ASSOCIATION BETWEEN SMARTPHONE ADDICTION AND MENTAL HEALTH AMONG HIGH SCHOOL STUDENTS IN BANGKOK, THAILAND: A CROSS-SECTIONAL STUDY

Miss Suphasuta Doungraksa

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ความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลายในเขตกรุงเทพมหานคร ประเทศไทย

น.ส.ศุภสุตา ด้วงรักษา

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Thesis Title	ASSOCIATION BETWEEN SMARTPHONE ADDICTION AND MENTAL HEALTH AMONG HIGH SCHOOL STUDENTS IN BANGKOK, THAILAND: A CROSS-SECTIONAL STUDY
By	Miss Suphasuta Doungraksa
Field of Study	Public Health
Thesis Advisor	Nuchanad Hounnaklang, Ph.D.

Accepted by the COLLEGE OF PUBLIC HEALTH SCIENCES, Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of Public Health

..... Dean of the COLLEGE OF PUBLIC HEALTH SCIENCES
(Professor SATHIRAKORN PONGPANICH, Ph.D.)

THESIS COMMITTEE

..... Chairman
(Associate Professor RATANA SOMRONGTHONG, Ph.D.)

..... Thesis Advisor
(Nuchanad Hounnaklang, Ph.D.)

..... External Examiner
(Nipunporn Voramongkol, M.D. MPH.)

ศุภสุตา ด้วงรักษา : ความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลายในเขตกรุงเทพมหานคร ประเทศไทย. (ASSOCIATION BETWEEN SMARTPHONE ADDICTION AND MENTAL HEALTH AMONG HIGH SCHOOL STUDENTS IN BANGKOK, THAILAND: A CROSS-SECTIONAL STUDY) อ.ที่ปรึกษาหลัก : ดร.นุชนาฏ หวนนากลาง

เทคโนโลยีในทุกวันนี้มีการแทรกแซงอย่างรวดเร็วและต่อเนื่องในชีวิตของผู้คนและเมื่อผู้คนเสพติดอุปกรณ์อิเล็กทรอนิกส์มากเกินไปก็แสดงให้เห็นถึงความผิดปกติของปัญหาสุขภาพ ซึ่งรวมถึงทั้งทางร่างกายและจิตใจ ตามที่กล่าวถึงการศึกษานี้มีวัตถุประสงค์เพื่อตรวจสอบความสัมพันธ์ของการติดยาเสพติดมาร์ทโฟนและสุขภาพจิตโดยเฉพาะในภาวะซึมเศร้า ความวิตกกังวล และความเครียด การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลายในกรุงเทพมหานครประเทศไทย โดยมีนักเรียนมัธยมปลายในเขตกรุงเทพมหานครที่สมัครใจเข้าร่วมการวิจัยด้วยตนเอง 420 คน ความชุกของการเสพติดสมาร์ทโฟนในนักเรียนมัธยมศึกษาตอนปลายในกรุงเทพมหานคร 52.1% นอกจากนี้ยังพบความสัมพันธ์ที่สำคัญระหว่างการติดสมาร์ทโฟนและภาวะซึมเศร้า [OR 2.18, 95% CI 1.16 – 4.13] ความวิตกกังวล [OR 2.16, 95% CI 1.36 – 3.45] แต่ในทางกลับกันนั้น ไม่พบความสัมพันธ์ที่สำคัญระหว่างการติดสมาร์ทโฟนและความเครียด [OR 3.73, 95% CI 0.77 – 17.95] งานวิจัยนี้ค้นพบว่าความชุกของภาวะซึมเศร้ามีค่า 13.3% ความชุกของความวิตกกังวลมีค่า 30.2% และความชุกของความเครียดมีค่า 3.3% โครงการวิจัยครั้งนี้ ค้นพบความสัมพันธ์ระหว่างการติดสมาร์ทโฟนกับภาวะซึมเศร้า และความวิตกกังวลในนักเรียนมัธยมปลายในกรุงเทพมหานคร ประเทศไทยนั้น แต่ไม่พบความสัมพันธ์ระหว่างการติดสมาร์ทโฟนกับความเครียด ดังนั้นสำหรับงานวิจัยในอนาคต ผู้วิจัยสามารถขยายขอบเขตและเรียนรู้ตรวจสอบในประเด็นอื่น ๆ ของสภาวะสุขภาพจิตได้

สาขาวิชา สาธารณสุขศาสตร์ ลายมือชื่อนิสิต

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ปีการศึกษา 2562 ลายมือชื่อ อ.ที่ปรึกษาหลัก

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Suphasuta Doungraksa : ASSOCIATION BETWEEN SMARTPHONE ADDICTION AND MENTAL HEALTH AMONG HIGH SCHOOL STUDENTS IN BANGKOK, THAILAND: A CROSS-SECTIONAL STUDY. Advisor: Nuchanad Hounnaklang, Ph.D.

The technology today is rapidly and continuously intervening into people's lives, and when people become too addict to electronic devices has shown series of abnormality of health problems which including both physical and mental. As it mentioned, the study aims to examine the relationship of smartphone addiction and mental health specifically in depression, anxiety, and stress. This study aims to investigate the relationship between smartphone addiction and mental health among high school students in Bangkok, Thailand. There were sample of 420 high school students in Bangkok, Thailand who participated in self-administrated questionnaires for a cross-sectional study of smartphone addiction and mental health. The prevalence of smartphone addiction among high school students in Bangkok, Thailand was 52.1. Additionally, there were significant association found between smartphone addiction and depression [OR 2.18, 95% CI 1.16 – 4.13], anxiety [OR 2.16, 95% CI 1.36 – 3.45]. In contrast, there was no significant association found between smartphone addiction and stress [OR 3.73, 95% CI 0.77 – 17.95]. The prevalence of depression was 13.3%, the prevalence of anxiety was 30.2%, and the prevalence of stress was 3.3%. As the significant values were found in smartphone addiction and depression, anxiety, but not stress among high school students in Bangkok, Thailand. Therefore, for further research, investigation in other spectrums of mental health should be considered.

Field of Study:	Public Health	Student's Signature .....
Academic Year:	2019	Advisor's Signature .....

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Suphasuta Doungraksa

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CHAPTER I
INTRODUCTION

1.1 BACKGROUND AND RATIONALE

Introduction:

"In the next 10 years, I expect at least five billion people worldwide to own smartphones, giving every individual with such a phone instant access to the full power of the Internet, every moment of everyday" – Marc Andreessen, a software engineer and co-founder of Netscape (Andreessen, 2011)

The world is rapidly evolving as same as technologies, and a smartphone is one of the greatest results of technologies innovations that impacted everybody's life. Comparing to the early 2000s, people used to communicate to one another through pager devices and even the most advanced form of communication is E-mail (Townsend, 2002). However, everything has changed today. The world is much closer, faster, and simpler by a touch on smartphone (Townsend, 2002). It is typical to see people walking around and carrying smartphones while their faces ducked onto the digital screen todays. People have become more interactive via these electronic devices than an actual interaction with other human beings. A smartphone contains multiple abilities which its goal is to assist people in their daily life in the most possible convenient way (Salehan & Negahban, 2013). People take their smart phones with them everywhere at whatever time such as when they drive, walk, and even to the bathroom. These are some signs showing of human addiction toward smartphones.

As its acknowledged, the technology in today's world is rapidly growing and constantly evolving. It is noticeable to see how peoples' lives are becoming more and more reliant on technology on daily bases especially smartphones. Today, people are progressively becoming addicted and have to rely on smartphone as it was a part of their daily routine; such as, checking news and weather, emailing for work, sending text messages and pictures, communicating with others via online applications and surfing the internet. The more people are adapting to constantly developing trends of technology is the higher number of technology users which escalating globally. Though, there are many benefits received from adequate amount of using

smartphones, its problematic uses of smartphones resulted as overused is relatively high which affected peoples' health (Lee, Chang, Lin, & Cheng, 2014). The result of their study further clarified as the compulsive usage of smartphone has positive relationship with multiples psychological traits such as social interaction anxiety, materialism, locus of control, and the need of touch (Lee et al., 2014).

In our society today, it is noticeable to see people are individually roaming around with their smartphones and creating their own personal space online. For example, as people are taking public transportations, one can notice that other people often stuck in their personal space as their playing games, watching movies or videos, and chatting on their smartphone devices. People are becoming less interactive while using their smartphones to avoid public social contact with other human beings (Salehan & Negahban, 2013). The social interaction upon people is changing as people are obsessing with smartphone as if they are possessed by these devices. Also, in reality people have become more isolated which is opposite from the purpose of smartphones as to bring people together and tighten up the community (Nicholas D. Lane, 2011). This isolation trend is growing as the same as number of smartphone users which associate to the mental health of people.

Moreover, in advanced technology, smartphone is one of the products that emerge in every corner and integrate among different generations. The number of smartphone users is increasing throughout the universe. Consequently, Thailand is also fallen within the loop of smartphone penetrations growing. In Thailand, its capital city is Bangkok which the core of the country where managements and developments of the county from multiple government authorities are being processed and located. Bangkok represented as a business district throughout the city. It represents the rich of modern technologies and westernization. It holds about 8,305,218 million people in the city (NSO, 2010) which is high comparing to other provinces or cities. Corresponding to the density of population in Bangkok, the higher the number of Bangkokians is the higher number of smartphone users (Wungaeo, 2016).

According to the relatively high number of population density in Bangkok, it is agreeable to complaint with National Statistical Office of Thailand, which presented data of people in Bangkok hold the highest percentage of smartphones users

– to access internet – which is 70.3%, and it is the highest amount of people comparing to the rest of the country. Also, it proves that the age between 15 to 24 hold the highest percentage of internet use which is 85.9% (NSO, 2016). Correspondingly, people in the age of 15 to 24 in Bangkok is the risk group to be considered for smartphone addiction and its associations to other aspects; such as, mental health – depression, anxiety, and stress.

Additionally, multiple studies show a rising trend of cyberbullying and its association toward mental health among young people (Betts & Spenser, 2017; Landstedt & Persson, 2014; Langos, 2012; Patchin, 2010; Robin M. Kowalski, 2014; Services, 2019; Smith, 2008; stopbullying.gov, 2019; Youngminds, 2018). Therefore, cyberbullying presented as an important variable that alerted consideration for the present study of mental health among youths.

As stated by WHO, mental health refers as "… a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO, 2014). In another word, mental health is a psychological, emotional, behavior, and social well-being of human being which consider on how people act, think, and feel. In the study, it is aiming to investigate in association of smartphone addiction and mental health or a state of mental well-being of people that associate to smartphone addiction. The study is directing toward the association of depression, anxiety, and stress as a state of people's mental health to smartphone addiction.

In conclusion, numerous statistics display the growing trend of smartphone users which exceedingly increases in less than a decade world-widely and it affects multiple aspects of people's daily life. As it mentioned, several studies support the finding of smartphone addiction associate to have negative impacts on mental health and the risk age group of smartphone addiction is within the age range of 15 to 24 years old. It is important to investigate and anticipate any association of smartphone addiction and mental health among people in the age between 15 to 24. However, in the current study, it is focusing on people in the age of 15 to 18 which follow the age classification on high school students. Therefore, the aim of this study is to

investigate associations of smartphone addictions to mental health, especially depression, anxiety, and stress among high school students in Bangkok, Thailand.

1.2 Research Questions:

What are relationships between smartphone addiction and mental health among high school students in Bangkok, Thailand?

1.3 Research Objective:

General Objective:

To evaluate associations between smartphone addiction and mental health among high school students in Bangkok, Thailand.

Specific Objective:

To evaluate associations between smartphone addiction and depression among high school students in Bangkok, Thailand

To evaluate associations between smartphone addiction and anxiety among high school students in Bangkok, Thailand.

To evaluate associations between smartphone addiction and stress among high school students in Bangkok, Thailand

1.4 Research Hypothesis:

Ho: There are no associations between smartphone addiction and depression, stress, and anxiety among high school students in Bangkok, Thailand

Ha: There are associations between smartphone addiction and depression, stress, and anxiety among high school students in Bangkok, Thailand.

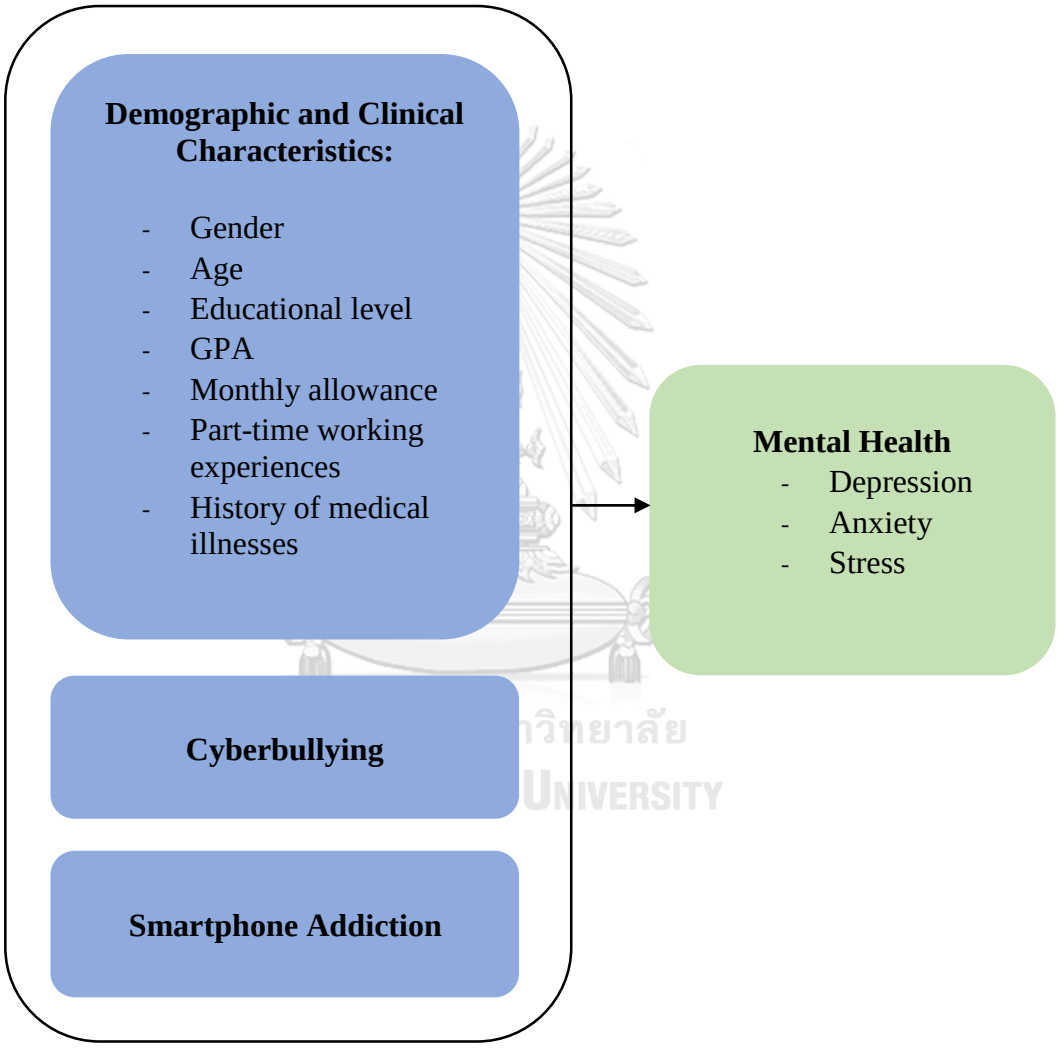
Study Design:

A cross-sectional study was conducted for the present study.

1.5 Conceptual Framework

Conceptual Framework

Independent Variables **Dependent Variables**



1.6 Operational Definition

Smartphones refer to a mobile phone which contain multiple advanced functions such as access to internet, touchscreen interface, and able to perform as a computer (Maged N Kamel Boulos, 2011).

Smartphone Addiction refers to the abuse of technology which mean when someone develop attachment and rely on the smartphone devices to the point it interferes with one's daily life and indorse anxiety and irritation when smartphone. Additionally, smartphone addiction seems to have association to poor mental health. The tool that will be using to indicate the level of smartphone addiction is a tool called Smartphone Addiction Scale Short Version (SAS-SV) which created by Min Kwon, Dai-Jin Kim, Hyun Cho, and Soo Yang in 2013 (Kwon, Kim, Cho, & Yang, 2013).

Addiction refers to a complex condition of repetitive behavior after the person receive rewarding effects which provide an enthralling inducement to continually repeat the behavior despite any harmful consequences (Ranna Perekh, 2017).

Mental Health refers to human's, emotional, cognitive, behavioral, and social well-being which mean mental health reflect on how people feel. think, behave, and interact (MentalHealth.gov, 2017; Nordqvist, 2017).

Referring to the present study:

The study is focusing on depression, anxiety, and stress as a state of people's mental health.

Depression refers to mood disorders which negatively distresses one's emotion, feelings, attitude, and critical thinking which affects one's ability to maintain his or her daily routines (Wales, 2018).

Anxiety refers to fear, unease, nervous feelings which often occur when a person face with unpredictable or difficult situations (Wales, 2018).

Stress refers to any physical, mental or emotional tension/pressure that can caused by (external) environment, and (internal) illness or medical procedure (Wales, 2018).

Cyberbullying

Cyber refers as matters which are generated by technology

Cyberbullying is another form of bullying via online platform which take actions on smartphones, tablets, and computer (Services, 2019). The cyberbullying happens on online applications, social media platforms, text messages, or games where people can consume and partake to the content. Also, cyberbullying comprised sharing, posting, or sending harmful, negative, or mean content about other people which can cause hurt feelings, humiliation, shame, or disgrace (Services, 2019).

