, the majority of the respondents are in the age group of 21 – 25 which represent 85.4% and 88 respondents are between 21 and 25. In addition, there are 12 respondents are in the age group of 18 – 20 which hold 11.7% of all respondents and 3 respondents who in the age group of 26 – 30 which consists of 2.9 out of the total respondents.

For course faculty, most of the respondents from Faculty of Business and Finance (FBF) which consists of 35 and 34% out of all respondents, 29 respondents come from Faculty of Information and Communication Technology (FICT) and 10 respondents from Centre for Foundation Studies (CFS) which obtained 28.2% and 9.7% of all respondents respectively. There are two faculties obtain same numbers of respondents which 7 out of 103 respondents and 6.8% out of the total respondents, that is Faculty of Arts and Social Science (FAS) and Institute of Chinese Studies (ICS). Meanwhile, Faculty of Engineering and Green Technology (FEGT) and Faculty of Accountancy and Management (FAM) obtain 5 respondents and occupied 4.9% of all respondents. Furthermore, 3 respondents come from Faculty of Creative Industries (FCI) and 2 respondents come from Faculty of Science (FSC) which 2.9% and 1.9% out of all respondents respectively. Lastly, there is no respondent from Lee Kong Chian Faculty of Engineering (LKCFES) and Faculty of Medicine and Health Sciences (FMHS).

Furthermore, most of the respondents are currently using Apple smartphone which consists of 30.1% and 31 respondents out of 103 respondents. Moreover, there are 20 respondents using Huawei and 17 respondents using Samsung which occupied 19.4% and 16.5% out of all respondents. Furthermore, there are two brands of smartphone consist of same respondents which are Xiao Mi and Oppo, both of them having 11.7% and 12 out of 103 respondents. Besides that, Vivo smartphone obtained 7.8% of total respondents and 8 respondents. On the other hand, there are 2 respondents categorized in using Realme smartphone which is 1.9%. Lastly, there is one respondent using Redmi which obtained 1.1%.

On the other hand, there are only three kinds of operating system used from the respondents which are IOS, Android and Harmony. For IOS user, there are 30.1% of total respondents and 31 out of 103 respondents. On the other hand, the majority of them are Android user which consists of 68 respondents and 66% of total respondent. Lastly, there are 4 respondents are Harmony user which occupied 3.9% of all respondents.

5.1.2 Scale Measurement

The scale measurement in this research is adopting the reliability test by using each of the variables and items reliability with Fornell-Larker Criterion, Items reliability, Cronbach's alpha and Average variance extracted. Based on the results, the highest value of Cronbach's alpha is Academic Performance which obtained 1.000, followed by Playing Mobile Game (0.876), Social Media Addiction (0.776), Sleep Deprivation (0.743) and Cognitive Function (0.674) whereas the lowest value of Cronbach's alpha is Excessive of watching drama or movie which is 0.633. Besides that, all the Average variance extracted value among six variables are between 0.5 and 1. Therefore, it is still considered an acceptable measurement.

5.1.3 SPSS Analysis

5.1.3.1 Pearson Correlation

Pearson correlation analysis is to calculate the strength of linear relationship between the independent variables and dependent variable. In this study, the analysis of correlation needs to separate into 3 parts which are (Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game & Sleep Deprivation) as first part, (Sleep Deprivation & Cognitive Function) as second part and (Cognitive Function & Academic Performance) as the last part. As the first part, Social Media Addiction, Excessive of Watching drama or movie and Playing Mobile Game as independent variables and Sleep Deprivation as dependent variable. The r value in this relationship is 0.463, 0.447 and 0.533 for Social Media Addiction, Excessive of Watching drama or movie and Playing Mobile Game respectively. The result shows that Playing Mobile Game (0.533) has the strongest relationship with Sleep Deprivation, followed by Excessive of Watching drama or movie (0.447) then Social Media Addiction (0.463). The correlation of three of these independent variables and dependent variable is significant positive. Next, Sleep Deprivation as independent variable and Cognitive Function as dependent variable. The correlation value stated as 0.581 which means that their strength of correlation is moderate and significant positive. Lastly, Cognitive Function as independent variable and Academic Performance as dependent variable. The r value is –0.356 which represent that it is significant negative in this relationship and the strength of correlation is considered as weak.

5.1.3.2 Single and Multiple Regression Analysis

Single and multiple regression is to evaluate the relationship of the independent variable and dependent variable. In this study, there are one multiple regression and two single regressions. Firstly, the multiple regression is to examine Social Media Addiction, Excessive of Watching drama and movie and Playing Mobile Game as independent variables and Sleep Deprivation as dependent variable. The coefficients of three independent variables are 0.15, 0.254 and 0.21 which means that there is positive relationship between these three independent variables and dependent variable. In other words, the independent variables

increase, the dependent variable also increase. Furthermore, their significant values are 0.149, < 0.001 and < 0.001 respectively. For Social Media Addiction, its significant value as 0.149 is greater than the significant level of 0.05, therefore the null hypothesis as H0 should be accepted which means that there is no significant relationship between social media addiction and sleep deprivation. On the other hand, the significant values of Excessive of Watching drama and movie and Playing Mobile Game are smaller than the significant level of 0.05, thus the alternative hypothesis as H2 and H3 are accepted which represents that there is a significant relationship between excessive of watching drama and movie and sleep deprivation as well as there is a significant relationship between playing mobile game and sleep deprivation.

Besides that, the next regression is single regression is to test the relationship of Sleep Deprivation as independent variable and Cognitive Function as dependent variable. The coefficient of Sleep Deprivation is 0.862 which represents that there is positive relationship between Sleep Deprivation and Cognitive Function. Moreover, the significant value of independent variable is < 0.001 which is lower than the significant level of 0.05. Hence, the null hypothesis is rejected which indicates that there is a significant relationship between sleep deprivation and cognitive function.

Lastly, the next single regression is to evaluate the relationship of Cognitive Function as independent variable and Academic Performance as dependent variable. The coefficient of Cognitive Function is - 0.329 which means that there is negative relationship between the independent variable and dependent variable. In other words, the independent variable increase, the dependent variable decrease. Other than that, the significant value is < 0.001 which is lower than the significant level of 0.05. Thus, the null hypothesis is rejected which represents that there is a significant relationship between cognitive function and academic performance.

5.2 Discussion of Hypotheses Test

5.2.1 First Hypothesis

H1: There is a significant relationship between social media addiction and sleep deprivation.

According to the Pearson correlation coefficient analysis, Social Media Addiction has a significant relationship with Sleep Deprivation as the correlation value of these two variables is 0.463 which strength of correlation considered as moderate level and it is positive significant relationship. Besides that, the significant value of these two variables is < 0.001 which is lower than the significant level of 0.01 or 0.05. However, the result of multiple regression analysis, the significant value of Social Media Addiction is 0.149 which is greater than the significant level of 0.05. In other words, it is weak evidence and lose to reject the null hypothesis. Therefore, it is no significant relationship between Social Media Addiction and Sleep Deprivation in this study even though the significant value is < 0.001 in Pearson correlation analysis. The result of the published researches in chapter 2, which is the study from [9] that stated out the use of social media on smartphone extravagantly will negatively affect sleeping duration. Other than that, a study from [11] mentioned that problematic social networking use have stronger effect on student satisfaction in school through sleep disturbance. In addition, another study from [12] pointed out that frequency of social media use and degree of problematic social media use is a critical character which delay teenagers' bedtime. The published studies above support that social media use as independent variable affect sleep. However, the result of this study shows that there is no significant relationship between Social Media Addiction and Sleep Deprivation. A study from [43] related to the result of this study which mentioned that social media use for 30 minutes before sleep does not importantly increase awake and disturb sleep. Therefore, Social Media Addiction should be considered to remove from the regression for more accuracy of regression model. In short, the target group in this study who are UTAR students are agree social media addiction affect sleep, but it is not necessary get affected by them on their sleep deprivation.

5.2.2 Second Hypothesis

H2: There is a significant relationship between excessive of watching drama or movie and sleep deprivation.