Referring to the present study:

The study is focusing on smartphones as platform where cyberbully takes place.

The most common place where cyberbullying arises:

- Text messages via smartphone devices
- Emails
- Social Media such as Instagram, Twitter, Facebook, and Snapchat (Services, 2019)

High School Students refers to student class systems in education as upper secondary level. In Thailand, high school is from grade 10 to grade 12 (Matthayom 4 to Mattayom 6).

CHAPTER II
LITERATURE REVIEWS

Rapid trends of technology today influence people lives in many ways. It is typical to encounter people who have their faces locked and eyes focused on their electronic devices especially smartphones in their hands as they stroll down the street. People think and feel that they are becoming undividable with their smartphones (Barkley, Lepp, & Salehi-Esfahani, 2016). With the flow of new technology, smartphone become a new face of mobile phones and computers. People can easily have an easier approach to a better convenient and time sufficient lifestyles by using the smartphone. They can send e-mails, record voices and videos, take pictures, send text messages, surfing the internet, and make voice or video phone call. As it is possible for people to adapt to this advanced daily routine by just a touch on smartphone screens, they are becoming addicted to the device.

Smartphone is constantly growing and evolving throughout different generations of people (Maged N Kamel Boulos, 2011). The technology can bring people from different ages and eras together, and yet, its paradox can also pull people apart. This is where the negative impacts from smartphone use become visible. It is ordinary to see how people become less and less interactive with other people in reality while they are connecting to their own world on the internet. People often communicate with others via online applications on smartphones, such as, Facebook, Twitter, Snapchat, and Instagram (Phua, Jin, & Kim, 2017). As people involve around the technology, they pay less attention to their surroundings including relationships and connections with other people. When a human being started to isolate themselves from the real world because he or she consumes too much of internet, it is becoming a problem as people become addicted to the behavior (Davis, 2001).

2.1 Smartphone

2.1.1. Definition of Smartphone

What is a smartphone? A smartphone is a wireless mobile phone that consists of multiple functions other than making phone calls. It can email, take photos, connect to the internet, and etc. The first smartphone was invented in 1992 by

IBM which called ‘Simon Personal Communicator’ and it was the first touchscreen phone with monochrome LCD and it could made calls, emails, and faxes (Clemens Arth, 2015). According to *Byte Magazine*, it written about the price of ‘Simon’s Phone’ was $899 which is high when it calculated inflation rate in 2018 (O’Malley, 1994). According to today’s dollars, the inflation rate of $899 in 1992 would be about $1,607.14 today (Calculator). This indicated that to own a smartphone back in the day was an unpopular lifestyle choice to make because only certain group of people were able to afford to purchase one. Furthermore, smartphone was a new invention that was in awed by people at the time. However, as the time gradually passed by, the intervention of smartphones was also continuously evolving.

As the smartphones evolve, they are easier to approach by all groups of people from different generations. In 2007, Apple Inc. released a smartphone called ‘iPhone 2G’ which triggered the trend of smartphone technologies (Apple, 2018). It led attentions and competitions among other smartphone companies to produce ‘the best’ smartphone in the market which allows the companies to compete their products to become more applicable for everybody. Therefore, the smartphones today are smarter, thinner, lighter, faster, and cheaper which permits all socioeconomic classes to purchase smartphones because they have becoming affordable for everybody in all groups of people. As the smartphones started to integrate into people lives, people can slightly notice the changes that they adapted to the new era of advanced technology. The smartphone phenomena brought attention to many researchers to study on it as it gradually produces a major impact on people lives in term of addiction. The impact of smartphone addiction to people lives cause changes in their daily routines, physical health, and mental health (Miakotko, 2017). However, this study aims to discover any association of smartphone addiction and mental health especially in depression, stress, and anxiety.

2.2 Smartphone Addiction

2.2.1 Definition of Smartphone Addiction

There are many studies in the last decades commenced to pay attention to association of smartphone addiction and psychological health because it expresses trends of smartphone addiction associate to change in people’s habits, daily routines, and social relationship with family and friends (Samaha & Hawi, 2016). In 2018, the

official definition of ‘smartphone addiction’ has not been settle by any health authoritative. However, many studies and researchers are proposing to add smartphone addiction as one of a mental disorder in *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) such as a study by Nicola Luigi Bragazzi and Giovanni Del Puente on *A Proposal for Including Nomophobia in the New DSM-V* (Bragazzi & Del Puente, 2014) and another study by Yu-Hsuan Lin, Chih-Lin Chiang, Po-Hseien Lin, Li-Ren Change, Chih-Hung Ko, Yang-Han Lee, and Sheng-Hsuan Lin on Proposed Diagnostic Criteria for Smartphone Addiction (Lin et al., 2016). Both of these studies are one of the first of studies that raise attention and awareness of smartphone addiction as a psychological disorder to be included in DSM-5 or a newer version of DSM.

Smartphone addiction is also called ‘nomophobia’ which mean the irrational “fear of being out of mobile phone contact” (Yildirim, 2014). If the disappearance of mobile phone or smartphone can cause someone to feel anxious, then the person might already develop nomophobia or smartphone addiction. Moreover, the termed ‘nomophobia’ was coined through a research study by the UK Post Office in 2008 which to explore anxieties among mobile phone users (Yildirim, 2014). Nomophobia is a portmanteau on behalf of “‘no mobile phone’ and phobia or mobile phone addiction” (Bragazzi & Del Puente, 2014). As the world and technology progress, phone evolved to cell phone then to smartphone. Even the word ‘nomophobia’ is an abbreviation from ‘no mobile phone phobia’, but the word was created back in 2008 and smartphone was not a popular device then. However, the behavior of nomophobia is the same as smartphone addiction. Therefore, smartphone addiction can be called nomophobia.

In another words, nomophobia or smartphone addiction is the fear of being without technology or the fear of losing access and unable to connect to a phone. It is the fear of lacking social communication or connectivity. Most of smartphone users are seeking for social gratification which are provided by Big Data of social networks such as Facebook, Twitter, Snapchat, Instagram, and etc. (Phua et al., 2017). These social networks are trying to create social platforms that allow people to share their personal information, thoughts, pictures, videos, and more on the social platform. They have to be creative to find ways to lead their users into becoming addicted to

their social platform such as multiply and regularly sending notifications, updating newsfeed by just a finger, trending hashtags, likes and comments on posts, and so on (Phua et al., 2017). Therefore, when people hear notifications ring or feel vibrations of smartphone devices, they tend to check on the devices. These functions of social medias trigger people's behavior on becoming addicting to smartphones.

2.2.2 Prevalence of Smartphone Addiction

Table 1: Related Articles on Prevalence of Smartphone Addiction

Tile	Reference	Country and Year	Study Population	Criterion	Prevalence (%)	Measurement Tools
Mobile Phone Dependence and Health-Related Life of University	(Toda, Monden, Kubo, & Morimoto, 2006)	Japan 2006	275 university students age between 19-23 years old	Dependence	18.8	MPDQ (Mobile Phone Dependence Questionnaire)
Linking Psychological Attributes to Addiction and Improper Use of the Mobile Phone Among Adolescents in Hong Kong	(Leung, 2008)	Hong Kong 2008	402 teenagers and young adults age between 14-20 years old	Addiction	27.4	MPAI (Mobile Phone Addiction Index) (adapted from MPPUS)
Characteristics of Excessive Cellular Phone Use in Korean Adolescents	(Ha, Chin, Park, Ryu, & Yu, 2008)	Korea 2008	595 students from a technical high school	Excessive Use of Cellular Phone	33	ECPUS (Excessive Cellular Phone Use Survey)
Problematic Internet Cell-Phone Use: Psychological, Behavioral, and Health Correlates	(Jenaro, Flores, Gómez-Vela, González-Gil, & Caballo, 2009)	Salamanca, Spain 2009	337 College Student from Universidad de Salamanca	Addiction	10.4	Cell Phone Over-Use Scale (COS)

Tile	Reference	Country and Year	Study Population	Criterion	Prevalence (%)	Measurement Tools
Cell Phone Addiction in Highschool Students and Its Predictors	(Koo, 2010)	Korea 2010	469 adolescents from four high schools	Addiction	4.1	Cell Phone Addiction of Subjects (CPAS)
Le Téléphone Portable: Une Nouvelle Addiction chez les Adolescents (The Mobile: A New Addiction upon Adolescents)	(Soumeya Halayem, 2010)	Tunisia 2010	120 adolescents (age between 13-20 years old)	Addiction	33.4	Igarashi's self-perception of text-message dependency (French version) (Igarashi, Motoyoshi, Takai, & Yoshida, 2008)
The Prevalence of Excessive Mobile Phone Use and its Relational with Mental Health Status Demographic Factors Among the Students of Gonabad University of Medical Sciences in 2011-2012	(Tavakolizadeh, Atarodi, Ahmadpour, & Pourgheisar, 2014)	Iran 2014	700 university students age between 19-23 years old	Addiction	36.7	MPAI

Tile	Reference	Country and Year	Study Population	Criterion	Prevalence (%)	Measurement Tools
Cell Phone and Internet Addiction among Students is Isfahan University of Medical Sciences (Iran)	(Maryam Amidi Mazaheri, 2014)	Iran 2014	1180 University students age between 18 - 39 years old	Addiction	64.5	MPAI
Exploring Smartphone Addiction: Insights from Long-Term Telemetric Behavioral Measures	(Tossell, Kortum, Shepard, Rahmati, & Zhong, 2015)	Houston, Texas (USA) 2015	34 university students	Addiction	62	Longitudinal Online Registry SAMI/CPAS
Prevalence of Mobile Phone Dependence in Secondary School Adolescents	(Chimatapu Sri Nikhita, 2015)	Mumbai, India 2015	415 Secondary School Adolescents	Mobile Phone Dependence	31.3	Mobile Phone Dependence Questionnaire
Prevalence of Facebook Addiction and Related Factors Among Thai High School Students	(Jiraporn Khumsri MSc, 2015)	Bangkok, Ubon Ratchathani, Chiang Mai, and Songkhla (Thailand) 2015	972 High School Studemts	Facebook Addiction and Related Factors	41.8	The Thai-Bergen Facebook Addiction Scale (Thai-BFAS)
Prevalence and Correlates of Problematic Smartphone Use in a Large Random	(Jiang Long, 2016)	Beijing, China 2016	1062 Undergraduate Students	Problematic Smartphone Use	21.3	Problematic Cellular Phone Use Questionnaire (PCPUQ)

Tile	Reference	Country and Year	Study Population	Criterion	Prevalence (%)	Measurement Tools
Sample of Chinese Undergraduates						
Prevalence, Associated Factors and Impact of Loneliness and Interpersonal Problems on Internet Addiction: A Study in Chiang Mai Medical Students	(Sutapat Simcharoena, 2017)	Chiang Mai, Thailand 2017	324 Chiang Mai Medical Students (First to Sixth Year)	Internet Addiction	36.7	Are you addicted? (AUA) questionnaire, Internet Addiction Test (IAT)
Factors Associated with Smartphone Addiction Prevalence and Its Predictive Capacity for Health-Related Quality of Life Among Filipino Adolescents	(Danilo B. Buctot, 2020)	Philippines 2020	1,447 Filipino Junior and Senior High School students	Smartphone Addiction	62.6	Smartphone Addiction Scale – Short Version (SAS – SV)

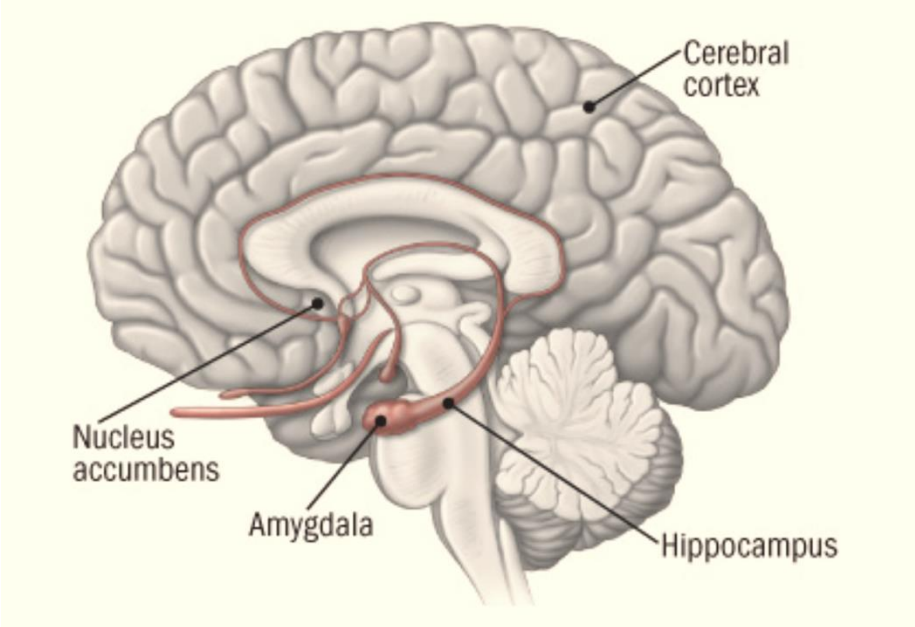
The prevalence from multiple researches in Table 1 shows a rising trend of dependence, smartphone addiction, excessive use of smartphone, and internet addiction. It is noticeable to see in 2010s the prevalence of smartphone addiction has

vastly gone up from 27.4% (in 2008) to between 62% (in 2015) - 64.5% (in 2014). Also, the table is displaying multiple researchers from different countries around the globe who conducted studies on smartphone addiction to alert the trend of smartphone addiction as it is growing and affecting people lives todays.

2.2.3 Addiction Pathways

According to Harvard Mental Health Letter (newsletter) from Harvard Medical School on *How Addiction Hijacks the Brain*, it demonstrates how a brain works on addiction. Addiction came from how a brain memorize the satisfaction it received after rewards. It's called 'pleasure principle' which means the brain recollect all pleasures in the same way including it from eating delicious foods, bonuses, psychological drug, or good massages. When one encounter pleasure, the brain release neurotransmitters called dopamine in nucleus accumbens (NAc) which located in the basal forebrain and referred as the 'brain's pleasure center' (Letter, 2011).

Figure 2.2.3: The Reward Center



Nucleus Accumbens is the reward or pleasure center of the brain (Letter, 2011).

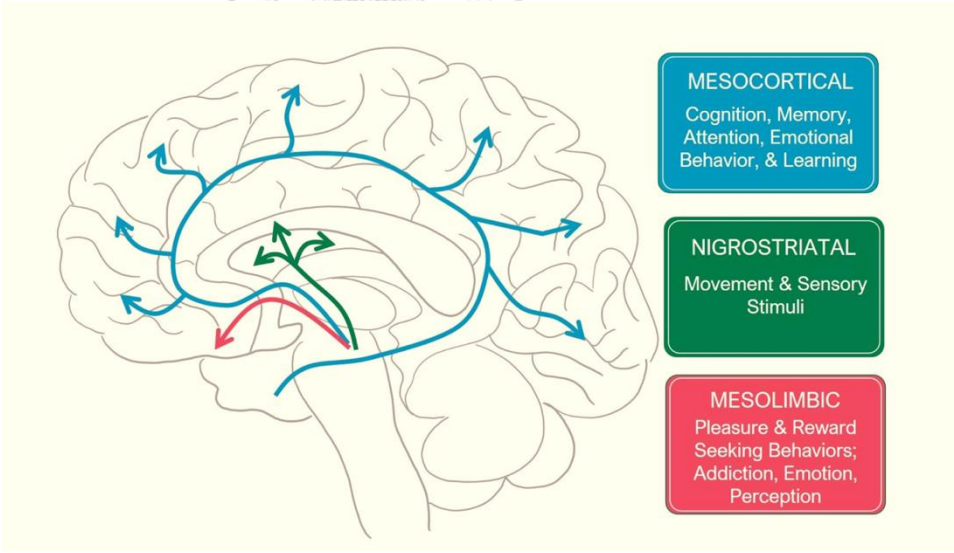
2.2.3.1 Dopamine and Social Rewards

Furthermore, according to a *Science in the News* from Harvard University by Trevor Haynes on *Dopamine, Smartphones & You: A battle for your time*, he

demonstrates how dopamine effects the brain of smartphone addiction. Dopamine is a neurotransmitter which is an organic chemical compound of catecholamine and phenethylamine that released by the brain during pleasurable moments. Dopamine will be released when we encounter any gratifying event such as when we have 'successful social interaction'. According to evolutionary psychology, it rewards us for positive behaviors and stimulates us to repeat the behavior which to create rewards (Haynes, 2018).

According to Haynes, he demonstrates pathways of dopamine when it released. There are four major pathways of dopamine. The pathways allow the dopamine to travel across the brain. Three of the pathways which are nigrostriatal, mesolimbic, and mesocoritcal are recognized as 'reward pathways' which associate to disturbance in most cases of addiction. Another dopamine pathway is tuberoinfundibular which regulate prolactin for the milk production (Haynes, 2018).

Figure 2.2.3.1: Dopamine Pathways



Most of dopamine pathways are generated deep in the midbrain and across the brain. The area that were shown of dopamine pathways are responsible for "behaviors associated with learning habit formation, and addiction" (Haynes, 2018).