From the Pearson correlation analysis of this study, there is a significant relationship between excessive of watching drama or movie and sleep deprivation. Through the data analysis result of 103 respondents, the significant value of Excessive of Watching drama or movie is < 0.001 which is lower than the significant level of 0.01 or 0.05, thus it is a significant relationship between these two variables. Other than that, the correlation value is 0.447 which mean that its moderate correlation and positive significant between these two variables. Furthermore, the significant value of Excessive of Watching drama or movie is < 0.001 that shown in multiple regression analysis which means that it has very strong evidence to reject the null hypothesis. This result supported by the studies stated from chapter 2, the study from [14] highlighted that more than 80% of teenagers recognized themselves as a binge-viewer and they were reported more symptoms of suffer to sleep, wearier and weaker sleep quality. Besides that, another study from [15] proved that binge viewing brings negative impact to overall sleep quality and defined awareness of pre-sleep arousal. In short, different people have different attitudes toward the topic of excessive of watching drama or movie which affect to their sleep deprivation.

5.2.3 Third Hypothesis

H3: There is a significant relationship between playing mobile game and sleep deprivation.

H3 is accepted as the result proves that there is a significant relationship between playing mobile game and sleep deprivation. From the multiple regression analysis shows that the p value of Playing Mobile Game is < 0.001 which indicates that lower than the significant level of 0.05 and resulting it has strong evidence to reject the null hypothesis. Moreover, Pearson correlation analysis shows the significant value is lesser than the significant level of 0.01 or 0.05 and the correlation value stated as 0.533 which represent that the

strength of correlation is moderate, and it is positive relationship. This result is same to the journal mentioned in chapter 2, the study from [20] stated that there is a significance relationship between gaming and sleep disturbance and mental symptoms. Hence, playing mobile game is one of the main characters that influence to sleep deprivation among the students.

5.2.4 Forth Hypothesis

H4: There is a significant relationship between sleep deprivation and cognitive function.

There is a significant relationship between sleep deprivation and cognitive function which hypothesis is accepted in this study. Since the result of Pearson correlation analysis and the first single regression analysis show the significant value is < 0.001 which is lower than the significant level of 0.01 or 0.05. Other than that, the correlation value is 0.581 which is neutral in strength of correlation and positive relationship between these two variables. It was a study mentioned in chapter which study from [26]. The researchers highlighted that the sleep distressed brings negative impact to the academic performance and cognitive function of student, which pointed out the proper sleep is an indispensable part of better academic performance and cognitive function. Hence, sleep deprivation is main impact on cognitive function among the students.

5.2.5 Fifth Hypothesis

H5: There is a significant relationship between cognitive function and academic performance.

The last hypothesis which is H5 is accepted in this study. According to the single regression analysis and Pearson correlation analysis, the p value shown is < 0.001 which is lesser than the significant level of 0.01 or 0.05. Besides that, the correlation value is – 0.356 which means that it is weak correlation for the strength of correlation and negative correlation between these two variables. For this negative correlation, it means that the increase of Cognitive Function, the decrease of Academic Performance. As mentioned in chapter 3, the

questionnaire of Cognitive Function is to collect the loss of cognitive function among respondents and Academic Performance is to collect the latest GPA of respondents. Consequently, the higher of cognitive function loss, the lower of GPA got among the respondents. Therefore, this result proves that there is a significant relationship between cognitive function and academic performance. This result supported by the research highlighted in chapter 2. Based on the study of [27], the cognitive skills such as memory of working, inferring, learning, concentration and visuospatial skills as well as academic performance such as counting, studying and spelling. In short, cognitive function is one of the factors on affecting the academic performance of students.

5.3 Limitation of the Research

This study has been completed successfully by using Social Media Addiction, Excessive of Watching drama or movie, Playing Mobile Game, Sleep Deprivation, Cognitive Function that affect to Academic Performance. From the result of this study, there are some limitations that can be enhanced that influence the result of the study. Since this research aim the UTAR student, so that 85.4% of the total respondents are in the age group between 21 – 25. The majority of respondents are in same age group may influence the outcome of each variable that affect to the academic performance. In other words, the result only proves this certain age group toward their academic performance. Other than that, most of the respondents are from the faculty of business and finance and faculty of information and communication technology which 35 and 29 respondents out of 103 respondents respectively. Consequently, the outcome of this research minimizes the response from other faculties and only proves the students from faculty of business and finance and faculty of information and communication technology.

The next limitation of this study is the respondents of the questionnaire did not focus to answer the questionnaire. As a consequence, some data is unusable because of they do not be concentrate on answer the question of survey. For example, there was a data set collected has been found out as the respondent chosen Oppo as his or her current using smartphone but he or she chosen IOS as the operating system of the smartphone. Hence,

the set of data should be removed due to it is unlogic response. In other words, data processing is important in this case before proceeding into the data analysis part.

Moreover, there is a correlation value shown in Pearson Correlation analysis which is lesser than 0.4, that value is from the variables of Cognitive Function and Academic Performance. In other words, the strength of this correlation relationship is weak which mean that there is minimal impact of independent variable that influence the dependent variable. Consequently, this independent variable has not enough influence to predict the dependent variable which represent the result of analysis is not much accuracy on academic performance among UTAR students.

In addition, this research only aims in a small sample size of 103 students which means that the result is not enough precision to prove the whole of the target group with their academic performance because the target group only focus on UTAR students.

5.4 Recommendation for Future Study

There is a limitation that found in this research. Hence, it should be improved on the larger scale research in future. Firstly, the age group of respondents should be balanced in the questionnaire, which majority of them is aged 21 – 25 that unable to represent the academic performance among UTAR students. Besides that, the faculty of respondents must be equilibrium in the survey, which most of the respondents come from faculty of business and finance and faculty of information and communication technology that cannot to prove the result of this study among UTAR students. In the university, it is made up with different age group of students and more than 10 faculties, resulting their behaviour might have difference toward bedtime smartphone usage and the effect on academic performance. Therefore, other age group which are 18 – 20, 26 – 30 and above 30 as well as other faculties such as centre for foundation studies, faculty of science and so on should be balanced in the questionnaire for larger scale research in future.

Besides that, the data collection method of this study is using Google Form because of Covid-19 pandemic that prevent the physical questionnaire sharing since I want to reduce the face-to-face communication. Consequently, the most suitable way for data collection of this study is use Google Form which means that all responses are collected via online. However, there was an unusable data set which possible that the respondent does not concentrate on answering the questionnaire loss understand the question of questionnaire. As a consequence, I unable to explain directly while they misunderstand the meaning of question. Thus, physical questionnaire should be run to collect more accuracy responses as I can explain the misunderstand of participant during answering the survey.

Other than that, there is a weak correlation is founded out from the data analysis. For resolving this limitation, the recommendation is trying to search other more precision variable as the factor that influence the academic performance for better prediction in future study. Take some examples from chapter 2, there are some journals stated out that the stress is one of the factors that related to this topic of study, which studies from [9], [19], [20] and [23]. Consequently, stress is one of the factors that may influence to the academic performance of students which proved by the four studies that mentioned above. Therefore, stress can be the variable that recommended for the future study that related to this topic.

Lastly, the small sample size in this study which only targeted 103 respondents. In other words, this sample size may not precision to prove all the students who studied in UTAR. Therefore, the recommendation is to target larger sample size for future study to increase the accuracy of the outcome in the questionnaire.

5.5 Conclusion

In the end of study, this final year project with the topic of bedtime smartphone usage and its effect on student's academic performance, which define the factors that affect the academic performance toward their smartphone usage among UTAR students. From the previous chapters, the content in chapter 1 shown the introduction of this study that includes the background and outline of the research. Besides that, literature review of this study is contained in chapter 2 to develop the conceptual framework and structure for this research. In chapter 3, the methodology of this study which lists out all the software and techniques. After that, the data analysis technique that used in this research is Pearson Correlation Coefficient, Single Regression and Multiple Regression which calculate the relationship between independent variables and dependent variable. In addition, the result is to prove the hypotheses test which examine whether there is significant relationship between the independent variables and dependent variable. In this study, there is only one variable which is Social Media Addiction that proved as no influence on Sleep Deprivation compared to other independent variables which are Excessive of Watching drama or movie and Playing Mobile Game. Besides that, Sleep Deprivation is shown that has impact on Cognitive Function and Cognitive Function is proved that has influence on Academic Performance. In conclusion, all the alternative hypotheses which are H2, H3, H4 and H5 are accepted expect H1 in this study.

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APPENDIX

Appendix 1 - Survey Question

I am student of Bachelor of Business Information Systems (Honours) at the Faculty of Information and Communication Technology (FICT) at Universiti Tunku Abdul Rahman. I am currently conducting a survey on the relationships between social media addiction, excessive watching drama or movie (binge-watching), playing mobile game, sleep deprivation, cognitive function and academic performance.

First of all, I would like to thank you for sparing your time to fill up the questionnaire. The purpose of this survey is to find out does social media addiction, excessive watching drama or movie, playing mobile game affecting sleep deprivation which affecting cognitive function and resulting the academic performance among undergraduate students. This would only take you approximately 10 minutes to complete.

Please take note all information obtained will be analysed and to be written into a report which is used solely for academic purpose. I would like to assure you that all the information collected will remain private and confidential.

Once again, I would like to thank you for your participation in completing this questionnaire. Thank you for your cooperation.

Section A – Demographic Information

1. Gender
   - Male
   - Female

2. Age
   - 18 – 20
   - 21 – 25
   - 26 – 30
   - Above 30

3. Faculty
   - CFS
   - FAS
   - FBF
   - FICT
   - FEGT
   - FSC
   - ICS
   - FAM
   - FCI
   - LKCFES
   - FMHS
   - Other: please specific: _____

4. Which brand of smartphone are you currently using?
   - Apple
   - Samsung
   - Huawei
   - Oppo
   - Vivo
   - Xiao Mi
   - One Plus
   - Others, please specify: _____

5. What kind of OS (Operating System) are you using in your smartphone?
   - IOS
   - Android
   - Harmony
   - Symbian
   - BlackBerry
   - Others, please specify: _____

Section B-1 Social Media Addiction

1	2	3	4	5
Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)

6. I am addicted to social networks and this is a challenge that affect my academic life.	1	2	3	4	5
7. Online social networks distract me from my studies.	1	2	3	4	5
8. Time spent on social media can never be compared to time spent on my studies.	1	2	3	4	5
9. There is no improvement in my grades since I became engaged into these social networking site**s.**	1	2	3	4	5

Section B-2 Excessive watching drama or movie

10. How often have you engaged in binge viewing during the past month?
    - o Approximately once during the past month
    - o A few times during the past month
    - o Approximately once a week during the past month
    - o A few times a week during the past month
    - o (almost) every day during the past month

11. I usually spent _____ on one binge watching (excessive watching drama or movie) session.
    - o Less than 1 hour
    - o 1 – 2 hours
    - o 2 – 3 hours
    - o 3 - 4 hours
    - o More 4 hours

12. How many episodes did you usually watch in one binge watching (excessive watching drama or movie) session?
    - Usually 2 episodes
    - Usually 3 – 4 episodes
    - Usually 5– 6 episodes
    - Usually 6-7 episodes
    - More than 7 episodes

13. After I studied for a long while I can treat myself by watching multiple episodes of a series.	1	2	3	4	5
14. I will compensate myself with watching multiple episodes of a series tonight if I study extra hard tomorrow.	1	2	3	4	5

Section B-3 Playing Mobile game

15. I prefer to play online mobile games rather than go out with classmates to have a group study.	1	2	3	4	5
16. I used to get low grades in most of my subjects because of playing online mobile games.	1	2	3	4	5
17. I have less sleep because of playing online mobile games.	1	2	3	4	5
18. I am unable to complete my assignments in university on time because of playing online mobile games	1	2	3	4	5
19. I am unable attend classes on time because of playing online mobile games.	1	2	3	4	5

Section C- Sleep Deprivation

20. I take _____ for my actual sleep at night during typical school week.
    - More than 8 hours
    - 6-7 hours
    - 5-6 hours
    - 4-5 hours
    - 3-4 hours

21. I take _____ to fall asleep at night.
    - Less than 10 minutes
    - 10-15 minutes
    - 16-30 minutes
    - 31-45 minutes
    - More than 45 minutes

22. I felt tired during class time.	1	2	3	4	5
23. I felt sleepiness during daytime.	1	2	3	4	5

Section D- Cognitive Function

24. I am unable to stay awake or focused during class.	1	2	3	4	5
25. I am unable to focus during examination.	1	2	3	4	5
26. Most of the time I feel less energetic and motivated.	1	2	3	4	5
27. I think my academic performance is hindered.	1	2	3	4	5