2.2.4 Theory of Smartphone Addiction

"Addiction is simply a learned behavior" because people are learning to implicate addictive behaviors in consonance with 'well-established learning principle'

(A. Tom Horvath). There are three fundamental theories of learning that appertain to people which are Social Learning, Classical Conditioning and Operant Conditioning.
The first theory, Social Learning Theory (SLT) was formulated by Albert Bandura – a Canadian/American psychologist—and he mentioned that SLT was about learning and observation. People often imitate behaviors and reactions from other humans in a social context. People tend to repeat positive behaviors because there are rewards related to the positive behaviors (Nabavi, 2011-2012). Furthermore, addiction as SLT context, is based on observation of behaviors and often repeated the positive behaviors because they are related to rewards; for example, when we commute by public transportation and we notice that nobody is talking to each other, people were busy looking at their smartphones, and to cope with uncomfortable silence, we also pull out our smartphones and locked inside our individual worlds as other people.
The second theory, Classical Conditioning was invented by Ivan Pavlov – a Russian psychologist—he mentioned that Classical Conditioning was a learning behavior by paired association between behaviors and stimuli such as when people are pairing 'the pleasure of addictive substances with environment cue' (A. Tom Horvath). For example, people often use smartphone while commuting in public transportations because it was their pleasure to reduce the tiresome and discomfort situation during the commuting.

The third theory, Operant Conditioning was proposed by Burrhus Frederic Skinner (B.F. Skinner) – an American psychologist, behaviorist, and social philosopher—he mentioned that Operant Conditioning Theory is a 'method of learning from punishments and rewards of behaviors' (Staddon & Cerutti, 2003). For example, when people playing an online game on their smartphone, and it reward the player when he or she achieves a goal in the game. The reward kept the player to become more addict to the game and that is a part of using smartphones.
In assumption, the theory of smart phone addiction is related to behaviors either it is social learning, classical conditioning or operant conditioning. Also, according to a study by F. Pinna on *Behavioral Addiction and transition DSM-IV-TR to DMS-5*, stated that many researchers demonstrate their studies on smartphone addiction as a 'behavior addiction' (F. Pinna, 2015).

2.2.5 Smartphone Addiction Measurements

There were many researchers used and developed measurement tools to measure problematic use of mobile phone, internet addiction, dependence, and smartphone addiction (Chimatapu Sri Nikhita, 2015; Danilo B. Buctot, 2020; Ha et al., 2008; Jenaro et al., 2009; Jiang Long, 2016; Jiraporn Khumsri MSc, 2015; Koo, 2010; Leung, 2008; Maryam Amidi Mazaheri, 2014; Soumeya Halayem, 2010; Sutapat Simcharoena, 2017; Tavakolizadeh et al., 2014; Toda et al., 2006; Tossell et al., 2015). After the measurement tools from the previous studies was cautiously examined, the measurement tool that was developed by Min Kwon, Dai-Jin Kim, Hyun Cho, and Soo Yang in 2013 which called Smartphone Addiction Scales – Short Version (SAS-SV) presented suitability for the present study. The SAS-SV provided 10 questions solely based on use of smartphone to easily screen smartphone addiction among adolescents whom considered exposed to addiction. The tool was evaluated by clinical psychologists and also provided a cut-off value for both genders. Therefore, the measurement tools by Min Kwon, Dai-Jin Kim, Hyun Cho, and Soo Yang were an appropriate measurement tool to use.

2.2.6 Outcome of Smartphone Addiction

Smartphone Addiction can transpire and affect people lives. There are both positives and negatives about smartphone use; however, in smartphone addiction context, many studies show only negatives consequences from smartphone addiction. According to CNN News Article on *Smartphone Addiction could be Changing Your Brain*, the news article mentioned the change in the brain and physical health (LaMotte, 2017). However, there are many studies prove negative association of smartphone addiction and mental health

2.2.6.1 Smartphone Addiction: Brain

According to multiples studies (Haynes, 2018; LaMotte, 2017; Letter, 2011), it demonstrates how the brain reacts when dopamine was released during rewarding or gratifying moments. According to a study from Korea University, the brain of smartphone addiction shows higher level of GABA, a neuron inhibitor, which slow down the neurons (LaMotte, 2017). Consequently, when the neurons travel slower, it affects the brain in to have poorer attention or vulnerable to distractions.

2.2.6.2 Smartphone Addiction: Physical Health

Smartphone addiction cause people to have “text neck”, poor posture, neck pain, and poor sleep (Wilson, 2012). According to Wilson, a reporter at CNN HEALTH, ‘text neck’ is an actual diagnosis by Dr. Dean Fishman. Doctor Fishman first coined the word ‘text-neck’ in 2008 while he was treating one of his teenager patients. He noticed that his patient came in with headaches and neck pain, and she was slouching her back while texting on her smartphone. She was sitting with her head tilted forward and slouching shoulders and back. The “forward head posture” caused twice of the head’s weight for the spine to hold, and it also can lead to muscle strain, pinched nerves and disc herniations (Wilson, 2012). Then, he portmanteau the word text-neck from symptoms and behaviors of his patient. Also, when people are using smartphones and placing it at a lower level which caused ‘forward head posture’, it can cause permanent damage to have poor posture because when the tissue has been stretch for too long, “then it gets sore, then it get flamed” (Wilson, 2012). Correspondingly, when people sit in a slouch position, it is hard for them to breathe compare when they sit with back straight. The ‘slouch’ position caused reduce the lung capacity to take in oxygen by 30% and with the lack of oxygen in the body system, it causes lower oxygenated blood and can hypothetically lead to vascular disease (Wilson, 2012). Furthermore, using too much smartphone can disrupt the smartphone addict to have poor sleep because of the blue light (short wavelength) from LED screens of smartphone interferes with the production of melatonin which is a hormone that acts as “a marker of circadian clock” (Cajochen et al., 2011). Melatonin is a hormone that secrete by pineal gland and it helps regulate human body sleep-awake cycle (Mohan, 2017).

2.2.6.3 Smartphone Addiction: Mental Health

Since the last decades, there is an ongoing trend of studies on smartphone addiction. Correspondingly, many researchers are paying attention to the association of smartphone and mental health which specifically in depression, anxiety, and stress.

2.2.6.3.1 Smartphone Addiction to Depression

The association of smartphone and depression is prominent in the today world. Many studies claim that the higher-level smartphone addiction is

related to the higher-level of depression. In the study of Kimberly S. Young, was one of the first researchers who did a study on *Internet Addiction* (or known as smartphone addiction today) and alert attention to the internet addiction in the society. Young did a study called *The Relationship of Depression and Internet Addiction* in 1998, her study presented that internet addiction was likely to occur in white-collar occupations because these workers were exposed to internet use and greater salary higher than blue-collar workers. Also, the Depression level from Beck Depression Inventory (BDI) suggested that "depression is a significant factor in the development of pathological Internet Use (PIU)" (Kimberly S. Young, 1998). From the study of Young, it is noticeable that internet (or smartphone) was only available in certain group of people such as white-collar workers. However, the accessibility of internet (smartphone today) has changed. People are now able to connect to the internet as simple as one finger swipes.

Furthermore, in the study of Sanchez-Martinez and Otereo, *Factors Associated with Cell Phone Use in Adolescents in the Community of Madrid (Spain)*, it found an association of smartphone uses and depression and aggression in college students. It indicated that high uses of cell phone associated with female sex, family economic, smoking and consuming alcohol, failure in academic performance, cell phone dependence, school location (rural), and depression (Mercedes Sánchez-Martínez, 2009). The study measured factors associated to excessive cell phone use among adolescents in the age between thirteen to twenty years old in Madrid, Spain. Moreover, another study by Sara Thomée, Annika Härenstam and Mats Hagberg in 2011, *Mobile Phone Use and Stress, Sleep Disturbances, and Symptoms of Depression among Young Adults*, it showed higher frequencies use of mobile phones related to the higher risk factors of mental health in depression and sleep disturbance among both male and female young adults at one-year-follow-up (Sara Thomée, 2011).

2.2.6.3.2 Smartphone Addiction to Anxiety

Many studies prove that depression and anxiety have some similar symptoms such as trouble sleeping and concentrating, irritability, and nervousness. Therefore, many people who developed depression also have history of anxiety disorder. Although, there is no claim that these two disorders causing one

another, there is a perfect evidence that people are undergo from both disorders (America).

In the study by Kadir Demirci, Mehmet Akgönül, and Abdullah Akpinar did a study on *Relationship of Smartphone Use Severity with Sleep Quality, Depression, and Anxiety in the University Students*, it presented that smartphone overuse may be associated with sleep quality, depression, and anxiety. The study also indicated that from overusing smartphone can lead depression and anxiety which result in poor sleep. Also, in university students in Isparta, Turkey with high anxiety and depression scores should be cautiously observed for smartphone addiction (Demirci, Akgönül, & Akpinar, 2015).

Another study done by Tara Matthews and Jeffrey S. Pierce's study called *No Smartphone Is an Island: The Impact of Places, Situations, and Other Devices on Smart Phone Use* in 2009 which also support the association of smartphone addiction and anxiety. The study showed a positive relationship between talking with others online via text messaging and social anxiety (Pierce, 2009). Furthermore, in the study by Asli Enez Darcin, Samet Kose, Cemal Onur Noyan, Sedar Nurmedov, Onat Yilmaz, and Nesrin Dilbaz called *Smartphone Addiction and Its Relationship with Social Anxiety and Loneliness*, it presented that smartphone addiction was related to social phobia (having anxiety to be in a social setting), and showing that in younger individuals who use smartphones for social networking have an extreme pattern of smartphone use (Enez Darcin et al., 2016).

2.2.6.3.3 Smartphone Addiction to Stress

Although, many studies prove trends of association between smartphone addiction to depression and anxiety, there is also another association which is between smartphone addiction and stress. Thomée, Härenstam, and Hagberg also showed the positive of cell phone use to stress level among young adults in Sweden (Sara Thomée, 2011). Also, another study by Shao-I Chiu on *The Relationship between Life Stress and Smartphone Addiction on Taiwanese University Student: A Mediation Model of Learning Self-Efficacy and Social Self-Efficacy,* the study showed that pressure from family and emotional stress have predicative influence over student smartphone addiction (Chiu, 2014). Another study by T.S. Ragu-Nathan, Monideepa Tarafdar, Bhanu S. Ragu-Nathan on The Consequences of

Technostress for End Users in Organizations: Conceptual Development and Empirical Validation, the study founded that obsessive use of smartphone has positive association with techonostress which caused by overload of communication and information (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008).

2.3 Association of Smartphone Addiction and Socio-demographic

2.3.1 Age

Many studies on smartphone addiction indicates that the age group between teenagers to young adults is the highest rate of smartphone. Therefore, most of the studies have conducted in the population of adolescents up to university students. Another study by Bianchi and Phillips found that people at a younger age or generation tended to embrace the new technology than the older people, and will likely be using new technology products (Adriana Bianchi, 2005). Additionally, another study by Sánchez-Martínez and Otero, stated that there are evidences by Child Wise Monitor, which presented data on *Children and Their Media in 2007*, children between the age of eleven to sixteen are like to have a cell phone more than the adult, and the Spain National Institute of Statistics supported that 98% of Spanish at the age between sixteen to twenty-four owned a cell phone in 2006 (Mercedes Sánchez-Martínez, 2009). Moreover, according to NSO, its Executive Summary in 2016, the report shows the age between fifteen to twenty-four years old hold 85.9% of population aged 6 years and over used Internet in 2016. This presents that the age between teenagers to young adult is the age group that have the highest use of the internet due to their development which evolving and adapting with technology. Therefore, their percentage is higher than other age group.

Figure 2.3.1: Percentage of Thai Population using Internet during 2010 to 2016 by Age Group (NSO, 2016)

Percentage of population aged 6 years and over used Internet during 2012 – 2016 by age group

Year	Age group (years)				
	6-14	15-24	25-34	35-49	50years+
2012	46.5	54.8	29.7	17.1	6.2
2013	54.1	58.4	33.5	18.7	6.6
2014	58.2	69.7	48.5	25.9	8.4
2015	*58.0*	*76.8*	*60.1*	*31.8*	*9.6*
2016	*61.4*	*85.9*	*73.6*	*44.9*	*13.8*

2.3.2 Gender

Multiple studies indicate that the trends of smartphone addiction in genders has various altered since the beginning of smartphone emerging to todays. The study by Bianchi and Philip stated that male tend to have more positive attitude toward internet and more likely to use computers than female (Adriana Bianchi, 2005). However, the study was done in 2005 and the trend of smartphone users have shifted. Today, both male and female are equally having access to internet or smartphone. Though, they might use smartphone differently. In the study by Baifeng Chen, Shushu Ding Xia Ying, Lele Wang, and Yufeng Wen on *Gender Differences in Factors Associated with Smartphone Addiction*, stated that the prevalence of smartphone addiction among patients was 29.8% which 30.3% is male smartphone addiction whom were mostly spend their time using game applications, and 29.3% is female smartphone addiction were often used multimedia applications such as social networking (Chen et al., 2017)

2.3.3 Education Performance

There are many evidences to prove that smartphone addiction has a negative link to students' academic performances. Initially, a study by Junco and Cotton in 2012 disclosed a negative relation between GPA and multitasking use of Facebook and text messaging in the class or during doing homework (Junco & Cotten, 2012).

Similarly, another study by Karpinski, Kirschner, Ozer, Mellot, and Ochwo in 2013 discovered a negative association between GPA and social networking sites which moderated by multitasking in a sample of 451 US university students (Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2013). Moreover, a study by Rosen founded that the a link between declined academic performance and switch-task (multitasking of using smartphone while studying) and students who is task-off (either study or being on smartphone) is less likely to be distracted during study (Rosen, Mark Carrier, & Cheever, 2013).

2.3.4 Socioeconomic Status

In order to use or own smartphone, is has to be purchased either by cash, credit card, or debit card which mean there has to be some monetary exchanging with the products. In history, when the first smartphone was launched, it was expensive and only certain group of socio-economic groups such as white collars can afford it. Therefore, level of socio-economic has already involved with smartphones since the beginning of smartphone era. Accordingly, a study from Rahmati et al., in 2012 was conducted in stated that socioeconomic was one of the factors that influenced smartphone use (Ahmad Rahmati, 2012). Additionally, the study of Frias-Martínez and Virsesa was conducted upon a population of in an emerging economy in Latin America. The study found that there are moderate and strong correlation between the expenses on smartphone, the exchange of communications, physical distance or geographical area of the person whereabout and level of socioeconomic (Virsesa, 2012).

2.4 Association of Smartphone Addiction and Medical Illnesses

'Do you have any history of medical problem?'. The patients often hear this question during their diagnosis with their doctors because several researches agree that there is a link between histories of physical problems to mental health. According to NIMH, a publication on *Chronic Illness & Mental Health*, it mentioned that "People with other chronic medical conditions have a higher risk of depression" (Health, 2015). Also, according Daniel P. Chapman, who wrote *The Vital Link between Chronic Disease and Depressive Disorder*, he revealed that people who have chronic disease often link to depressive disorder (Daniel P. Chapman, 2004). Furthermore, according to an article on the Relationship between Mental Health,

Mental Illness and Chronic Physical Conditions in 2018, it stated that people living with chronic disease experience anxiety and depression at a double rate of general population; contrarily, people with severe mental illness are at a higher risk of undergoing a wide collection of chronic diseases (Association, 2018). According to the findings from the previous study (Association, 2018), it presented a table which listed "Risk of People with a Mental Illness Developing Specified Chronic Physical Conditions", namely, diabetes, heart disease, stroke, and Chronic Obstructive Pulmonary Disease (COPD).

Table 2.4: Risk of People with a Mental Illness Developing Specified Chronic Physical Conditions (Association, 2018)

Chronic Disease	**Relative Risk (RR) or Odd Ratio (OR)**	**References**
Diabetes	RR = 1.6 for depression	(Briana Mezuk, 2008)
Heart Disease	RR = 1.6 for depression	(Rugulies, 2002)
Stroke	RR = 3.1 for depression	(Sharon L. Larson, 2001)
Chronic Obstructive Pulmonary Disease (COPD)	OR = 3.8 – 5.7 for schizophrenia, schizoaffective disorder, major depressive disorder or bipolar disorder	(Seth Himelhoch, 2005)

2.5 Cyberbullying and Mental Health

2.5.1 Definition of Cyberbullying

Bullying is often expressed as being a hostile and aggressive act or behavior that executed by an individual or a group toward a person who targeted to be unable to protect him or herself (Smith, 2008). However, in the recent years, a new form of bullying take place upon modern technologies called 'cyberbullying'. Cyberbullying is another form of bullying that appears on digital devices such as computers, tablets, and smartphones. Cyberbullying comprises of posting, sharing, or

sending deleterious, harmful and hurtful messages or contents of others which can cause shame, disgrace, or humiliation (stopbullying.gov, 2019).

"There are growing concerns about the prevalence and impact of online bullying or 'cyberbully' amongst children and young people" (Youngminds, 2018). Corresponding to the previous statement by The Children's Society and YoungMinds, cyberbullying is another type of bullying which occur on internet platform. As the technology is evolving, people are adapting into a newer lifestyle which progressed around technology. Therefore, cyberbullying is another form of bullying that followed the trend of a newer lifestyle which developed around technology. Cyberbullying can still cause harm or hurt other people via online platform. As the above statement mentioned about the growing concerns of the influence of cyberbullying on young people, mental health is one of the concerns (Youngminds, 2018).