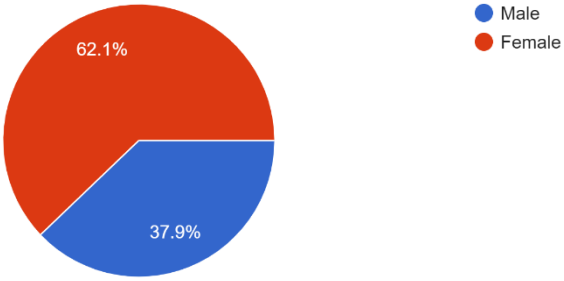
Section E- Academic Performance

28. What is your latest GPA?
    - 2.1 – 2.69
    - 2.7 – 2.99
    - 3.0 - 3.29
    - 3.3 - 3.69
    - 3.7 or higher

Appendix 2 - Questionnaire Result
Section A: Demographic Information

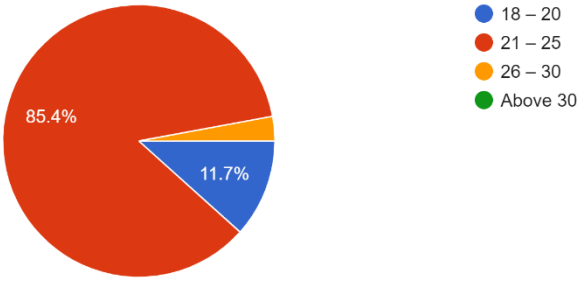
1. Gender

103 responses



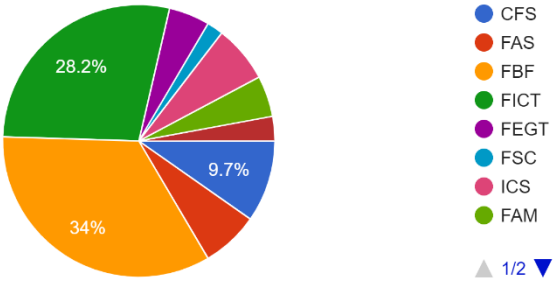
2. Age

103 responses



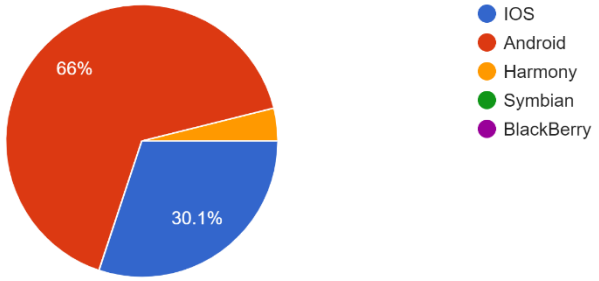
3. Faculty

103 responses



5. What kind of OS (Operating System) are you using in your smartphone?

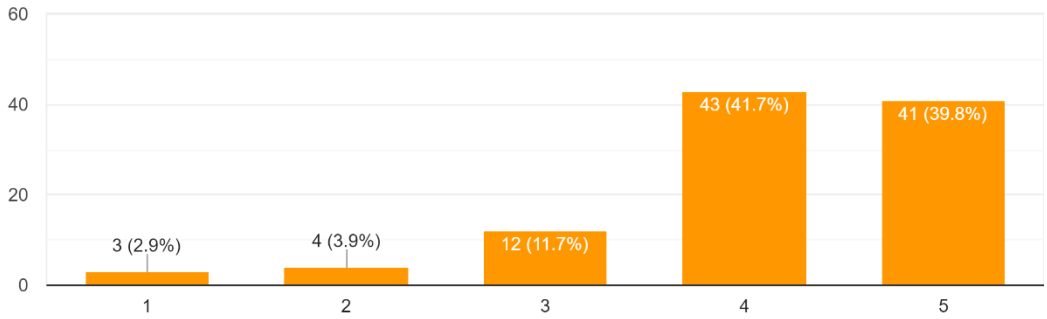
103 responses



Section B-1: Social Media Addiction

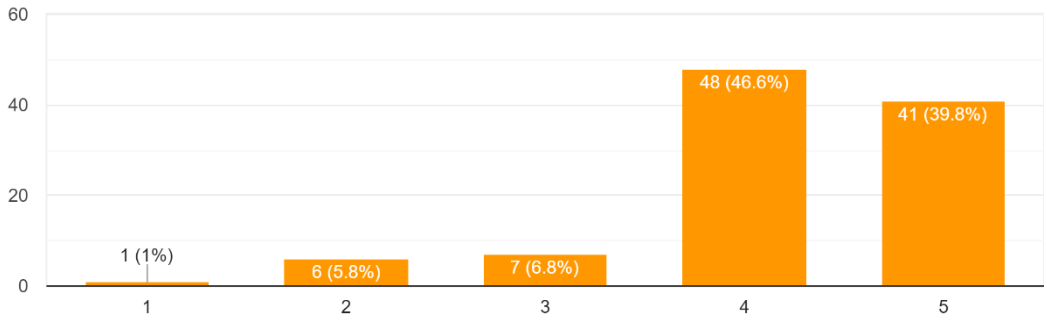
1. I am addicted to social networks and this is a challenge that affect my academic life.

103 responses



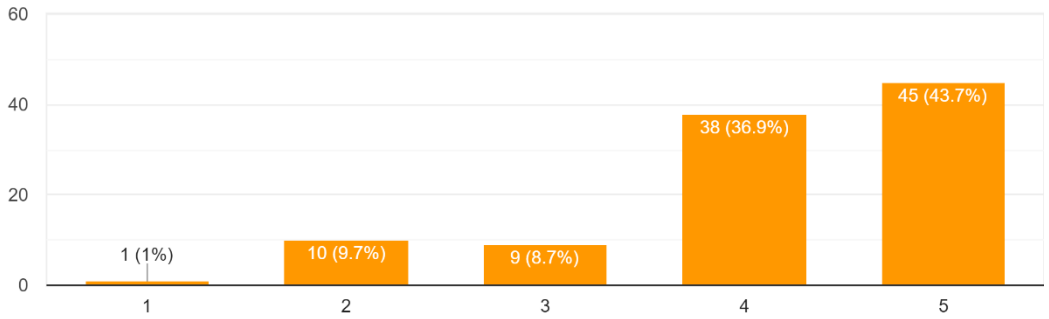
2. Online social networks distract me from my studies.

103 responses



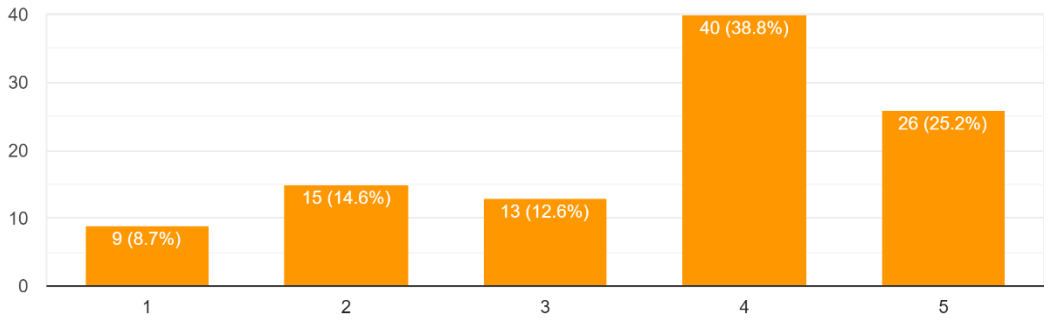
3. Time spent on social media can never be compared to time spent on my studies.

103 responses



4. There is no improvement in my grades since I became engaged into these social networking sites.

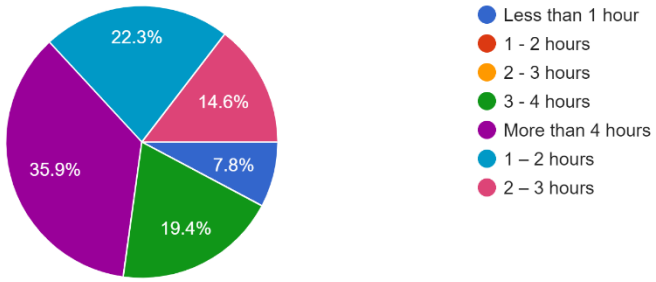
103 responses



Section B-2: Excessive Watching Drama or Movie (Binge-Watching)

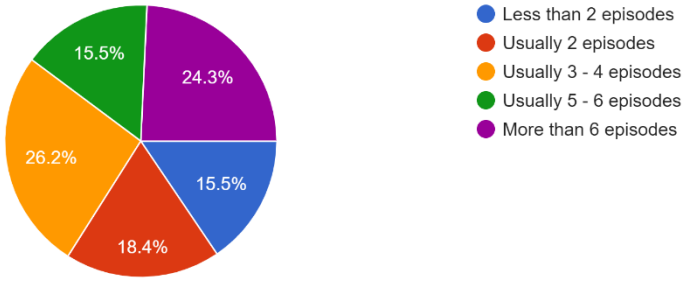
1. I usually spent _____ on one binge-watching(excessive watching drama or movie) session.

103 responses



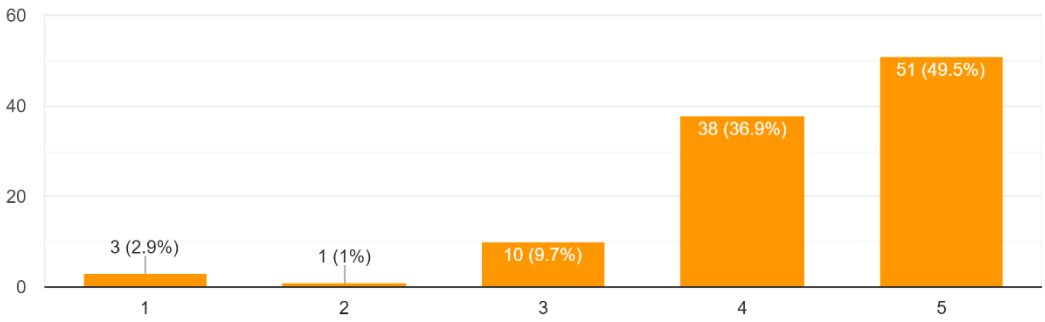
2. How many episodes did you usually watch in one binge-watching(excessive watching drama or movie) session?