5.3.2 Cyberbullying and Mental Health

Due to the growing number of internet users, there are many researches on relationship of cyberbullying and mental health. According to a study that was done by Jutta Linbert on Cyber-Bullying and It Its Impact on Mental Health, she found out that the effect of cyberbullying as for cyber-victim has severe impacts on mental signs, and the rates of cyber-bullying to self-harming behaviors, depression, and anxiety may have been undervalued. Also, another study by Evelina Landstedt and Susanne Persson on Bullying, and Mental Health in Young People reported that cyberbullying is a continuous part of an in-real-life bullying. Also, they discovered all types bullying were associated with depressive symptoms in both male and female students, and cyberbullying was also related in raising the possibility of psychological problems in female students (Landstedt & Persson, 2014). The study alarm people that cyberbullying is becoming an issue among young people. According to Liam Hackett, a Chief Executive of anti-bullying charity Ditch the Label, he once stated that "Thirty years ago, home was a safe place, but now there is no escape from the bullying, which creates constant stress and anxiety which is hard to navigate" (Youngminds, 2018). Correspondingly, an inquiry report from The Children's Society and Young Minds – Young Minds is a leading charity group that focused on improving the mental wellbeing of young people which based in the United Kingdom

of England – on Safety Net: Cyberbullying's Impact on Young People's Mental Health. The report alerted about the growing number of cyberbullying and how it impacted young people's mental health. It collected and presented previous researches from multiple universities such as University of Sheffield and Birmingham University. The study from University of Sheffield discovered the association between mental health and children's experiences of cyberbullying. They found that 17.7% cyberbullying victims had visited website related to self- harm and 12.2% of the victims had visited suicidal related websites. Conversely, when comparing to people who have not entangled with cyberbullying, the researchers discovered that people who were uninvolved with cyberbullying visited self-harm websites by 5.7% and 3.7% of them visited suicidal related websites which were lower than cyberbullying victims (Youngminds, 2018). Furthermore, another study was done by Birmingham University learned that cyberbullying victims who are the age under twenty-five years old were twice to endorse suicide and self-harm behaviors than non-cyberbullying-victims (Youngminds, 2018). The studies that were mentioned above confirmed a relationship of cyberbullying and mental health among young people which is show how essential it is to include cyberbullying in the study as a covariate to mental health.

5.3.3 Cyberbullying Measurement Tools

According to a critical review and meta-analysis of cyberbullying researches among youth by Robin M. Kowalski, Gary W. Giumetti, Amber N. Schroeder, and Micah R. Lattanner in 2014, it showed multiples researches constructed on cyberbullying and its measurement tools. The research supported that young people or teenagers are the targeted population of cyberbullying (Robin M. Kowalski, 2014). However, despite many measurement tools for cyberbullying, many of psychometric properties of the scales remain indistinct and unclear. A research by Brendesha M. Tynes, Chad A. Rose, and David R. Williams found that in Asian and biracial students experienced significantly more individual online racial discrimination than White and Black students (Brendesha M. Tynes, 2010) which presented a conflict with another previous study by Sameer Hinduja and Justin W. Patchin in 2010 that there is no difference in online victimization among races (Patchin, 2010) which showed that the findings may not be generalized to all the youth. Also, another study

by Bayram Cetin, Erkan Yaman, and Adem Peker in 2011 was to develop a reliable and valid measurement tool for cyberbullying which called ‘Cyber Victimization and Bullying Behaviors’ which reported three factor scales which were cyber verbal bullying, hiding identity, and cyber forgery (Bayram Cetin, 2011). However, the scale developed by Tynes et al. and Cetin et al. solely studied activities on the internet and ignore others modern technologies and devices which showed that their measurement tools might not be generalize and appropriate to use for the present study. Consequently, the study by Lucy R. Betts and Karin A. Spenser developed measurement tools for cyberbullying which designed to assess general experiences and involvement in cyber bullying rather than focusing on specific media. Their development of measurement tool of cyberbullying emphasizes on generalization because the changes in the media due to popular culture such as transitioning from MySpace to Facebook and the evolvement of technologies such as transitioning from cell phone to smartphone (Betts & Spenser, 2017). Also, their tools were created to study young people’s experiences of cyberbullying. Therefore, the measurement tools by Betts and Spenser were an appropriate measurement tools to use.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Design

The research design of the study was a cross-sectional and random sampling technique.

3.2 Study Area

The study area of this study was in high schools in Bangkok, Thailand

3.3. Study Period

Study period was from September 2018 to March 2020 and the data was collected from November 2019 to February 2020.

3.4 Study Population and Sample

Population: The study population of the current study was high school students in Bangkok, Thailand

Sample: High school students in Bangkok, Thailand which randomly selected from 3 different schools

- Yothinburana School
- Samsenwittayalai School
- Wat Raja O Ros School

Inclusion Criteria

- Students who used smartphones
- Students both male and female who studied in high school in Bangkok from grade 10 to 12 (Mattayhom 4 – 6)
- Students who were willing to participate in the study

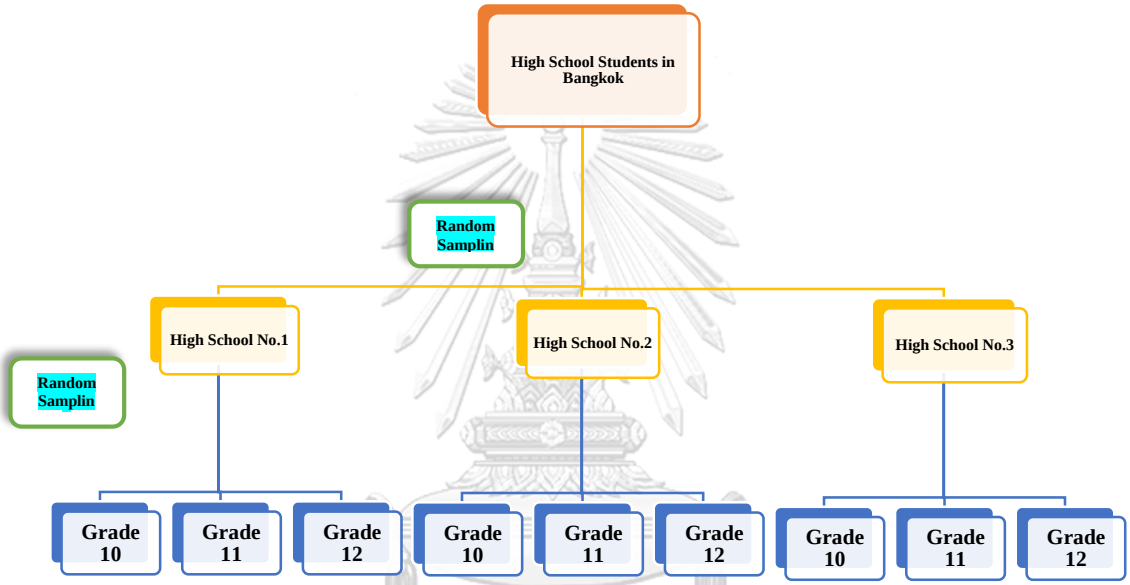
Exclusion Criteria

- Incomplete questionnaire responses

3.5 Sampling Technique:

In the investigation of association between smartphone addictions to mental health in high school students in Bangkok, Thailand, are composed of multiple steps of *Random Sampling technique* as following Figure 3.5.

Figure 3.5 Sampling Technique



3.6 Sample & Sample Size:

The sample size of the study is calculated by using Cochran's sample size formula. Prevalence of Smartphone Addiction was 62.6% from the study of *Factors Associated with Smartphone Addiction Prevalence and Its Predictive Capacity for Health-Related Quality of Life Among Filipino Adolescents* by Danilo B. Buctot, Nami Kim, and Jinsoo Jason Kim (Danilo B. Buctot, 2020).

According to Cochran's sample size formula: $n = \frac{Z\alpha/2\ ^2(p*q)}{e^2}$

At 95% CI

n = number of participants

$Z_{\alpha/2} = 1.96$

p = estimated proportion of population = 0.63

q = 1-p = 1-0.63 = 0.37

e = margin of error 5% = 0.05

Therefore, $n = \frac{1.96^2(0.63*0.37)}{0.05^2}$

n = 359

However, the researcher increased the percentage of error up to 15 percent.

(With 15% error)

Therefore, n = 359 + 54

n = 413

Then, the researcher rounded the number up to 420 participants.

3.7 Measurement Tools

The study contains four sections of questionnaire. There are demographic data sets of questionnaires, a health factor questionnaire, Cyber Victimisation Experienced Scales (CV), Smartphone Addiction Scale-Short Version (SAS-SV), and Depression, Anxiety, and Stress Scale (DASS-21). The amount of time to answer the questionnaire should be about 20 to 30 minutes.

Part 1 Demographic and Clinical Characteristics

Demographic data is to analyze the background of the participants in gender, age, class years, academic performance (GPA), monthly allowance, and part time

working experience. Additionally, a history of medical illness question was also added to Part 1 of the questionnaire. The question is to explore whether the participants have been exposure to any medical problems, and to examine if there is any association between having medical problems to mental health.

Part 2 Cyber Victimisation Experienced Scales (CV) Questionnaire

The Cyber Victimisation Experienced Scales was developed in a study called *Developing the Cyber Victimization Experiences and Cyberbullying Behavior Scales* by Lucy R. Betts and Karin A. Spencer in 2017. The questionnaire contains 15 items and rated by six-point Likert's Scale which were ranging from 1 (coded as Never) to 6 (coded as Everyday), and there is no specific anchor point between 2 to 5. Since there is no anchor cut point there, the researcher categorized the participants into two groups which were a group of <75 percentiles and a group of ≥75 percentiles.

Part 3 Smartphone Addiction Scale (SAS-SV) Questionnaire

Smartphone Addiction Scale – Short Version (SAS-SV) was created by Min Kwon, Dai-Jin Kim, Hyun Cho, and Soo Yang in 2013. The short version was from the original version by Min Kwon, Joon-Yeop Won, Jae-Woo Park, Jung-Ah Min, Changtae Hahn, Xinyu Gu, Ji-Hye Choi, and Dai-Jin Kim in 2013 from a research study called *Development and Validation of a Smartphone Addiction Scale (SAS)* which had 33 items and it was too long for younger students to sit and answer it in one setting. Therefore, the researchers created the short version of SAS. The questionnaire was made to assess the level of smartphone addiction and was not to diagnose any mental disorder. The SAS-SV consisted of ten items and rated by six-point Likert's Scale which were Strongly Disagree coded as 1, Disagree coded as 2, Weakly Disagree coded as 3, Weakly Agree coded as 4, Agree coded as 5, and Strongly Agree coded as 6. The internal consistency of the questionnaire was 0.91, and the cutoff value for male is 31 and female is 33. Additionally, higher of the score represents higher level of smartphone addiction.

Part 4 Depression Anxiety and Depression Scale (DASS-21) Questionnaire

Depression, Anxiety, and Stress Scale (DASS-21) was created by Lovibond, S.H. and Lovibond, P.F. in 1995. DASS-21 (with 21 items) is a shorter version from the original DASS (with 42 items) in 1995. Both versions of the questionnaires were for assessing and screening the emotional states of depression, anxiety, and depression. However, the questionnaire could not be used for diagnosing any mental disorder. The DASS-21 consisted of 21 items with four-point Likert's Scale which were Did not apply to me at all coded as 0, Applied to me to some degree or some of the time coded as 1, Applied to me a considerable degree or a good part of time coded as 2, and Applied to me very much or most of the time coded as 3. The internal consistency of the questionnaire was 0.7. The scale can be measure as Normal, Mild, Moderate, Severe, and Extreme Severe (Lovibond, 1995).

Each domain hold 7 items – in depression domain there were items number 3, 5, 10, 13, 16, 17, and 21, in anxiety domain there were items number 2, 4, 7, 9, 15,19, and 20, and in stress domain there were items number 1, 6, 8, 11, 12, 14, and 18. Additionally, in the following, there is a table of level of measurement for DASS-21 which uses for the present study.

Level of Measurement	**Depression**	**Anxiety**	**Stress**
Normal	0-9	0-7	0-14
Unusual	10 and over	8 and over	15 and over

3.7 Instrument Development

1. Grant permission for operating questionnaires from researchers/ authors of the Cyber Victimisation Experienced Scales (CV), Smartphone Addiction Scale – Short Version (SAS-SV), and Depression, Anxiety, and Stress Scale (DASS-21) (See Appendex C, D, and E)
2. Translated questionnaires from English version to Thai version
3. Back translated from Thai version to English version by an English expert

4. Progressed and reviewed items of questionnaires according to comments and suggestions of the three experts. Then, attained validity of measurements (to measure whether the questionnaires were corresponding to the objective of the study).

The Item-Objective Congruence (IOC)

Scoring +1 = certain that the test is congruent

Scoring 0 = uncertain/ unsure that the test is congruent

Scoring -1 = certain that the test is NOT congruent

The equation of IOC

$$IOC = R/N$$

R = sum of scores

N = number of specialists

If the value of IOC was higher than 0.5, then the questionnaire was acceptable. However, if the value of IOC was less than 0.5, then the questionnaire was unacceptable.

5. After calculated the IOC from the questionnaires have been revised from comments and suggestions from the three experts, IOC was calculated.

1). The IOC of the Cyber Victimisation Experienced Scales (CV) was 1.0

2). The IOC of Smartphone Addiction Scale – Short Version (SAS-SV) was 1.0

3). The IOC of Depression, Anxiety, and Stress Scale (DASS-21) score was 0.87

Therefore, all of the questionnaires were accepted.

6. In order to obtain reliability of measurements (to measure the consistency and stability of the questionnaires), the questionnaires were given to 30 high school students.
7. After the questionnaires were given to 30 high school students, Cronbach's alphas were calculated to measure reliability of measurements.

1). The Cronbach's alpha of the Cyber Victimisation Experienced Scales (CV) was 0.85.

2). The Cronbach's alpha of Smartphone Addiction Scale – Short Version (SAS-SV) was 0.84.

3). The Cronbach's alpha of Depression, Anxiety, and Stress Scale (DASS-21) score was 0.80

Therefore, all of the questionnaires were good.

3.8 Data Collection

The data collection was self-administered questionnaires.

Information on Contacting and Accessing to the Research Participants:

1. The researcher used a random sampling method to choose three different schools and that were registered under Office of the Basic Education Commission.
2. The researcher sent a request letter from College of Public Health, Chulalongkorn University which to conduct a research to the principals of the mentioned schools (*Yothinburana School, Wat Raja O Ros School, School, and Samsenwittayalai School*).
3. After the research was approved by the principals, list of students will be arranged by the Administration.
4. The researcher sent out three forms to the teachers to pass along to the students which are 1) a Participation Information Sheet, 2) a Letter of Consent, and 3) a questionnaire. However, the students can make a decision whether they want to participate in the project. If the students are interested to participate in the study, then they can bring all of the forms back to their parents.
5. After the guardians' revision all of the forms and approval to sign the Letter of Consent, then the students need to bring all of the forms (which including Participation Information Sheet, Letter of Consent, and Questionnaire) back to the teacher or the researcher.
6. Verbal explanations were given to the students for further clarification about the research study and signatures of the Letter of Consent was required before any farther step was taken in the study.
7. After the researcher received both the Letter of Consent, then the research proceeded on conducting the self-administrate questionnaires to the students.

8. Before the students take the questionnaire, the researcher was verbally explained the importance of the study to the participants and asked them to cooperate by answer the questionnaire truthfully. Therefore, the researcher was able to use information that were collected from the participants.
9. Once the questionnaires have been administrated by the participants (high school students), all of the questionnaires and any information related to the study will be kept confidentially, and they will be terminated once the study is complete.
10. In addition, the researcher provided the information of healthcare services to the students who seek help.

3.9 Data Analysis (Statistics)

IBM SPSS Statistics 22 was used to calculate the statistic

- Descriptive statistic for describing information of demographic and clinical characteristics, smartphone addiction, cyberbullying and mental health variables
- Chi-Square Test for finding association between smartphone addiction and mental health variables
- Simple and Multivariable Logistic Regression Analysis for finding association between smartphone addiction and mental health variables

3.10 Ethical Consideration

The study will be conduct on high school students which implies as the majority of participants from the study are **people** who belong to the age group of **children who aged under eighteen**. Therefore, the Ethic Approval must be done before the study can take place. The **Ethic Approval** will be taken from the Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University, and a **request letter conducted a research** from College of Public Health, Chulalongkorn University will be sent to principals of the mentioned schools. Lastly, as it mentioned the majority of the participants belong to people who aged under eighteen group, therefore a **Letter of**

Consent from the guardians and the students will be taken before the administration of the questionnaire. The Approval Ethical Number of the present study was 138.1/62.
(For further clarification, please see *Appendix F: The Approval Ethical Number*)

3.11 Human Subjects Protection

As the researcher considers for the rights of participants, the researcher will conduct the study and collect the data after the research proposal approved by The Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University.

Once the participants are informed about the study, they have the right to choose whether they want to participate or not to participate in the study, and their decisions will not be affected to their grades or scores of any kind. The students will be informed that their participation of the study based on voluntarily. They will be notified that they can withdraw from the study at any time and without any consequences. The data will only be used for the current research study. Additionally, the participants will be informed and confirmed that, all of the questionnaires and any information related to the study will be kept confidentially, and they will be terminated once the thesis is complete. If the participants have any questions, comments, or suggestions, the researcher was available to answer and clarify the inquiries based on the Ethic Committee of Chulalongkorn University.

3.12 Limitation

The study upon smartphone addiction associates to mental health counted as a subjective matter to each person. As an individual, he or she might interpret the questionnaires differently due to their unique personality. Therefore, to prevent such further misinterpreted, the researcher will explain the questionnaire to each participant prior to the questionnaire will be administered.

3.13 Expected Benefit & Application

- The prevalence of smartphone addiction was found in the study
- Researchers were able to investigate associations between smartphone addiction and mental health especially depression, anxiety, and stress among high school students in Bangkok, Thailand.
- The knowledge of smartphone addiction was increased and understood in aspect of mental health for high school students in Bangkok, Thailand.
- The study was another steppingstone for researching smartphone addiction in high school students, however this research can be used as a based info for others age group or other group of samples.
- The research was able to guide the study toward mental health in depression, anxiety, and stress. Therefore, for future study, other researches can investigate in other spectrum of mental health.

CHAPTER IV
RESULTS

This study directed to investigate associations of smartphone addictions to mental health, especially in depression, anxiety, and stress among high school students in Bangkok, Thailand. The study intended to describe independent variables, in particular, demographic and clinical characteristics – age, gender, educational level, academic performance (GPA), monthly allowance, part-time working experiences, and history of health illnesses – cyberbullying, and smartphone addiction. Also, the study intended to describe dependent variable, mental health in particular depression, anxiety, and stress. The study designed to evaluate associations between these independent variables and a dependent variable among high school students in Bangkok, Thailand. The study consisted of 420 high school students in Bangkok, Thailand.

The result included descriptive and inferential statistical results of these dependent and independent variables among high school student in Bangkok, Thailand. The statistical results of bivariate analysis were done by binary logistic regression as follow.

4.1 Demographic and Clinical Characteristics

Table 4.1 demonstrated Demographic and Clinical Characteristics of the participants. There were 420 high school students participated in the study. Among 420 participants. The participants were female participants (64.0%) and male participants (36.0%). The age of the student was ranging from 15 – 20 years old, and the mean(sd) was 16.6 (0.99%). There were three educational levels, grade 10 (33.1%), grade 11 (34.0%), and grade 12 (32.9%). The GPA of the participants were ≤3.02 (25 percentiles) (24.8%), 3.03 – 3.45(26-50 percentiles) (24.3%), 3.46 – 3.75 (51-75 percentiles) (26.4%), and >3.75 (>75 percentiles) (24.5%). The mean(sd) of participants' GPA was 3.3 (0.53) and it was ranging from 1.00 to 4.00. Most of the participants did not work part-time (90.2%), although some participants had work part-time (9.8%). The weekly allowance of the participants was ≤400 (25 percentiles) (25.5%) and >400 (25 percentiles) (74.5%). The mean(sd) of participants' monthly allowance was 625.6 (398.69) and it was ranging from 60 Baht to 3,000 Baht.

History of medical illnesses among participants were diabetes (0.5%), high blood pressure (2.1%), thyroid, and others (i.e. asthma, allergic, …) (9.0%). The cyberbullying among participants were separated into two groups – group one was <75 percentiles (74.3%) and group two was ≥75 percentiles (25.7%). Finally, the prevalence of smartphone addiction was 52.1%, the prevalence of depression was 13.3%, the prevalence of anxiety was 30.2%, and the prevalence of stress was 3.3%.

Table 4.1 Demographic and Clinical Characteristics (n=420)

Characteristics	**n**	**(%)**
Gender		
Male	151	(36.0)
Female	269	(64.0)
Age (Years)		
15	54	(12.9)
16	139	(33.1)
17	141	(33.6)
≥18	86	(20.4)
Mean(sd)	16.6 (0.99)	
Range	15 – 20	
Educational		
Grade10	139	(33.1)
Grade11	143	(34.0)
Grade12	138	(32.9)
Grade Point Average		
≤3.02(25 percentiles)	104	(24.8)
3.03 – 3.45(26-50 percentiles)	102	(24.3)
3.46 – 3.75 (51-75 percentiles)	111	(26.4)
>3.75 (>75 percentiles)	103	(24.5)
Mean(sd)	3.3 (0.53)	
Range	1.00- 4.00	

Table 4.1 (Continued)	**n**	**(%)**
Part-time job		
No	379	(90.2)
Yes	41	(9.8)
Weekly allowance (baht/week)		
≤400 (25 percentiles)	107	(25.5)
>400 (>25 percentiles)	313	(74.5)
Mean(sd)	625.6 (398.69)	
Range	60 – 3000	
History of Medical Illnesses		
Diabetes	2	(0.5)
High blood pressure	9	(2.1)
Thyroid	6	(1.4)
Others (i.e. asthma, allergic, …)	38	(9.0)
Cyberbullying		
<75 percentiles	312	(74.3)
≥75 percentiles	108	(25.7)
Smartphone Addiction		
No	201	(47.9)
Yes	219	(52.1)
Mental Health		
Depression	56	(13.3)
Anxiety	127	(30.2)
Stress	14	(3.3)

4.2 Association between Depression and Demographic and Clinical Characteristics

Table 4.2 displayed demographic and clinical characteristics associated with depression by using simple logistic regression. The study found significant association in 'History of Medical Illnesses' [OR 2.57, 95% CI 1.34 – 4.94], Cyberbullying [OR 2.73, 95% CI 1.53 – 4.88], and 'Smartphone Addiction' [OR 2.58, 95% CI 1.40 – 4.78] with 'Depression'. The result indicated that the participants who had history of medical illnesses were 2.57 times to have a risk of depression, the participants who had cyberbullying at ≥75 percentiles were 2.73 times to have a risk of depression; also, the participants who had tendency of smartphone addiction were 2.58 times to have a risk of depression.

Table 4.2 Demographic and clinical characteristics associated with depression using logistic regression

Characteristics	**Unadjusted OR (95%CI)**	**p-value**
Gender		
Male	1.29 (0.72 – 2.28)	0.392
Female	Ref.	
Age (Years)		
15	Ref.	
16	1.267 (0.48 – 3.37)	0.635
17	1.322 (0.50 – 3.50)	0.573
≥18	1.173 (0.41 – 3.39)	0.767
Grade Point Average		
≤3.02(25 percentiles)	Ref.	
3.03 – 3.45(26-50 percentiles)	1.03 (0.49 – 2.14)	0.951
3.46 – 3.75 (51-75 percentiles)	0.62 (0.28 – 1.37)	0.238
>3.75 (>75 percentiles)	0.55 (.024 – 1.27)	0.160
Part-time job		
No	Ref.	
Yes	1.13 (0.45 – 2.82)	0.797

Table 4.2 (Continued)	**Unadjusted OR (95%CI)**	**p-value**
Weekly allowance (baht/week)		
≤400 (25 percentiles)	Ref.	
>400 (>25 percentiles)	1.03 (0.54 – 1.98)	0.930
History of Medical Illnesses		
No	Ref.	
Yes	2.57 (1.34 – 4.94)	**0.005**
Cyberbullying		
<75 percentiles	Ref.	
≥75 percentiles	2.73 (1.53 – 4.88)	**0.001**
Smartphone Addiction		
No	Ref.	
Yes	2.58 (1.40 – 4.78)	**0.002**

Table 4 . 3 displayed the association between 'Depression' and 'Smartphone Addiction' which controlled by 'History of Medical Illnesses' and 'Cyberbullying' variables was calculated by using multivariable logistic regression. In the group of depression, participants were categorized into two groups – a group of not smartphone addiction (28.6%) and a group of smartphone addiction (71.3%). The result indicated that participants who belonged in the smartphone addiction group has higher percentage to depression than participants who were not belong in the smartphone addiction group

Also, the association between depression and smartphone addiction [OR 2.18, 95% CI 1.16 – 4.13] after adjusted OR with 'History Medical of Illnesses' and 'Cyberbullying' which showed a significant value. The result indicated that he participants who had tendency of smartphone addiction were 2.18 times to have a risk of depression.

Table 4.3 The association between depression and smartphone addiction

Smartphone Addiction	Non-depression	Depression	Unadjusted OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
No	185(50.8)	16 (28.6)	Ref.		Ref.	
yes	179(49.2)	40 (71.3)	2.58 (1.40 – 4.78)	0.002	2.18 (1.16– 4.13)	**0.016**

*Each OR is adjusted with History Medical of Illnesses and Cyberbullying

4.3 Association between Anxiety and Demographic and Clinical Characteristics

Table 4.4 presented demographic and clinical characteristics associated with anxiety by using simple logistic regression. The study found significant association in 'History Medical of Illnesses' [OR 2.65, 95% CI 1.55 – 4.55], Cyberbullying [OR 4.32, 95% CI 2.72 – 6.88], and 'Smartphone Addiction' [OR 2.65, 95% CI 1.71 – 4.12] with 'Anxiety'. The result indicated that the participants who had history of medical illnesses were 2.65 times to have a risk of anxiety, the participants who had cyberbullying at ≥75 percentiles were 2.72 times to have a risk of anxiety; also, the participants who had tendency of smartphone addiction were 2.65 times to have a risk of anxiety.

Table 4.4 Demographic and clinical characteristics associated with anxiety using logistic regression

Characteristics	**Unadjusted OR (95%CI)**	**p-value**
Gender		
Male	1.12 (0.73 – 1.72)	0.604
Female	Ref.	
Age (Years)		
15	Ref.	
16	2.00 (0.94 – 4.23)	0.071
17	1.83 (0.87 – 3.88)	0.114
≥18	1.51 (0.67 – 3.41)	0.318
Grade Point Average		
≤3.02(25 percentiles)	Ref.	
3.03 – 3.45(26-50 percentiles)	0.85 (0.47 – 1.56)	0.600
3.46 – 3.75 (51-75 percentiles)	1.17 (0.66 – 2.08)	0.588
>3.75 (>75 percentiles)	0.88 (0.49 – 1.60)	0.680
Part-time job		
No	Ref.	
Yes	1.73 (0.90 – 3.35)	0.103
Weekly allowance (baht/week)		
≤400 (25 percentiles)	Ref.	
>400 (>25 percentiles)	0.91 (0.57 – 1.46)	0.688
History of Medical Illnesses		
No	Ref.	
Yes	2.65 (1.55 – 4.55)	**>0.001**
Cyberbullying		
<75 percentiles	Ref.	
≥75 percentiles	4.32 (2.72 – 6.88)	**>0.001**

Table 4.2 (Continued)	**Unadjusted OR (95%CI)**	**p-value**
Smartphone Addiction		
No	Ref.	
Yes	2.65 (1.71 – 4.12)	**>0.001**

Table 4.5 displayed the association between 'Anxiety' and 'Smartphone Addiction' which controlled by 'History of Medical Illnesses' and 'Cyberbullying' variables was calculated by using multivariable logistic regression. In the group of anxiety, participants were categorized into two groups – a group of not smartphone addiction (31.5%) and a group of smartphone addiction (68.5%). The result indicated that participants who belonged in the smartphone addiction group has higher percentage to anxiety than participants who were not belong in the smartphone addiction group

Also, the association between anxiety and smartphone addiction [OR 2.16, 95% CI 1.36 – 3.45] after adjusted OR with 'History of Medical Illnesses' and 'Cyberbullying' which showed a significant value. The result indicated that he participants who had tendency of smartphone addiction were 2.16 times to have a risk of anxiety.

Table 4.5 The association between anxiety and smartphone addiction

Smartphone Addiction	**Non-anxiety**	**Anxiety**	**Unadjusted OR (95%CI)**	**p-value**	**Adjusted OR (95%CI)**	**p-value**
No	161(54.9)	40 (31.5)	Ref.		Ref.	
yes	132(45.1)	87 (68.5)	2.65 (1.71 – 4.12)	0.000	2.16 (1.36 – 3.45)	**>0.001**

*Each OR is adjusted with History Medical of Illnesses and Cyberbullying

4.4 Association between Stress and Demographic and Clinical Characteristics

Table 4.6 displayed demographic and clinical characteristics associated with stress by using simple logistic regression. The study found significant association in

‘Gender’ [OR 3.35, 95% CI 1.10 – 10.18], ‘History of Medical Illnesses’ [OR 3.20, 95% CI 1.04 – 9.89], ‘Cyberbullying’ [OR 7.86, 95% CI 2.41 – 25.61], and ‘Smartphone Addiction’ [OR 5.77, 95% CI 1.28 – 26.10] with ‘Stress’. The result indicated that the male participants were 3.35 times to have a risk of stress, the participants who had history of medical illnesses were 3.20 times to have a risk of stress, the participants who had cyberbullying at ≥75 percentiles were 7.86 times to have a risk of stress; also, the participants who had tendency of smartphone addiction were 5.77 times to have a risk of stress.

Table 4.6 Demographic and clinical characteristics associated with stress using logistic regression

Characteristics	**Unadjusted OR (95%CI)**	**p-value**
Gender		
Male	3.35 (1.10 – 10.18)	**0.033**
Female	Ref.	
Age (Years)		
15	Ref.	
16	0.77 (0.07 – 8.71)	0.835
17	2.77 (0.33 – 23.05)	0.346
≥18	2.56 (0.28 – 23.77)	0.401
Grade Point Average		
≤3.02(25 percentiles)	Ref.	
3.03 – 3.45(26-50 percentiles)	1.02 (0.25 – 4.12)	0.978
3.46 – 3.75 (51-75 percentiles)	0.46 (0.08 – 2.56)	0.374
>3.75 (>75 percentiles)	1.01 (0.25 – 4.15)	0.989
Part-time job		
No	Ref.	
Yes	0.70 (0.90 – 5.52)	0.738

Table 4.6 (Continued)	**Unadjusted OR (95%CI)**	**p-value**
Weekly allowance (baht/week)		
≤400 (25 percentiles)	Ref.	
>400 (>25 percentiles)	0.85 (0.26 – 2.77)	0.787
History of Medical Illnesses		
No	Ref.	
Yes	3.20 (1.04 – 9.89)	0.043
Cyberbullying		
<75 percentiles	Ref.	
≥75 percentiles	7.86 (2.41 – 25.61)	**0.001**
Smartphone Addiction		
No	Ref.	
Yes	5.77 (1.28 – 26.10)	**0.023**

Table 4.7 displayed the association between 'Stress' and 'Smartphone Addiction' which controlled by 'Gender', 'History of Medical Illnesses', and 'Cyberbullying' variables was calculated by using multivariable logistic regression. In the group of stress, participants were categorized into two groups – a group of not smartphone addiction (14.3%) and a group of smartphone addiction (85.7%). The result indicated that participants who belonged in the smartphone addiction group has higher percentage to stress than participants who were not belong in the smartphone addiction group

Also, the association between stress and smartphone addiction [OR 3.73, 95% CI 0.77 – 17.95] after adjusted OR with 'Gender', 'History of Medical Illnesses', and 'Cyberbullying' which showed a **not** significant value. **The result did not indicate that he participants who had tendency of smartphone addiction were 3.73 times to have a risk of stress.**

Table 4.7 The association between stress and smartphone addiction

Smartphone Addiction	Non-stress	Stress	Unadjusted OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
No	199(49.0)	2 (14.3)	Ref.		Ref.	
yes	207(51.0)	12 (85.7)	5.77 (1.28 – 26.10)	0.023	3.73 (0.77 – 17.95)	0.101

*Each OR is adjusted with Gender, History Medical of Illnesses, and Cyberbullying

CHAPTER V
DISCUSSION, CONCLUSION, AND RECOMMENADTION

Discussion

Prevalence of Smartphone Addiction

From multiple studies, prevalence of Smartphone Addiction was ranging from 4.1 to 62.1 which presented an increasing trend of number of prevalence. (Reference from (Chimatapu Sri Nikhita, 2015; Danilo B. Buctot, 2020; Ha et al., 2008; Jenaro et al., 2009; Jiang Long, 2016; Jiraporn Khumsri MSc, 2015; Koo, 2010; Leung, 2008; Maryam Amidi Mazaheri, 2014; Soumeya Halayem, 2010; Sutapat Simcharoena, 2017; Tavakolizadeh et al., 2014; Toda et al., 2006; Tossell et al., 2015) Additionally, the prevalence from the past five years was ranging from 21.3 – 62.6. It is noticeable to see the increasing trend of prevalence of smartphone addiction reference from (Danilo B. Buctot, 2020; Jiang Long, 2016; Sutapat Simcharoena, 2017).

In the most recent study, the highest prevalence of smartphone addiction was found from the study of Factors Associated with Smartphone Addiction Prevalence and Its Predictive Capacity for Health-Related Quality of Life Among Filipino Adolescents by Danilo B. Buctot, Nami Kim, and Jinsoo Jason Kim (Danilo B. Buctot, 2020). The study was conducted among Filipino Adolescents and found the prevalence of smartphone addiction was 62.6% which comparable to this study (the prevalence of smartphone addiction is this study was 52.1).

The prevalence in Table 1 demonstrated prevalence from multiple researches of dependence, excessive use of smartphone, internet addiction, and smartphone addiction. It is noticeable to see in 2010s the prevalence of smartphone addiction has vastly gone up from 27.4% (in 2008) to between 62% (in 2015) - 64.5% (in 2014). Also, the table demonstrated multiple researchers from different countries around the globe who conducted studies on smartphone addiction to alert the trend of smartphone addiction as it is growing and affecting people lives todays.