103 responses



3. After I studied for a long while I can treat myself by watching multiple episodes of a series.

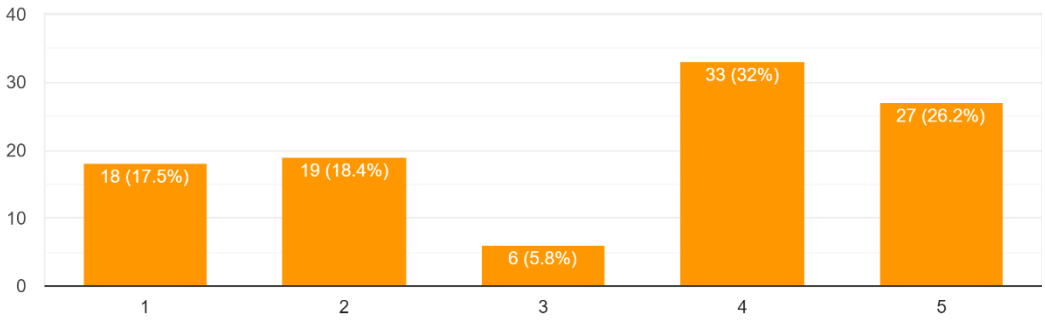
103 responses



Section B-3: Playing Mobile Game

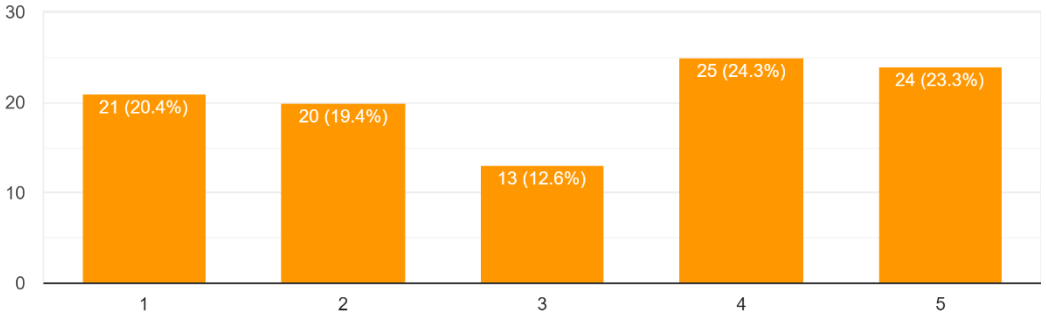
1. I prefer to play online mobile games rather than go out with classmates to have a group study.

103 responses



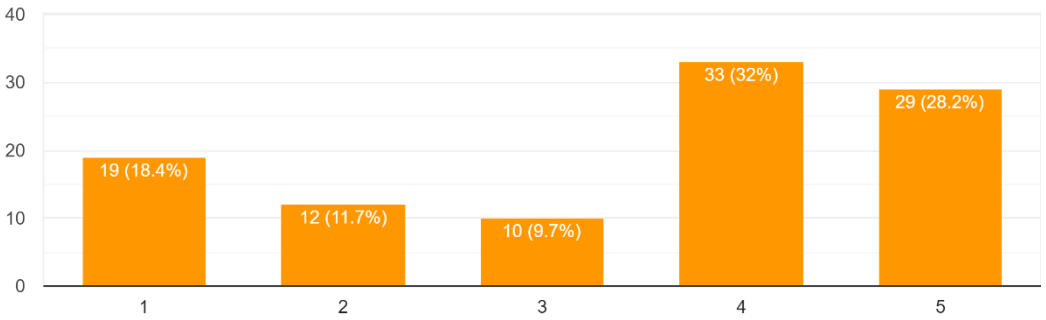
2. I used to get low grades in most of my subjects because of playing online mobile games.

103 responses



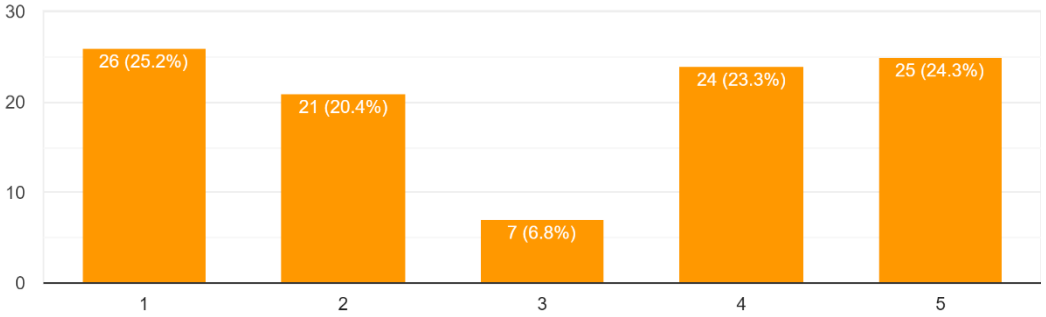
3. I have less sleep because of playing online mobile games.

103 responses



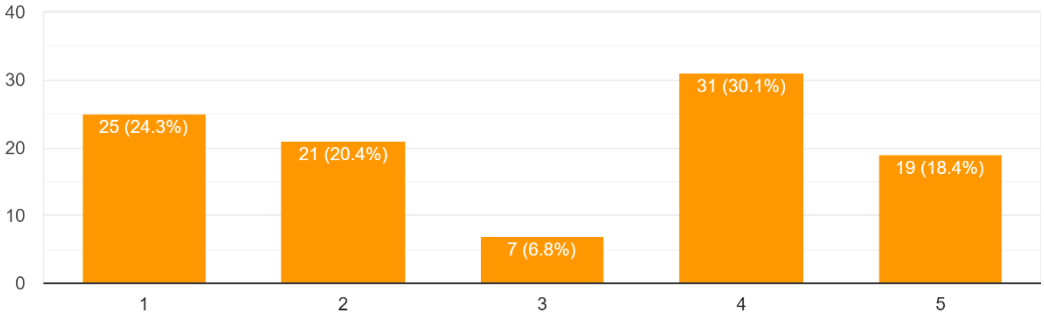
4. I am unable to complete my assignments in university on time because of playing online mobile games.

103 responses



5. I am unable to attend classes on time because of playing online mobile games.

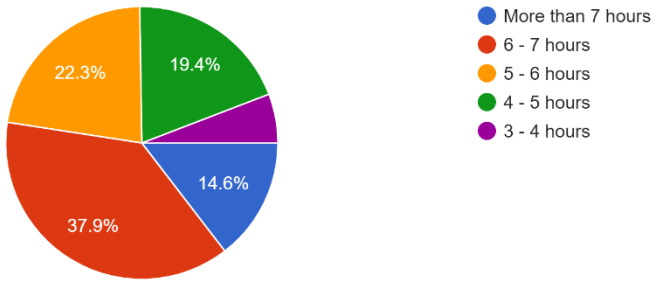
103 responses



Section C: Sleep Deprivation

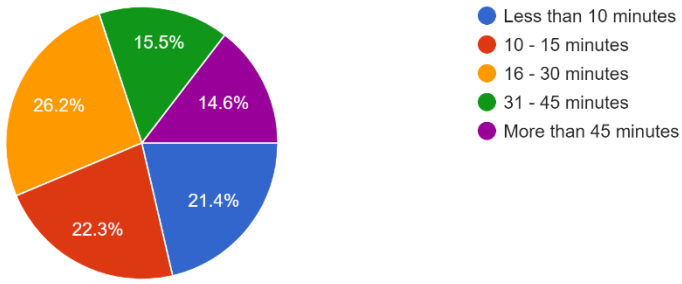
1. I take _____ for my actual sleep at night during typical school week.