Outcome of Smartphone Addiction: Mental Health

There has been an ongoing trend of studies on smartphone addiction. Correspondingly, many researchers are paying attention to the association of smartphone and mental health which specifically in depression, anxiety, and stress. In this study,

Smartphone Addiction to Depression

The current study found the association between depression and smartphone addiction [OR 2.18, 95% CI 1.16 – 4.13] after adjusted OR with 'History of Medical Illnesses' and 'Cyberbullying' which showed a significant value. The result indicated that the participants who had tendency of smartphone addiction were 2.18 times to have a risk of depression. Many studies claim that the higher-level smartphone addiction is related to the higher-level of depression According to previous studies which supported the result of the current study, such as the study of Sanchez-Martinez and Otereo, found an association of smartphone uses and depression and aggression in college students which indicated that high uses of cell phone associated with and depression (Mercedes Sánchez-Martínez, 2009). The study measured factors associated to excessive cell phone use among adolescents in the age between thirteen to twenty years old in Madrid, Spain. Moreover, another study, Mobile Phone Use and Stress, Sleep Disturbances, and Symptoms of Depression among Young Adults, showed higher frequencies use of mobile phones related to the higher risk factors of mental health in depression and sleep disturbance among both male and female young adults at one-year-follow-up (Sara Thomée, 2011).

Smartphone Addiction to Anxiety

The current study found the association between anxiety and smartphone addiction [OR 2.16, 95% CI 1.36 – 3.45] after adjusted OR with 'History of Medical Illnesses' and 'Cyberbullying' which showed a significant value. The result indicated that the participants who had tendency of smartphone addiction were 2.16 times to have a risk of anxiety. Many studies prove that depression and anxiety have some similar symptoms such as trouble sleeping and concentrating, irritability, and nervousness. Therefore, many people who developed depression also have history of anxiety disorder. Although, there is no claim that these two disorders causing one another, there is a perfect evidence that people are undergo from both disorders (America). According to previous studies which supported the result of the current study, such as a study on Relationship of Smartphone Use Severity with Sleep Quality, Depression, and Anxiety in the University Students found overused of smartphone may be associated with poor sleep quality, depression, and anxiety in university students in Isparta, Turkey and with high anxiety and depression scores should be cautiously observed for smartphone addiction (Demirci et al., 2015). Another study, entitled—No Smart Phone Is an Island: The Impact of Places, Situations, and Other Devices on Smart Phone Use – in 2009, also supported the association of smartphone addiction and anxiety. The study showed a positive relationship between talking with others online via text messaging and social anxiety (Pierce, 2009).

Smartphone Addiction to Stress

The current study found the association between stress and smartphone addiction [OR 3.73, 95% CI 0.77 – 17.95] after adjusted OR with 'Gender', 'History of Medical Illnesses', and 'Cyberbullying' which showed not a significant value. The result did not indicate that the participants who had tendency of smartphone addiction were 3.73 times to have a risk of stress. Many studies prove there is association which is between smartphone addiction and stress, such as a study The Relationship between Life Stress and Smartphone Addiction on Taiwanese University Student: A Mediation Model of Learning Self-Efficacy and Social Self-Efficacy by Shao-I Chiu which stated that pressure from family and emotional stress have predicative influence over student smartphone addiction (Chiu, 2014). Another study by T.S. Ragu-Nathan, Monideepa Tarafdar, Bhanu S. Ragu-Nathan on The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation, the study founded that obsessive use of smartphone has positive association with techonostress which caused by overload of communication and information (Ragu-Nathan et al., 2008).

Further discussion, as the present study supported and showed the relationships between smartphone addiction and mental health specifically in depression, anxiety, and stress among high school students in Bangkok, Thailand. However, smartphone addiction was not only associated to mental health but also physical health and social interactions. Many studies and doctors claimed that becoming addicted to smartphones or unhealthily overused of smartphones can lead to poor posture, neck pain, and poor sleep (Wilson, 2012). According to Dr. Dean Fishmen who coined the word for the symptoms of smartphone addiction which was 'text neck' in 2008, while he was treating one of his teenager patients. He noticed that his patient came in with headaches and neck pain, and she was slouching her back while texting on her smartphone. His patient was sitting with her head tilted forward and slouching shoulders and back. The "forward head posture" caused twice of the head's weight for the spine to hold, and it also can lead to muscle strain, pinched nerves and disc herniations (Wilson, 2012). Correspondingly, when people sit in a slouch position, it is harder for them to breathe compare to when they sit with back

straight. The ‘slouch’ position caused reduce the lung capacity to take in oxygen by 30% and with the lack of oxygen in the body system, it causes lower oxygenated blood and can hypothetically lead to vascular disease (Wilson, 2012). Furthermore, using too much smartphone can have poor sleep because of the blue light – short wavelength— from LED screens of smartphone which interfered with the production of melatonin which is a hormone that acts as “a marker of circadian clock” (Cajochen et al., 2011). Melatonin is a hormone that secrete by pineal gland and it helps regulate human body sleep-awake cycle (Mohan, 2017).

Additionally, not only smartphone addiction associate to physical health but also social interactions. Overly used smartphone caused distraction from family and friends. “Have friends and family expressed concern about amount of time you spend on your phone?” (Melinda Smith, 2019). Spending too much time on smartphone associated to isolation among the smartphone users and others and it caused inattentiveness in face-to-face relationships, distraction from hobbies, school, work, or other important matters.

Conclusion

Several studies support the finding of smartphone addiction associate to have negative impacts on mental health. Many statistics also shows the rising trend of smartphone use which increases in less than a decade world-widely, and it affects multiple aspects of people’s daily life. This study focused on the age group between 15 to 18 years old which age group classified as high school students. Therefore, the present study investigated in associations of smartphone addictions to mental health, especially depression, anxiety, and stress among high school students in Bangkok, Thailand.

In this study, there were 420 high school students participated whose age ranged from 15 to 20 years old. There were 269 female students and 151 male students. The mean age of the study was 16.6. There were three educational levels, grade 10 (33.1%), grade 11 (34.0%), and grade 12 (32.9%). The GPA of the participants was ranging from 1.00 to 4.00. Most of the participants did not work part-time (90.2%), although some participants had work part-time (9.8%). The weekly allowance of the participants was ranging from 60 Baht to 3,000 Baht. History of medical illnesses among participants were diabetes (0.5%), high blood

pressure (2.1%), thyroid, and others (i.e. asthma, allergic, …) (9.0%). The cyberbullying among participants were separated into two groups – group one was <75 percentiles (74.3%) and group two was ≥75 percentiles (25.7%). Finally, the prevalence of smartphone addiction was 52.1%, the prevalence of depression was 13.3%, the prevalence of anxiety was 30.2%, and the prevalence of stress was 3.3%.

A cross-sectional study was carried out among 420 high school students in Bangkok, Thailand to investigate relationships between smartphone addiction and mental health. As the trend of smartphone use have been constantly growing, it integrated and effected people lives in many different ways. It is normal to see people have their faces locked and eyes focused on the electronic devices in their hands as they stroll down the street. People think and feel that they are becoming undividable with their smartphones (Barkley et al., 2016). They can easily have an easier approach to a more convenient lifestyles by using the smartphone.

Recommendation

Mental Health of Thai students should be alerted in the society with suitable funds according to the current necessity. Supporting the psychological health of students should be considered into a strategic investment which may produce many positive outcomes for individuals, peoples, and health organizations. Furthermore, Ministry of Public Health, Ministry of Education, and others related authorities should invest into strategy plans and/or health policies for students. According to the number of prevalence from this study was 52.6% and multiple previous study show an increasing trend of smartphone addiction among adolescents to young adults which should alert Thai citizens about this current trend of smartphone addiction and its association toward health.

For future study, further investigation in other spectrums of mental health could be examining as the mental health awareness for students.

REFERENCES

A. Tom Horvath, P. D., ABPP, Kaushik Misra, Ph.D., Amy K. Epner, Ph.D., and Galen Morgan Cooper, Ph.D. Learning Theory of Addiction and Recovery. Retrieved from https://www.mentalhelp.net/articles/learning-theory-of-addiction-and-recovery-implications/

Adriana Bianchi, P. a. J. G. P., Ph.D. (2005). Psychological Predictors of Problem Mobile Phone Use. *CyberPsychology & Behavior*.

Ahmad Rahmati, C. T., Clayton Shepard, Philip Kortom, and Lin Zhong. (2012). Exploring iPhone Usage: the Influence of Socioeconomic Differences on Smartphone Adoption, Usage and Usabbility *MobileHCT '12* doi:10.1145/2371574.2371577

America, A. a. D. A. o. Understand the Facts: Depression.

Andreessen, M. (2011). Why Software Is Eating The World *The Wall Street Journal*. Retrieved from https://www.wsj.com/articles/SB10001424053111903480904576512250915629460

Apple, T. S. (2018). Identify Your iPhone Model. Retrieved from https://support.apple.com/en-us/HT201296

Association, C. M. H. (2018). The Relationship between Mental Health, Mental Illness and Chronic Physical Conditions. Retrieved from https://ontario.cmha.ca/documents/the-relationship-between-mental-health-mental-illness-and-chronic-physical-conditions/

Barkley, J. E., Lepp, A., & Salehi-Esfahani, S. (2016). College Students' Mobile Telephone Use Is Positively Associated With Sedentary Behavior. *American Journal of Lifestyle Medicine, 10*(6), 437-441. doi:10.1177/1559827615594338

Bayram Cetin, E. Y., and Adem Peker. (2011). Cyber victim and bullying scale: A study of validity and reliability. *Computers & Education, 57*, 2261-2271. doi:https://doi.org/10.1016/j.compedu.2011.06.014

Betts, L. R., & Spenser, K. A. (2017). Developing the Cyber Victimization Experiences and Cyberbullying Behaviors Scales. *J Genet Psychol, 178*(3), 147-164. doi:10.1080/00221325.2017.1295222

Bragazzi, N. L., & Del Puente, G. (2014). A proposal for including nomophobia in the new DSM-V. *Psychol Res Behav Manag, 7*, 155-160. doi:10.2147/PRBM.S41386

Brendesha M. Tynes, C. A. R., and David R. Williams. (2010). The Development and Validation of the Online Victimization Scale for Adolescents. *Cyberpsychology*, *4*. Retrieved from http://cyberpsychology.eu/view.php?cisloclanku=2010112901&article=1

Briana Mezuk, S. A., William W. Eaton, and Sherita Hill Golden. (2008). Depression and type 2 diabetes over the lifespan: a meta-analysis. *Meta-analysis*. doi:10.2337/dc08-0985

Cajochen, C., Frey, S., Anders, D., Spati, J., Bues, M., Pross, A., . . . Stefani, O. (2011). Evening exposure to a light-emitting diodes (LED)-backlit computer screen affects circadian physiology and cognitive performance. *J Appl Physiol (1985), 110*(5), 1432-1438. doi:10.1152/japplphysiol.00165.2011

Calculator, I. Inflation Calculator. Retrieved from https://www.officialdata.org/1992-dollars-in-2018?amount=899

Chen, B., Liu, F., Ding, S., Ying, X., Wang, L., & Wen, Y. (2017). Gender differences in factors associated with smartphone addiction: a cross-sectional study among medical college students. *BMC Psychiatry, 17*(1), 341. doi:10.1186/s12888-017-1503-z

Chimatapu Sri Nikhita, P. R. J., Shaunak A. AJinkya. (2015). Prevalence of Mobile Phone Dependece in Secondary School Adolescents doi:10.7860/JCDR/2015/14396.6803

Chiu, S.-I. (2014). The relationship between life stress and smartphone addiction on taiwanese university student: A mediation model of learning self-Efficacy and social self-Efficacy. *Computers in Human Behavior, 34*, 49-57. doi:10.1016/j.chb.2014.01.024

Clemens Arth, L. G., Raphael Grasset, Tobias Langlotz, Alessandro Mulloni, Dieter Schmalstieg, Daniel Wagner. (2015). *The History or Mobile Augmented Reality: Developments in Mobile AR over the last almost 50 years*. Retrieved from

Daniel P. Chapman, G. S. P., and Tara W. Strince. (2004). The Vital Link Between Chronic Disease and Depressive Disorders. *Preventing Chronic Disease*.

Danilo B. Buctot, N. K., and Jinsoo Jason Kim. (2020). Factors Associated with Smartphone Addiction Prevalence and Its Predictive Capacity for Health-Related Quality of Life Among Filipino Adolescents. *Children and Youth Services Review, 110*. doi:https://doi.org/10.1016/j.childyouth.2020.104758

Davis, R. A. (2001). A Cognitive-Behvioral Model of Pathological Internet Use. *Computers in Human Behavior, 17*(2), 187-195. doi:https://doi.org/10.1016/S0747-5632(00)00041-8

Demirci, K., Akgönül, M., & Akpinar, A. (2015). Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *Journal of Behavioral Addictions, 4*(2), 85-92. doi:10.1556/2006.4.2015.010

Enez Darcin, A., Kose, S., Noyan, C. O., Nurmedov, S., Yılmaz, O., & Dilbaz, N. (2016). Smartphone addiction and its relationship with social anxiety and loneliness. *Behaviour & Information Technology, 35*(7), 520-525. doi:10.1080/0144929x.2016.1158319

F. Pinna, B. D. O., M. Di Nicola, L. Janiri, A.C. Altamura, B. Carpiniello, E. Hollander. (2015). Behavioural Addictions and the Transition from DSM-IV-TR to DSM-5.

Ha, J. H., Chin, B., Park, D. H., Ryu, S. H., & Yu, J. (2008). Characteristics of excessive cellular phone use in Korean adolescents. *Cyberpsychol Behav, 11*(6), 783-784. doi:10.1089/cpb.2008.0096

Haynes, T. (2018). Dopamine, Smartphones & You: A battle for your time. *Science in the News*. Retrieved from http://sitn.hms.harvard.edu/flash/2018/dopamine-smartphones-battle-time/

Health, N. I. o. M. (2015). Chronic Illness & Mental Health.

Igarashi, T., Motoyoshi, T., Takai, J., & Yoshida, T. (2008). No mobile, no life: Self-perception and text-message dependency among Japanese high school students. *Computers in Human Behavior, 24*(5), 2311-2324. doi:10.1016/j.chb.2007.12.001

Jenaro, C., Flores, N., Gómez-Vela, M., González-Gil, F., & Caballo, C. (2009). Problematic internet and cell-phone use: Psychological, behavioral, and health correlates. *Addiction Research & Theory*, *15*(3), 309-320. doi:10.1080/16066350701350247

Jiang Long, T.-Q. L., Yan-Hui Liao, Chang Qi, Hao-Yu He, Shu-Bao Chen and Joël Billieux. (2016). Prevalence and Correlates of Problematic Smartphone Use in a Large Random Sample

of Chinese undergraduates. doi:10.1186/s12888-016-1083-3

Jiraporn Khumsri MSc, R. Y. M., Mereerat Manwong MPh, Nitt Hanprathet MSc, Munthita Phanasathit MD, FPCPsychT. (2015). Prevalence of Facebook Addiction and Related Factors Among Thai High School Students *Department of Preventive and Social Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand*.

Junco, R., & Cotten, S. R. (2012). No A 4 U: The relationship between multitasking and academic performance. *Computers & Education*, *59*(2), 505-514. doi:10.1016/j.compedu.2011.12.023

Karpinski, A. C., Kirschner, P. A., Ozer, I., Mellott, J. A., & Ochwo, P. (2013). An exploration of social networking site use, multitasking, and academic performance among United States and European university students. *Computers in Human Behavior*, *29*(3), 1182-1192. doi:10.1016/j.chb.2012.10.011

Kimberly S. Young, P. D. a. R. C. R. (1998). The Relationship Between Depression and Internet Addiction. *CyberPsychology & Behavior*, *1*.

Koo, H. Y. (2010). Cell Phone Addiction in Highschool Students and Its Predictors. *Journal of Korean Academy of Child Health Nursing*, *16*(3). doi:10.4094/jkachn.2010.16.3.203

Kwon, M., Kim, D. J., Cho, H., & Yang, S. (2013). The smartphone addiction scale: development and validation of a short version for adolescents. *PLoS One*, *8*(12), e83558. doi:10.1371/journal.pone.0083558

LaMotte, S. (2017). Smartphone Addiction could be Changing Your Brain. *CNN Health* Retrieved from https://edition.cnn.com/2017/11/30/health/smartphone-addiction-study/index.html

Landstedt, E., & Persson, S. (2014). Bullying, cyberbullying, and mental health in young people. *Scand J Public Health*, *42*(4), 393-399. doi:10.1177/1403494814525004

Langos, C. (2012). Cyberbullying: the challenge to define. *Cyberpsychol Behav Soc Netw*, *15*(6), 285-289. doi:10.1089/cyber.2011.0588

Lee, Y.-K., Chang, C.-T., Lin, Y., & Cheng, Z.-H. (2014). The dark side of smartphone usage: Psychological traits, compulsive behavior and technostress. *Computers in Human Behavior*, *31*, 373-383. doi:10.1016/j.chb.2013.10.047

Letter, H. M. H. (2011). How Addiction Hijacks the Brain, Harvard Mental Health Letter. Retrieved from https://www.health.harvard.edu/newsletter_article/how-addiction-hijacks-the-brain

Leung, L. (2008). Linking Psychological Attributes to Addiction and Improper Use of the Mobile Phone among Adolescents in Hong Kong. *Journal of Children and Media*, *2*(2), 93-113. doi:10.1080/17482790802078565

Lin, Y. H., Chiang, C. L., Lin, P. H., Chang, L. R., Ko, C. H., Lee, Y. H., & Lin, S. H. (2016). Proposed Diagnostic Criteria for Smartphone Addiction. *PLoS One, 11*(11), e0163010. doi:10.1371/journal.pone.0163010

Lovibond, P. F. L. a. S. H. (1995). *Manual for the depression anxiety stress scales* (2nd ed. ed.). Sydney, N.S.W. : Psychology Foundation of Australia, c1995.