103 responses

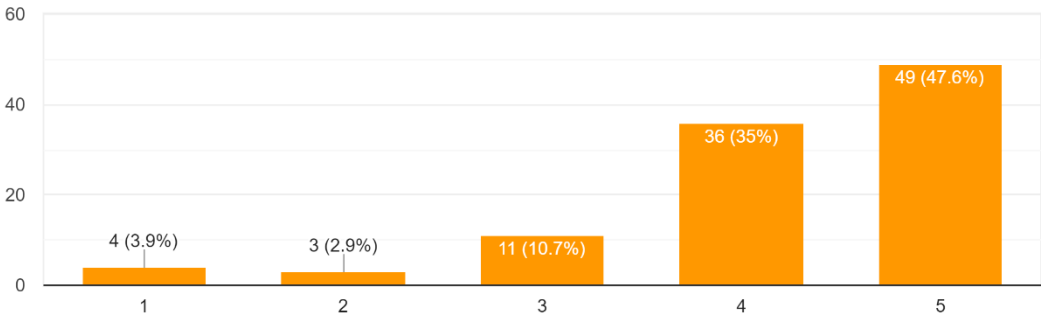


2. I take _____ to fall asleep at night.

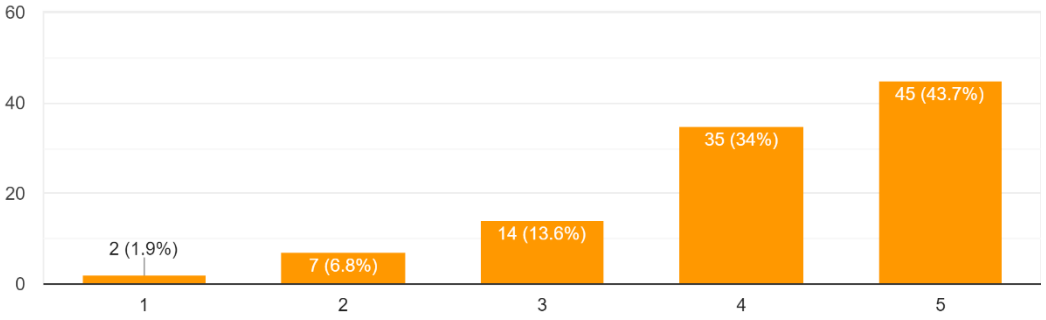
103 responses



3. I felt tired during class time.
103 responses

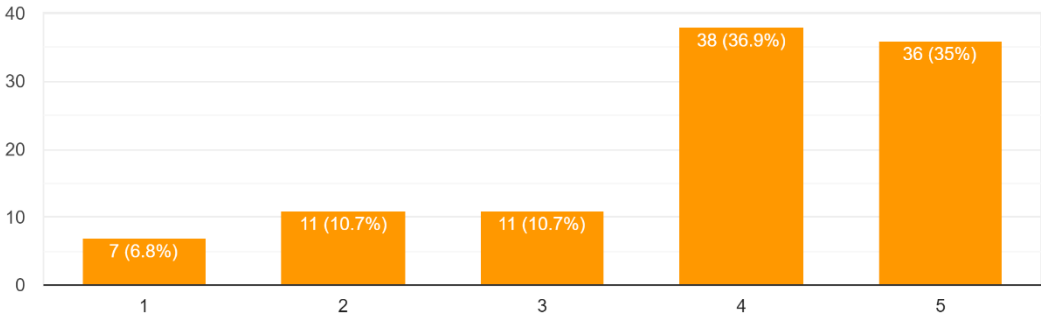


4. I felt sleepiness during daytime.
103 responses



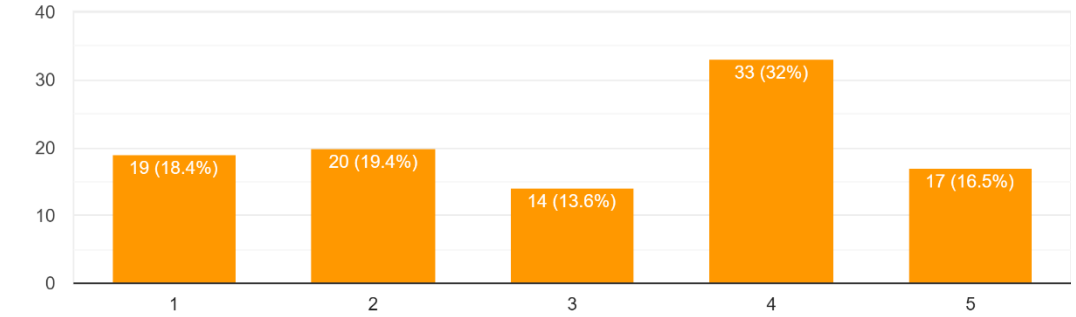
Section D: Cognitive Function

1. I am unable to stay awake or focused during class.
103 responses



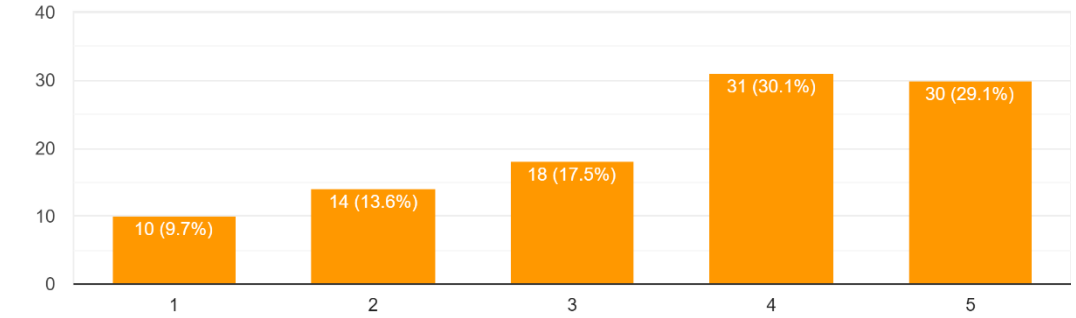
2. I am unable to focus during examination.

103 responses



3. I think my academic performance is hindered.

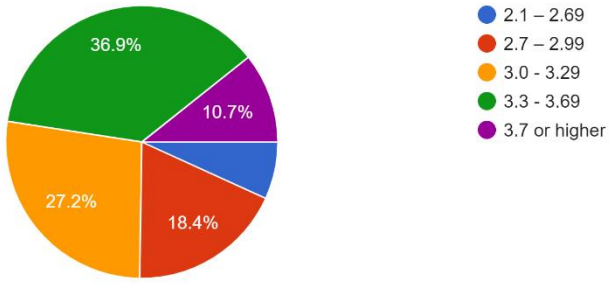
103 responses



Section E: Academic Performance

1. What is your latest GPA?

103 responses



Appendix 3 - SmartPLS Result
Initial Reliability

Construct Reliability and Validity

Matrix | Cronbach's Alpha | rho_A | Composite Reliability | Average Variance Extracted (AVE)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
AP	1.000	1.000	1.000	1.000
CF	0.681	0.755	0.794	0.498
EOWDOM	0.720	-0.437	0.571	0.272
PMG	0.876	0.897	0.910	0.672
SD	0.743	0.808	0.831	0.557
SMA	0.776	0.810	0.850	0.588

Discriminant Validity

Fornell-Larcker Criterion | Cross Loadings | Heterotrait-Monotrait Ratio (HTMT) | Hete

	AP	CF	EOWDOM	PMG	SD	SMA
AP	1.000					
CF	-0.133	0.705				
EOWDOM	-0.187	0.394	0.521			
PMG	-0.097	0.320	0.313	0.820		
SD	-0.171	0.448	0.397	0.349	0.747	
SMA	-0.241	0.460	0.078	0.300	0.348	0.767

Discriminant Validity

Fornell-Larcker Criterion | Cross Loadings | Heterotrait-Monotrait Ratio (HTMT) | Heter

	AP	CF	EOWDOM	PMG	SD	SMA
AP1	1.000	-0.133	-0.187	-0.097	-0.171	-0.241
CF1	-0.088	0.810	0.243	0.095	0.465	0.312
CF2	-0.005	0.722	0.264	0.296	0.255	0.234
CF3	0.086	0.506	0.226	0.233	0.199	0.099
CF4	-0.278	0.747	0.408	0.395	0.250	0.579
EOWDOM1	0.092	0.010	0.045	-0.308	-0.161	0.269
EOWDOM2	-0.229	0.370	0.808	0.278	0.166	0.271
EOWDOM3	-0.204	0.194	0.641	0.120	0.154	0.094
EOWDOM4	0.292	0.238	0.503	-0.092	0.179	0.026
EOWDOM5	0.259	0.169	0.205	0.053	-0.092	-0.026
PMG1	-0.066	0.126	0.332	0.751	0.305	0.067
PMG2	-0.289	0.328	0.313	0.818	0.246	0.302
PMG3	0.030	0.479	0.189	0.695	0.204	0.337
PMG4	-0.139	0.191	0.226	0.916	0.301	0.296
PMG5	0.044	0.280	0.224	0.896	0.342	0.274
SD1	-0.290	0.321	0.353	0.210	0.730	0.141
SD2	0.072	0.114	0.158	0.197	0.568	0.144
SD3	-0.018	0.394	0.044	0.327	0.809	0.379
SD4	-0.178	0.411	0.516	0.295	0.848	0.323
SMA1	-0.356	0.390	0.086	0.116	0.247	0.837
SMA2	-0.161	0.339	-0.098	-0.093	0.245	0.778
SMA3	0.037	0.388	0.155	0.028	0.159	0.668
SMA4	-0.185	0.330	0.111	0.631	0.353	0.774

Final Reliability

Construct Reliability and Validity

Matrix | Cronbach's Alpha | rho_A | Composite Reliability | Average Variance Extracted (AVE)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
AP	1.000	1.000	1.000	1.000
CF	0.674	0.725	0.812	0.592
EOWDOM	0.633	0.616	0.805	0.583
PMG	0.876	0.896	0.910	0.672
SD	0.743	0.799	0.831	0.557
SMA	0.776	0.810	0.850	0.588

Discriminant Validity

Fornell-Larcker Criterion | Cross Loadings | Heterotrait-Monotrait Ratio (HTMT) | Heter

	AP	CF	EOWDOM	PMG	SD	SMA
AP	1.000					
CF	-0.165	0.769				
EOWDOM	-0.030	0.346	0.764			
PMG	-0.095	0.304	0.119	0.820		
SD	-0.162	0.449	0.202	0.352	0.746	
SMA	-0.238	0.485	0.168	0.302	0.356	0.767

Discriminant Validity

Fornell-Larcker Criterion | Cross Loadings | Heterotrait-Monotrait Ratio (HTMT) | Hete

	AP	CF	EOWDOM	PMG	SD	SMA
AP1	1.000	-0.165	-0.030	-0.095	-0.162	-0.238
CF1	-0.088	0.835	0.275	0.098	0.473	0.313
CF2	-0.005	0.698	0.113	0.297	0.254	0.234
CF4	-0.278	0.768	0.379	0.397	0.249	0.580
EOWDOM2	-0.229	0.353	0.892	0.278	0.144	0.272
EOWDOM3	-0.204	0.177	0.733	0.119	0.134	0.095
EOWDOM4	0.292	0.246	0.646	-0.092	0.172	0.028
PMG1	-0.066	0.073	0.164	0.749	0.304	0.067
PMG2	-0.289	0.324	0.064	0.818	0.247	0.302
PMG3	0.030	0.477	0.080	0.700	0.215	0.339
PMG4	-0.139	0.185	0.085	0.915	0.300	0.297
PMG5	0.044	0.272	0.088	0.896	0.348	0.276
SD1	-0.290	0.319	0.262	0.208	0.717	0.139
SD2	0.072	0.101	0.006	0.196	0.558	0.141
SD3	-0.018	0.398	-0.091	0.328	0.836	0.380
SD4	-0.178	0.410	0.359	0.295	0.838	0.323
SMA1	-0.356	0.429	0.206	0.117	0.250	0.836
SMA2	-0.161	0.338	0.018	-0.092	0.246	0.777
SMA3	0.037	0.434	0.242	0.030	0.170	0.673
SMA4	-0.185	0.334	0.100	0.632	0.361	0.774

Appendix 4 - SPSS Result

Descriptive Statistics

Descriptive Statistics

	Mean	Std. Deviation	N
AP	3.26	1.093	103
SMA	4.0000	.80135	103
EOWDOM	3.6570	.99285	103
PMG	3.1612	1.33345	103
SD	3.4345	.79672	103
CF	3.4951	1.18346	103

Pearson Correlation

Correlations

		SMA	EOWDOM	PMG	SD	CF	AP
SMA	Pearson Correlation	1	.260**	.652**	.463**	.672**	-.302**
	Sig. (2-tailed)		.008	<.001	<.001	<.001	.002
	N	103	103	103	103	103	103
EOWDOM	Pearson Correlation	.260**	1	.262**	.447**	.295**	-.248*
	Sig. (2-tailed)	.008		.008	<.001	.002	.012
	N	103	103	103	103	103	103
PMG	Pearson Correlation	.652**	.262**	1	.533**	.826**	-.353**
	Sig. (2-tailed)	<.001	.008		<.001	<.001	<.001
	N	103	103	103	103	103	103
SD	Pearson Correlation	.463**	.447**	.533**	1	.581**	-.321**
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	<.001
	N	103	103	103	103	103	103
CF	Pearson Correlation	.672**	.295**	.826**	.581**	1	-.356**
	Sig. (2-tailed)	<.001	.002	<.001	<.001		<.001
	N	103	103	103	103	103	103
AP	Pearson Correlation	-.302**	-.248*	-.353**	-.321**	-.356**	1
	Sig. (2-tailed)	.002	.012	<.001	<.001	<.001	
	N	103	103	103	103	103	103

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

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

Single & Multiple Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.632[a]	.399	.381	.62696	.399	21.905	3	99	<.001

a. Predictors: (Constant), PMG, EOWDOM, SMA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.831	3	8.610	21.905	<.001[b]
	Residual	38.914	99	.393		
	Total	64.745	102			

a. Dependent Variable: SD

b. Predictors: (Constant), PMG, EOWDOM, SMA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.242	.363		3.420	<.001	.522	1.963
	SMA	.150	.103	.151	1.455	.149	-.054	.354
	EOWDOM	.254	.065	.316	3.886	<.001	.124	.383
	PMG	.210	.062	.352	3.398	<.001	.088	.333

a. Dependent Variable: SD

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.581[a]	.337	.331	.96828	.337	51.370	1	101	<.001

a. Predictors: (Constant), SD

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	48.164	1	48.164	51.370	<.001[b]
	Residual	94.695	101	.938		
	Total	142.859	102			

a. Dependent Variable: CF

b. Predictors: (Constant), SD

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.533	.424		1.256	.212	-.308	1.374
	SD	.862	.120	.581	7.167	<.001	.624	1.101

a. Dependent Variable: CF

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.356[a]	.127	.118	1.027	.127	14.695	1	101	<.001

a. Predictors: (Constant), CF

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.486	1	15.486	14.695	<.001[b]
	Residual	106.436	101	1.054		
	Total	121.922	102			

a. Dependent Variable: AP

b. Predictors: (Constant), CF

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.413	.317		13.931	<.001	3.785	5.041
	CF	-.329	.086	-.356	-3.833	<.001	-.500	-.159

a. Dependent Variable: AP

Weekly Log

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 3, Year 3	**Study week no.: 1**
Student Name & ID: Ting Zhe Wei 18ACB04279	
Supervisor: Ts Soong Hoong Cheng	
Project Title: Bedtime Smart Phone Usage and its Effect on Student's Academic Performance	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Plan on the topic that proposed for the Final Year Project 1 to refresh the rest task of Final Year Project 2.

2. WORK TO BE DONE

Finalized survey questions and plan the method of data collection to share the survey

3. PROBLEMS ENCOUNTERED

Some questions are removed to get a simple and quality question for questionnaire.

4. SELF EVALUATION OF THE PROGRESS

I done the planning on Week 1 because of the coming week is Chinese New Year holiday. Therefore, I would not delay my work.

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31900 KAMPAR.

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Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 3, Year 3	**Study week no.: 3**
Student Name & ID: Ting Zhe Wei 18ACB04279	
Supervisor: Ts Soong Hoong Cheng	
Project Title: Bedtime Smart Phone Usage and its Effect on Student's Academic Performance	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Questionnaire is successfully developed via Google Form and ready to share to collect 100 or more than 100 respondents.

2. WORK TO BE DONE

Download SPSS and create an account in SPSS which prepare to do data analysis after the data collection done.

3. PROBLEMS ENCOUNTERED

For data collection, it is a bit of challenging since the target sample size is 100 that I need to collect 100 respondents by myself.

4. SELF EVALUATION OF THE PROGRESS

My progression is going smooth in this current situation, but I need to share survey on the next week to collect 100 respondents as my target sample size.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 3, Year 3	**Study week no.: 5**
Student Name & ID: Ting Zhe Wei 18ACB04279	
Supervisor: Ts Soong Hoong Cheng	
Project Title: Bedtime Smart Phone Usage and its Effect on Student's Academic Performance	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Distribute the questionnaire through Facebook and WeChat and created a free trial account in SPSS.

2. WORK TO BE DONE

Starting to collect 100 respondents and complete this task as soon as possible

3. PROBLEMS ENCOUNTERED

The SPSS account is free trial for one month that I created this account by myself because there is no source provided for me.