Maged N Kamel Boulos, S. W., Carlos Tavares, and Ray Jones. (2011). How Smartphone are Changing the Face of Mobile and Participatory Healthcare- an Overview with Example from eCAALYX. *BioMedical Engineering OnLine 2011, 10:24*. doi:10.1186/1475-925X-10-24

Maryam Amidi Mazaheri, F. R. N. (2014). Cell Phone and Internet Addiction among Students in Isfahan University of Medical Sciences (Iran). *Journal of Health Policy and Sustainable Health 1*(3).

Melinda Smith, M. A., Lawrence Robinson, and Jeanne Segal, Ph.D. (2019). Smartphone Addiction. Retrieved from https://www.helpguide.org/articles/addictions/smartphone-addiction.htm

MentalHealth.gov. (2017). What is Mental Health Retrieved from https://www.mentalhealth.gov/basics/what-is-mental-health

Mercedes Sánchez-Martínez, M. D. a. A. O., M.D., Ph.D. (2009). Factors Associated with Cell Phone Use in Adolescents in the Community of Madrid (Spain). *Cyberpsychol & Behavior, 12*. doi:10.1089/cpb.2008.0164

Miakotko, L. (2017). The Impact of Smartphones and Mobile Devices on Human Health and Life.

Mohan, C. P. (2017). What is Melatonin? Retrieved from https://www.webmd.com/sleep-disorders/what-is-melatonin

Nabavi, R. T. (2011-2012). Bandura's Social Learning Theory & Social Cognitive Learning Theory

Nicholas D. Lane, Y. X., Hong Lu, Shaohan Hu, Tanzeem Choudhury, Andrew T. Campbell, and Feng Zhao. (2011). Enabling Large-Scale Human Activity Inference on Smartphones Using Community Similarity Networks (CSN). *Energy and Networking*, 355-364.

Nordqvist, C. (2017). What is Mental Health. *MedicalNewsToday*. Retrieved from https://www.medicalnewstoday.com/articles/154543.php

NSO, N. S. O. (2010). *ExecutiveSummary_10*. National Statistical Office NSO: National Statistical Office NSO Retrieved from http://web.nso.go.th/en/census/poph/data/090913_ExecutiveSummary_10.pdf

NSO, N. S. O. (2016). *Executive Summary 2016*. National Statistical Office NSO: National Statistical Office NSO Retrieved from http://web.nso.go.th/en/survey/ict/data_ict/Executive_Summary_2016.pdf

O'Malley, C. (1994). BellSouth's Communicative Simon is a Milestone in the Evolution of the PDA. *BYTE Magazine*. Retrieved from http://byte.com/art/9412/sec11/art3.htm

Patchin, S. H. a. J. W. (2010). Bullying, Cyberbullying, and Suicide. *International Acadmy for Suicide Research*. doi:10.1080/13811118.2010.494133

Phua, J., Jin, S. V., & Kim, J. (2017). Gratifications of using Facebook, Twitter, Instagram, or Snapchat to follow brands: The moderating effect of social comparison, trust, tie strength, and network homophily on brand identification,

brand engagement, brand commitment, and membership intention. *Telematics and Informatics, 34*(1), 412-424. doi:10.1016/j.tele.2016.06.004

Pierce, T. M. a. J. S. (2009). *No Smart Phone is an Island the Impact of Places, Situations, and Other Devices on Smart Phone Use*. Retrieved from IBM Research Division:

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Tu, Q. (2008). The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation. *Information Systems Research, 19*(4), 417-433. doi:10.1287/isre.1070.0165

Ranna Perekh, M. D., M.P.H. (2017). What Is Addiction? Retrieved from https://www.psychiatry.org/patients-families/addiction/what-is-addiction

Robin M. Kowalski, G. W. G., Amber N. Schroeder, and Micah R. Lattanner. (2014). Bullying in the Digital Age: A Critical Review and Meta-Analysis of Cyberbullying Research Among Youth. *Psychological Bulletin, 140*. doi:10.1037/a0035618

Rosen, L. D., Mark Carrier, L., & Cheever, N. A. (2013). Facebook and texting made me do it: Media-induced task-switching while studying. *Computers in Human Behavior, 29*(3), 948-958. doi:10.1016/j.chb.2012.12.001

Rugulies, R. (2002). Depression as a predictor for coronary heart disease: a review and meta-analysis. *American Journal of Preventive Medicine, 23*(1), 51-61. doi:https://doi.org/10.1016/S0749-3797(02)00439-7

Salehan, M., & Negahban, A. (2013). Social networking on smartphones: When mobile phones become addictive. *Computers in Human Behavior, 29*(6), 2632-2639. doi:10.1016/j.chb.2013.07.003

Samaha, M., & Hawi, N. S. (2016). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior, 57*, 321-325. doi:10.1016/j.chb.2015.12.045

Sara Thomée, A. H., and Mats Hagberg. (2011). Mobile Phone Use and Stress, Sleep Disturbances, and Symptoms of Depresion among Young Adults - A Prospective Cohort Study. *BMC Public Health, 11:66*.

Services, U. S. D. o. H. a. H. (2019, May 30, 2019). What Is Cyberbullying. Retrieved from https://www.stopbullying.gov/cyberbullying/what-is-it

Seth Himelhoch, A. L., Julie Kreyenbuhl, Gail L Daumit, Clayton H. Brown, and Lisa Dixon. (2005). Prevalence of Chronic Obstructive Pulmonary Disease Among Those With Serious Mental Illness. *American Journal of Psychiatry 161*(12), 2317-2319.

Sharon L. Larson, P. L. O., Daniel Ford, and William Eaton. (2001). Depressive Disorder, Dysthymia, and Risk of Stroke: Thirteen-Year Follow-Up from the Baltimore Epidemiologic Catchment Area Study. *Stroke: Journal of the American Heart Association, 32*(9), 1979-1983. doi:10.1161/hs0901.094623

Smith, R. S. a. P. K. (2008). Cyberbullying: Another Main Type of Bullying? *Scandinavian Journal of Psychology, 49*, 147-154. doi:10.1111/j.1467-9450.2007.00611.x

Soumeya Halayem, O. N., Soumaya Bourgou, Asma Bouden, Sami Othman, and Mohamed Halayem. (2010). The Mobile: a New Addiction upon Adolescents. *La Tunisie Médicale, 88*, 593-596.

Staddon, J. E., & Cerutti, D. T. (2003). Operant conditioning. *Annu Rev Psychol, 54*, 115-144. doi:10.1146/annurev.psych.54.101601.145124

stopbullying.gov. (2019). *What Is Cyberbullying*. U.S. Department of Helthh and Human Services: U.S. Department of Helthh and Human Services Retrieved from https://www.stopbullying.gov/cyberbullying/what-is-it

Sutapat Simcharoena, M. P., Pattaraporn Haopromb, Pimolpun Kuntawonga, Nahathai Wongpakarana, and Tinakon Wongpakarana. (2017). Prevalence, Associated Factors and Impact of Lonliness and Interpersonal Problems on Internet Addiction: A Study in Chiang Mai Medical Students. doi:10.1016/j.ajp.2017.12.017

Tavakolizadeh, J., Atarodi, A., Ahmadpour, S., & Pourgheisar, A. (2014). The Prevalence of Excessive Mobile Phone Use and its Relation With Mental Health Status and Demographic Factors Among the Students of Gonabad University of Medical Sciences in 2011 - 2012. *Razavi International Journal of Medicine, 2*(1). doi:10.5812/rijm.15527

Toda, M., Monden, K., Kubo, K., & Morimoto, K. (2006). Mobile Phone Dependence and Health-Related Lifestyle of University Students. *Social Behavior and Personality: an international journal, 34*(10), 1277-1284. doi:10.2224/sbp.2006.34.10.1277

Tossell, C., Kortum, P., Shepard, C., Rahmati, A., & Zhong, L. (2015). Exploring Smartphone Addiction: Insights from Long-Term Telemetric Behavioral Measures. *International Journal of Interactive Mobile Technologies (iJIM), 9*(2). doi:10.3991/ijim.v9i2.4300

Townsend, A. M. (2002). Mobile Communications in the Twenty-first Century City In *Wireless World*. New York University: Taub Urban Research Center.

Virsesa, V. F.-M. a. J. (2012). On The Relationship Between Socio-Economic Factors and Cell Phone Usage

Wales, P. D. o. U. o. N. S. (2018, July 26, 2018). Overview of the DASS and its Uese. Retrieved from http://www2.psy.unsw.edu.au/dass/over.htm

WHO, W. H. O. (2014). Mental Health: a State of Well-Being. Retrieved from http://www.who.int/features/factfiles/mental_health/en/

Wilson, J. (2012). Your Smartphone is a Pain in the Neck. *CNN*. Retrieved from https://edition.cnn.com/2012/09/20/health/mobile-society-neck-pain/index.html

Wungaeo, C. B. (2016). *Globalization and Democracy in Southeast Asia: Challenges, Responses and Alternative Futures (Frontiers of Globalization)*: Palgrave Macmillan; 1st ed. 2016 edition (August 31, 2016).

Yildirim, C. (2014). *Exploring the Dimensions of Nomophobia: Developing and Validating a Questionnaire Using Mixed Method Research.* (Mastor of Science Graduate Theses and Dissertations). Iowa State University, Ames, Iowa.

Youngminds, T. C. s. S. a. (2018). *Safety Net: Cyberbullying's impact on young people's mental health* Retrieved from

APPENDIX

Appendix A: Questionnaire in English Version

Questionnaires

of

Association between Smartphone Addiction and Mental Health among High School Students in Bangkok, Thailand: A Cross-Sectional Study

Query Statement

Please answer the screening tool. And you can stop because you meet exclusion criteria of this research. Lastly thank you for you devote your time to do the screening questions.

This questionnaire is to research any "association between smartphone addiction and mental health which including depression, anxiety, and stress among high school students in Bangkok, Thailand". The questionnaire comprises of 4 sections which hold the total amount of 39 questions and up to 8 pages. It will take approximately 30 – 45 minutes to complete the questionnaire.

Section 1 Demographic and Clinacal Characteristics 7 questions
Section 2 Cyber Victimisation Experiences Scale 15 questions
Section 3 Smartphone Addiction Scale: Short Version (SAS-SV) 10 questions
Section 4 Depression Anxiety Stress Scales (DASS-21) 21 questions

The information which will be acquired from the study will be used in analyzing the association between smartphone addiction and mental health which including depression, anxiety, and stress among high school students in Bangkok, Thailand. If there is any question regarding to ethics of the study, please contact the Ethics Review Committee for Research and Involving Human Research Subjects, Health Science Group, Chulalongkorn University. Correspondingly, if there is any question regarding to the questionnaire, please contact Miss Suphasuta Doungraksa at College of Public Health, Chulalongkorn University or contact 0959564035.

Thank you for your cooperation
Miss Suphasuta Doungraksa
College of Public Health, Chulalongkorn University

Section 1: Demographic and Clinical Characteristics (15 questions)

Explanation Please mark ✓ in a □ when the passage is true and fill in the blank.

1. Gender □ 1. Male □ 2. Female

2. Age …….. years old

3. Which grade are you currently studying?
   - □ 1. Grade 10
   - □ 2. Grade 11
   - □ 3. Grade 12

4. Your GPA from the previous semester was ……

5. Your allowance per week is …… Baht

6. Are you doing any part-time job?
   - □ 1. No
   - □ 2. Yes, ……. hours/week

7. Have you ever been diagnosed with any of the following diseases by a doctor? (Please answer all questions)

7.1 Diabetes	□ 1. Have	□ 2. Have not
7.2 High blood pressure	□ 1. Have	□ 2. Have not
7.3 Thyroid	□ 1. Have	□ 2. Have not
7.4 ADHD	□ 1. Have	□ 2. Have not
7.5 Depression	□ 1. Have	□ 2. Have not
7.6. Other, please specify……	□ 1. Have	□ 2. Have not

Section 2: Cyber Victimisation Experiences Scale (15 questions)

Explanation Please carefully read each passage and mark ✓ in a box of either ①, ②, ③, ④, ⑤, or ⑥ which identify the message that is most relevant to you in the past three months. However, there is no right or wrong answer, and you should not spend too much time on each passage.

Rating scale:

① ② ③ ④ ⑤ ⑥

Never ⟷ **Everyday**

***In the past 3 months*, how often do you experience the following situations on cyber space**	Never ① ⟷ Everyday ⑥					
1. Sent me a threatening comment anonymously	①	②	③	④	⑤	⑥
2. Sent me a threatening comment whilst pretending to be someone else	①	②	③	④	⑤	⑥
3. Sent me a threatening comment and it was from someone I don't know	①	②	③	④	⑤	⑥
4. Sent me an obscene image and it was from someone I know	①	②	③	④	⑤	⑥
5. Sent me a threatening comment and it was from a friend after an argument	①	②	③	④	⑤	⑥
6. Sent me a threatening comment and it was from someone I know	①	②	③	④	⑤	⑥
7. Called me an offensive nickname	①	②	③	④	⑤	⑥
8. Referred to me by an offensive nickname	①	②	③	④	⑤	⑥
9. Made fun of me because of my appearance	①	②	③	④	⑤	⑥
10. Blamed me for something I couldn't help	①	②	③	④	⑤	⑥

***In the past 3 months*, how often do you experience the following situations on cyber space**	Never ① ⟷ Everyday ⑥					
11. Take a photograph of me doing something humiliating and shared it without permission	①	②	③	④	⑤	⑥
12. Take a photograph of me doing something embarrassing and shared it without permission	①	②	③	④	⑤	⑥
13. Made a video of me doing something embarrassing and shared it without permission	①	②	③	④	⑤	⑥
14. Made a video of me doing something humiliating and shared it without permission	①	②	③	④	⑤	⑥
15. Shared my photographs without my permission	①	②	③	④	⑤	⑥

Section 3: Smartphone Addiction Scale: Short Version (SAS-SV) (10 questions)

Explanation Please carefully read each passage and mark ✓ in a box of 1, 2, 3, 4, 5, or 6 which identify the message that is most relevant to you from your present situations However, there is no right or wrong answer, and you should not spend too much time on each passage

Rating Scale:
1 – Strongly Disagree
2 – Disagree
3 – Weakly Disagree
4 – Weakly Agree
5 – Agree
6 – Strongly Agree

From your current situation, how much do you agree with the following statement?	**Strongly Disagree** (1)	**Disagree** (2)	**Weakly Disagree** (3)	**Weakly Agree** (4)	**Agree** (5)	**Strongly Agree** (6)
1. Missing planned work due to smartphone use						
2. Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use						
3. Feeling pain in the wrists or at the back of the neck while using a smartphone						
4. Won't be able to stand not having a smartphone						
5. Feeling impatient and fretful when I am not holding my smartphone						

From your current situation, how much do you agree with the following statement?	**Strongly Disagree** (1)	**Disagree** (2)	**Weakly Disagree** (3)	**Weakly Agree** (4)	**Agree** (5)	**Strongly Agree** (6)
6. Having my smartphone in my mind even when I am not using it						
7. I will never give up using my smartphone even when my daily life is already greatly affected by it.						
8. Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook						
9. Using my smartphone longer than I had intended						
10. The people around me tell me that I use my smartphone too much						

Section 4 Depression Anxiety Stress Scales (DASS-21) 21 questions

Explanation Please carefully read each passage and mark ✓ in a box of 0, 1, 2, or 3 which identify the message that is most relevant to you *in the past week.* However, there is no right or wrong answer, and you should not spend too much time on each passage

Rating Scale:

0 – Did not apply to me at all

1 – Applied to me to some degree, or some of the time

2 – Applied to me a considerable degree or a good part of time

3 – Applied to me very much or most of the time

In the past week…	Did not apply to me at all (0)	Applied to me to some degree, or some of the time (1)	Applied to me a considerable degree or a good part of time (2)	Applied to me very much or most of the time (3)
1. I found it hard to wind down				
2. I was aware of dryness of my mouth				
3. I couldn't seem to experience any positive feeling at all				
4. I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)				
5. I found it difficult to work up the initiative to do things				

In the past week…	Did not apply to me at all (0)	Applied to me to some degree, or some of the time (1)	Applied to me a considerable degree or a good part of time (2)	Applied to me very much or most of the time (3)
6. I tended to over-react to situations				
7. I experienced trembling (e.g. in the hands)				
8. I felt that I was using a lot of nervous energy				
9. I was worried about situations in which I might panic and make a fool of myself				
10. I felt that I had nothing to look forward to				
11. I found myself getting agitated				
12. I found it difficult to relax				
13. I felt down-hearted and blue				
14. I was intolerant of anything that kept me from getting on with what I was doing				
15. I felt I was close to panic				
16. I was unable to become enthusiastic about anything				

In the past week…	Did not apply to me at all (0)	Applied to me to some degree, or some of the time (1)	Applied to me a considerable degree or a good part of time (2)	Applied to me very much or most of the time (3)
17. I felt I wasn't worth much as a person				
18. I felt that I was rather touchy				
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)				
20. I felt scared without any good reason				
21. I felt that life was meaningless				

Appendix B: The Approval Ethical Number

AF 04-07

เอกสารข้อมูลสำหรับผู้มีส่วนร่วมในการวิจัยและหนังสือแสดงความยินยอมเข้าร่วมงานวิจัย