4. SELF EVALUATION OF THE PROGRESS

The progress is considered as slow as I need to collect 100 respondents in the coming two weeks.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 3, Year 3	**Study week no.: 6**
Student Name & ID: Ting Zhe Wei 18ACB04279	
Supervisor: Ts Soong Hoong Cheng	
Project Title: Bedtime Smart Phone Usage and its Effect on Student's Academic Performance	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Report writing of chapter 1 to 3 is completed before week 7.

2. WORK TO BE DONE

Continue on the process of collecting survey and learn the data analysis technique from YouTube.

3. PROBLEMS ENCOUNTERED

SPSS is a new software for me that I need to search and learn by myself through Google and YouTube.

4. SELF EVALUATION OF THE PROGRESS

The number of respondents is almost to hit the target sample size, so this progress is smooth at the moment.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 3, Year 3	**Study week no.: 7**
Student Name & ID: Ting Zhe Wei 18ACB04279	
Supervisor: Ts Soong Hoong Cheng	
Project Title: Bedtime Smart Phone Usage and its Effect on Student's Academic Performance	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

All the surveys are collected successfully.

2. WORK TO BE DONE

Apply the knowledge that got from Google and YouTube to analyze the data sets by using SPSS.

3. PROBLEMS ENCOUNTERED

There are some outcomes of SPSS which I do not understand the meaning of the outcome, so that I need read some guideline from internet to help me get more understanding on the method of explaining the result analysis.

4. SELF EVALUATION OF THE PROGRESS

The current progress is good as Chapter 1 and 2 are done, while Chapter 3 has some changes and add in information.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 3, Year 3	**Study week no.: 10**
Student Name & ID: Ting Zhe Wei 18ACB04279	
Supervisor: Ts Soong Hoong Cheng	
Project Title: Bedtime Smart Phone Usage and its Effect on Student's Academic Performance	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

All the analysis and result are finished by using SPSS

2. WORK TO BE DONE

Compare and discuss the hypotheses developed in chapter 2 with the analysis result.

3. PROBLEMS ENCOUNTERED

There are few results that I cannot understand such as same relationship between two variables but different outcome that confuse me when analyze the data, so I need to read more online sources to get more knowledge in the data analysis part.

4. SELF EVALUATION OF THE PROGRESS

Report writing of chapter 1 to 3 is done. Chapter 4 still in progressing.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 3, Year 3	**Study week no.: 12**
Student Name & ID: Ting Zhe Wei 18ACB04279	
Supervisor: Ts Soong Hoong Cheng	
Project Title: Bedtime Smart Phone Usage and its Effect on Student's Academic Performance	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Data analysis and conclusion are done

2. WORK TO BE DONE

Starting to prepare presentation slide and presentation content

3. PROBLEMS ENCOUNTERED

The presentation content is too large that need to present all the content in 15 minutes, so I need to concise and highlight the important content that I need to share to my supervisor and moderator.

4. SELF EVALUATION OF THE PROGRESS

The whole project is considered as not hard as I started at the beginning of study week, so that I have enough to complete this project on time.

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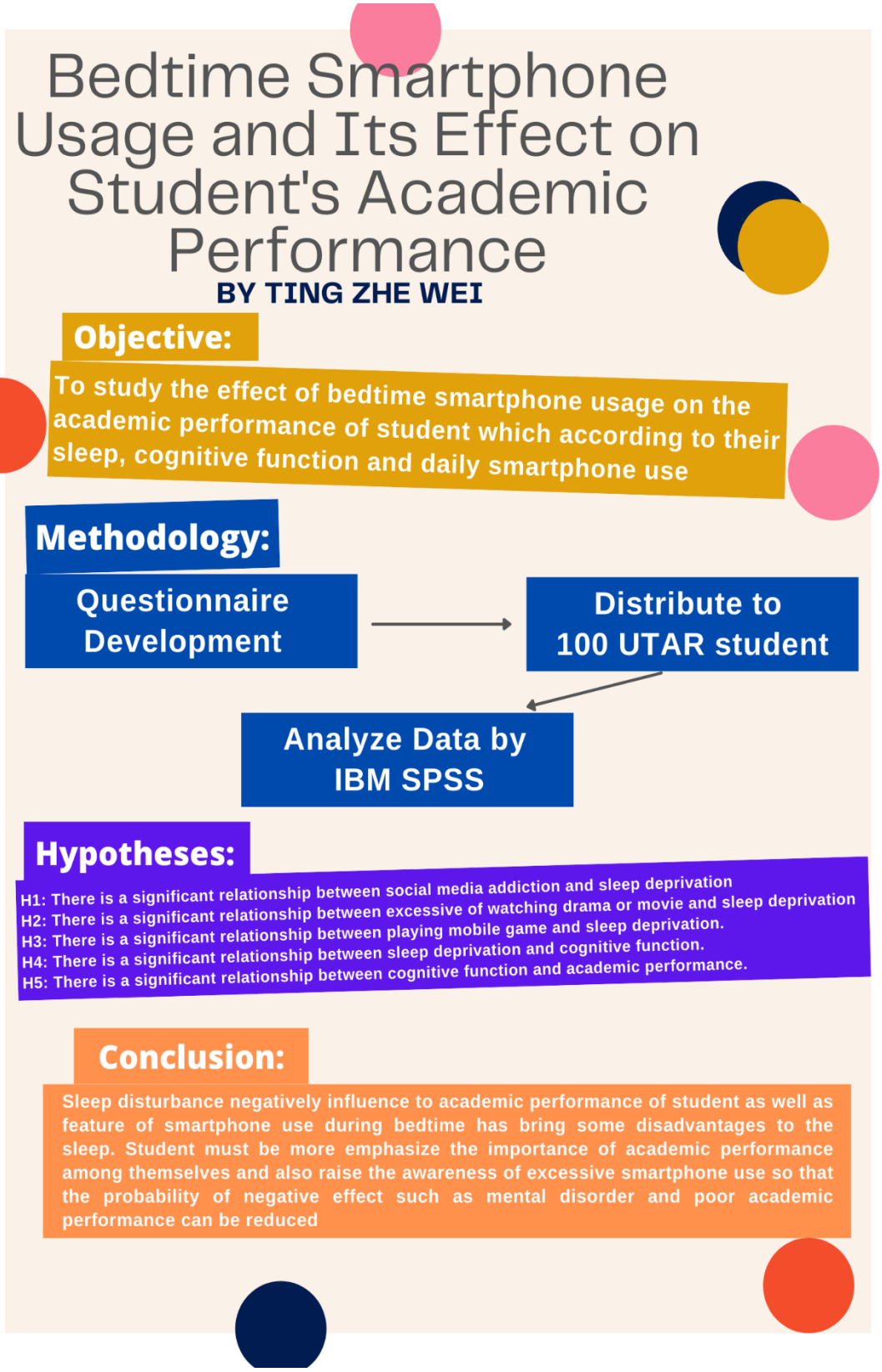
Student's signature

Poster


Bedtime Smartphone Usage and Its Effect on Student's Academic Performance
BY TING ZHE WEI
Objective:
To study the effect of bedtime smartphone usage on the academic performance of student which according to their sleep, cognitive function and daily smartphone use
Methodology:
Questionnaire Development
Distribute to 100 UTAR student
Analyze Data by IBM SPSS
Hypotheses:
H1: There is a significant relationship between social media addiction and sleep deprivation
H2: There is a significant relationship between excessive of watching drama or movie and sleep deprivation
H3: There is a significant relationship between playing mobile game and sleep deprivation.
H4: There is a significant relationship between sleep deprivation and cognitive function.
H5: There is a significant relationship between cognitive function and academic performance.
Conclusion:
Sleep disturbance negatively influence to academic performance of student as well as feature of smartphone use during bedtime has bring some disadvantages to the sleep. Student must be more emphasize the importance of academic performance among themselves and also raise the awareness of excessive smartphone use so that the probability of negative effect such as mental disorder and poor academic performance can be reduced

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Bedtime Smart Phone Usage and its Effect on Student's Academic Performance

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