ชื่อโครงการวิจัย	ความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลายในเขตกรุงเทพมหานคร ประเทศไทย
ชื่อผู้วิจัย	นางสาวศุภสุดา ด้วงรักษา
ตำแหน่ง	นิสิตปริญญาโท วิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย
ชื่ออาจารย์ที่ปรึกษา	*ดร.นุชนาฏ หวนนากลาง*
แหล่งทุน	*ไม่มี*
สถานที่ติดต่อผู้วิจัย	(ที่ทำงาน) สำนักก่อสร้างสะพาน กรมทางหลวง อาคารเฉลิยวรัชรพฤกษ์ ชั้น 4 เขตราชเทวี จังหวัดกรุงเทพมหานคร 10400 (ที่บ้าน) 8/368 ซอย 5 หมู่ 12 หมู่บ้านรัตนาธิเบศน์ ถนนรัตนาธิเบศน์ ตำบลบางรักพัฒนา อำเภอบางบัวทอง จังหวัดนนทบุรี 11110
โทรศัพท์ที่บ้าน	02-921-0895
โทรศัพท์มือถือ	095-956-4035 E-mail : s.doungraksa@gmail.com

1. ขอเรียนเชิญท่านเข้าร่วมในการวิจัยก่อนที่ท่านจะตัดสินใจเข้าร่วมในการวิจัย มีความจำเป็นที่ท่านควรทำความเข้าใจว่างานวิจัยนี้ทำเพราะเหตุใด และเกี่ยวข้องกับอะไร กรุณาใช้เวลาในการอ่านข้อมูลต่อไปนี้อย่างละเอียดรอบคอบ และสอบถามข้อมูลเพิ่มเติมหรือข้อมูลที่ไม่ชัดเจนได้ตลอดเวลา

2. โครงการนี้เกี่ยวข้องกับการวิจัยความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียน ทางด้านโรคซึมเศร้า โรควิตกกังวล และโรคเครียด ในนักเรียนมัธยมศึกษาตอนปลายในเขตกรุงเทพมหานคร ประเทศไทย

3. รายละเอียดของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

3.1 ลักษณะของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

- *เกณฑ์การคัดเข้า*
  1. นักเรียนที่กำลังศึกษาอยู่ระดับชั้นมัธยมศึกษาตอนปลาย (มัธยมศึกษาปีที่ 4 – 6) ในเขตกรุงเทพมหานคร
  2. นักเรียนที่เต็มใจเข้าร่วมการศึกษาครั้งนี้
- *เกณฑ์การคัดออก*
  1. *นักเรียนที่ไม่มีสมาร์ทโฟน*

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3.2 มีจำนวนทั้งหมด 422 คน

3.3 วิธีการได้มาซึ่งกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

3.3.1 ประชากรตัวอย่างคือนักเรียนมัธยมศึกษาตอนปลาย ในเขตกรุงเทพมหานคร โดยการสุ่มนักเรียนที่กำลังศึกษาอยู่ในโรงเรียนในสังกัดสำนักงานคณะกรรมการการศึกษาขั้นพื้นฐาน (สพฐ)
ระดับมัธยมศึกษาปีที่ 4 – 6 ในเขตกรุงเทพมหานคร จำนวน 422 คนและเต็มใจเข้าร่วมโครงการวิจัย

4. กระบวนการการวิจัยที่กระทำต่อกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

ผู้ดำเนินการวิจัย คือ นางสาวศุภสุดา ด้วงรักษา และคณะนักวิจัย จะทำการนำแบบสอบถามความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลายในเขตกรุงเทพมหานคร ประเทศไทย โดยผู้มีส่วนร่วมในการวิจัย จะใช้เวลาประมาณ 30 - 45 นาทีในการตอบ

V.2.4/2558

แบบสอบถาม เอกสารบันทึกข้อมูลจะถูกเผาทำลายเมื่อการวิจัยเสร็จสิ้นตามกระบวนการสถานที่เก็บแบบสอบถาม คือ โรงเรียนมัธยมศึกษาตอนปลาย ในเขตกรุงเทพมหานคร จำนวน 4 แห่ง (โรงเรียนบางกะปิ, โรงเรียนวัดราชโอรส, โรงเรียนบดินทรเดชา (สิงห์ สิงหเสนี), โรงเรียนสามเสนวิทยา) โดยสถานที่ในการทำแบบสอบถาม โรงเรียนจะจัดเตรียมห้องที่มีความเป็นส่วนตัวไว้ให้สำหรับผู้มีส่วนร่วมในการวิจัยในการทำแบบสอบถาม

5. นักวิจัยหลักจากวิทยาลัยศาสตร์สาธารณสุข จุฬาลงกรณ์ลงมหาวิทยาลัย จะทำการอธิบายรายละเอียดเกี่ยวกับโครงการ ตอบคำถามที่ท่านสงสัย และพร้อมทั้งถามความสมัครใจ

5.1 เนื่องจากกลุ่มประชากรในการวิจัย จัดเป็นกลุ่มที่หากเป็นกลุ่มที่เป็นเด็กอายุต่ำกว่า 18 ปี ดังนั้น ขอท่านนำเอกสาร *3 ฉบับ คือ 1) ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย 2) ใบยินยอมเข้าร่วมการวิจัย และ 3) แบบสัมภาษณ์ เพื่อขออนุญาตจากผู้ปกครองในการเข้าร่วมโครงการ* จากนั้นให้ท่านนำแบบสอบถามและใบยินยอมเข้าร่วมโครงการวิจัยกลับมา ภายหลังจากที่ได้รับการ ยินยอมจากท่านและ การได้รับอนุญาตจากผู้ปกครอง คณะนักวิจัยจึงจะทำการสัมภาษณ์

6. หากผู้ดำเนินการวิจัยพบว่าผู้มีส่วนร่วมในการวิจัยในครั้งนี้มีปัญหาด้านสภาวะทางจิตใจ เช่น ภาวะซึมเศร้า ภาวะวิตกกังวล หรือความเครียด ผู้ดำเนินการวิจัยจะให้คำแนะนำแก่ผู้มีส่วนร่วมในการวิจัยเพื่อพบนักจิตวิทยาทันที

7. การเข้าร่วมในการ วิจัยในครั้งนี้มีความเสี่ยงเล็กน้อยที่ไม่มากกว่าความ เสี่ยงในชีวิตประจำวันกับท่านแต่อย่างใด แต่อาจทำให้ท่านเสียเวลาในการตอบคำถามในแบบสัมภาษณ์ หรือท่านอาจรู้สึกเหนื่อยหน่ายบ้างระหว่างการสัมภาษณ์หรืออาจรู้สึกไม่สะดวกใจที่ จะตอบคำถามบางข้อหรือคำถามนั้นตอบยากหรืออาจรู้สึกว่าการเปิดเผยข้อมูลด้านสุขภาพหรือด้านอารมณ์ของท่านเป็นเรื่องที่รุกล้ำความเป็นส่วนตัว หากเกิดกรณีเช่นนั้นท่านสามารถแจ้งให้ทางผู้สัมภาษณ์ทราบหรือซักถามเพิ่มเติม ท่านสามารถขอหยุดพักชั่วคราว ขอยกเลิกการให้สัมภาษณ์ หรือขอข้ามไม่ตอบคำถามบางข้อที่ไม่อยากตอบก็ได้ โดยไม่มีผลกระทบใด ๆ

8. *ประโยชน์ที่จะได้รับส่วนบุคคล ไม่มี แต่*ข้อมูลที่ได้จากท่านจะนำมาใช้ในการศึกษาความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลาย ในเขตกรุงเทพมหานคร

9. การเข้าร่วมในการวิจัยของท่านเป็นโดย**สมัครใจ** และสามารถ**ปฏิเสธ**ที่จะเข้าร่วม**หรือถอน**ตัวจากการวิจัยได้ทุกขณะ โดยไม่ต้องให้เหตุผลและไม่สูญเสียประโยชน์ที่พึงได้รับ

10. หากท่านมีข้อสงสัยให้สอบถามเพิ่มเติมได้โดยสามารถติดต่อผู้วิจัยได้ตลอดเวลา และหากผู้วิจัยมีข้อมูลเพิ่มเติมที่เป็นประโยชน์หรือโทษเกี่ยวกับการวิจัย ผู้วิจัยจะแจ้งให้ท่านทราบอย่างรวดเร็ว **เพื่อให้ผู้มีส่วนร่วมในการวิจัยทบทวนว่ายังสมัครใจจะอยู่ในงานวิจัยต่อไปหรือไม่**

11. ข้อมูลที่เกี่ยวข้องกับท่านจะเก็บเป็น**ความลับ** หากมีการเสนอผลการวิจัยจะเสนอเป็นภาพรวม ข้อมูลใดที่สามารถระบุถึงตัวท่านได้จะไม่ปรากฏในรายงาน

12. การวิจัยครั้งนี้ให้ของที่ระลึก เป็นปากกา

เลขที่โครงการวิจัย 138.1/62
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วันหมดอายุ 29 ก.ย. 2563

13. หากท่านไม่ได้รับการปฏิบัติตามข้อมูลดังกล่าวสามารถร้องเรียนได้ที่ คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย 254 อาคารจามจุรี 1 ชั้น 2 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์/โทรสาร 0-2218-3202 E-mail: eccu@chula.ac.th

ข้าพเจ้าได้รับการอธิบายจากผู้วิจัย และเข้าใจข้อมูลดังกล่าวข้างต้นทุกประการแล้ว จึงลงนามยินยอม/ยินยอมด้วยวาจา เข้าร่วมการวิจัยนี้ด้วยความสมัครใจ และได้รับเอกสารไว้ 1 ชุดแล้ว

ลงชื่อ.....
(.....)
ผู้วิจัยหลัก
วันที่...../...../.....

ลงชื่อ.....
(.....)
ผู้เข้าร่วมการวิจัย
วันที่...../...../.....

ลงชื่อ.....
(.....)
พยาน
วันที่...../...../.....

ลงชื่อ.....
(.....)
พ่อ/แม่/ผู้ปกครอง/ผู้ดูแล
วันที่...../...../.....

เลขที่โครงการวิจัย 138.1/62
วันที่รับรอง 30 ก.ย. 2562
วันหมดอายุ 29 ก.ย. 2563

Appendix 2: Thai Version Questionnaire

แบบสอบถาม
เรื่อง
ความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลาย ในเขตกรุงเทพมหานคร ประเทศไทย

<u>คำชี้แจงแบบสอบถาม</u>

แบบสอบถามนี้เกี่ยวกับการประเมินความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียน ทางด้านโรคซึมเศร้า โรควิตกกังวล และโรคเครียด ในนักเรียนมัธยมศึกษาตอนปลายในเขตกรุงเทพมหานคร ประเทศไทย แบบสอบถามนี้ประกอบด้วย 4 ส่วน รวม *53 ข้อ 7 หน้า* และใช้เวลาในการทำแบบสอบถามประมาณ 30 - 45 นาที ดังนี้

ส่วนที่ 1 ข้อมูลส่วนบุคคลและข้อมูลทางด้านสุขภาพ มี *7 ข้อ*

ส่วนที่ 2 แบบสอบถามด้านประสบการณ์การตกเป็นเหยื่อการรังแกผ่านพื้นที่ไซเบอร์ (Cyber Victimisation Experiences Scale) มี 15 ข้อ

ส่วนที่ 3 แบบสอบถามด้านการเสพติดสมาร์ทโฟนแบบสั้น (Smartphone Addiction Scale: Short Version) มี 10 ข้อ

ส่วนที่ 4 แบบสอบถามด้านภาวะสุขภาพจิต (DASS-21) มี 21 ข้อ

ข้อมูลจากแบบสอบถามถูกนำไปวิเคราะห์การศึกษาความสัมพันธ์ระหว่างการเสพติดสมาร์ทโฟนกับสุขภาพจิตของนักเรียนมัธยมศึกษาตอนปลาย ในเขตกรุงเทพมหานคร หากท่านมีข้อสงสัยประการใดเกี่ยวข้องกับปัญหาด้านจริยธรรมท่านสามารถติดต่อสอบถามได้ที่ คณะกรรมการจริยธรรมการ วิจัย จุฬาลงกรณ์มหาวิทยาลัยหากท่านมีข้อสงสัยใด ๆ เกี่ยวกับข้อคำถาม โปรดติดต่อ นางสาวศุภสุตา ด้วงรักษา ได้ที่วิทยาลัยวิทยาศาสตร์สาธารณสุขจุฬาลงกรณ์มหาวิทยาลัย หมายเลขโทรศัพท์ 0959564035

ขอขอบคุณที่ให้ความร่วมมือมา ณ โอกาสนี้
นางสาวศุภสุตา ด้วงรักษา
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

ส่วนที่ 1 ข้อมูลส่วนบุคคลและข้อมูลทางด้านสุขภาพ

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงในช่อง ☐ หน้าข้อความ และเติมคำในช่องว่าง ..... ท้ายคำตอบให้ตรงกับความเป็นจริง

1. เพศ ☐ 1. ชาย ☐ 2. หญิง

2. อายุ ..... ปี

3. กำลังศึกษาอยู่ในระดับชั้น:
   - ☐ 1. มัธยมศึกษาปีที่ 4
   - ☐ 2. มัธยมศึกษาปีที่ 5
   - ☐ 3. มัธยมศึกษาปีที่ 6

4. เทอมที่ผ่านมาได้เกรดเฉลี่ย.....

5. คุณได้เงินมาโรงเรียนอาทิตย์ละ ..... บาท

6. คุณทำงานเพื่อหารายได้หรือไม่
   - ☐ 1. ไม่ทำ
   - ☐ 2. ทำ ..... ชั่วโมง/สัปดาห์

7. ท่านเคยได้รับการบอกกล่าวจากแพทย์ว่าเจ็บป่วยด้วยโรคใดต่อไปนี้ (กรุณาตอบทุกข้อ)

10.1	เบาหวาน	☐ 1. ไม่เคย	☐ 2. เคย
10.2	ความดันโลหิตสูง	☐ 1. ไม่เคย	☐ 2. เคย
10.3	ไทรอยด์	☐ 1. ไม่เคย	☐ 2. เคย
10.4	สมาธิสั้น	☐ 1. ไม่เคย	☐ 2. เคย
10.5	ซึมเศร้า	☐ 1. ไม่เคย	☐ 2. เคย
10.6	อื่น ๆ (ระบุ)	☐ 1. ไม่เคย	☐ 2. เคย

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ส่วนที่ 2 แบบสอบถามด้านประสบการณ์การตกเป็นเหยื่อการรังแกผ่านพื้นที่ไซเบอร์ (Cyber Victimisation Experiences Scale) มี 15 ข้อ

<u>คำชี้แจง</u> โปรดอ่านข้อความในแต่ละข้อและเขียน ✓ ในช่อง 1, 2, 3, 4, 5, หรือ 6 ที่ระบุข้อความที่ตรงกับคุณมากที่สุด*ในช่วง 3 เดือนที่ผ่านมา* ทั้งนี้ไม่มีคำตอบที่ถูกหรือผิด และคุณไม่ควรใช้เวลามากนักในแต่ละข้อความ

เกณฑ์การประเมิน:

① ② ③ ④ ⑤ ⑥

ไม่เคยเลย ⟷ ทุกวัน

<u>ในช่วง 3 เดือนที่ผ่านมา</u>ท่านมีประสบการณ์ต่อไปนี้ผ่านพื้นที่ไซเบอร์มากน้อยเพียงใด	ไม่เคยเลย ①	②	③	④	⑤	ทุกวัน ⑥
1. บุคคลนิรนามส่งข้อความ/ความคิดเห็นที่ข่มขู่คุกคามถึงฉัน	①	②	③	④	⑤	⑥
2. คนที่แกล้งทำเป็นคนอื่นส่งข้อความ/ความคิดเห็นที่คุกคามถึงฉัน	①	②	③	④	⑤	⑥
3. คนที่ฉันไม่รู้จักส่งข้อความ/ความคิดเห็นที่คุกคามถึงฉัน	①	②	③	④	⑤	⑥
4. คนที่ฉันรู้จักส่งภาพอนาจารมาหาฉัน	①	②	③	④	⑤	⑥
5. เพื่อนของฉันส่งข้อความ/ความคิดเห็นที่คุกคามฉันที่มาจากหลังจากที่เราทะเลาะกัน	①	②	③	④	⑤	⑥
6. คนที่ฉันรู้จักส่งข้อความ/ความคิดเห็นที่คุกคามถึงฉัน	①	②	③	④	⑤	⑥
7. คนเรียกชื่อเล่นที่ไม่เหมาะสมให้ฉัน	①	②	③	④	⑤	⑥
8. คนพาดพิงถึงฉันด้วยชื่อเล่นที่ไม่เหมาะสม	①	②	③	④	⑤	⑥
9. คนล้อเลียนฉันเพราะรูปร่างหน้าตาของฉัน	①	②	③	④	⑤	⑥
<u>ในช่วง 3 เดือนที่ผ่านมา</u>ท่านมีประสบการณ์ต่อไปนี้ผ่านพื้นที่ไซเบอร์มากน้อยเพียงใด	ไม่เคยเลย ①				⑥	ทุกวัน

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10. คนโทษฉันในสิ่งที่ฉันไม่สามารถช่วยเหลือหรือทำอะไรกับมันได้	①	②	③	④	⑤	⑥
11. คนได้ถ่ายรูปของฉันในขณะที่ฉันกำลังทำอะไรที่น่า อับอาย ขายหน้า และเผยแพร่โดยที่ฉันไม่ได้อนุญาต	①	②	③	④	⑤	⑥
12. คนถ่ายรูปฉันในขณะที่ฉันกำลังทำเรื่องน่าเขินอายและเผยแพร่โดยที่ฉันไม่ได้อนุญาต	①	②	③	④	⑤	⑥
13. คนถ่ายวิดีโอที่ฉันในขณะที่ฉันกำลังทำสิ่งที่น่าอับอาย ขายหน้า และเผยแพร่โดยที่ฉันไม่ได้อนุญาต	①	②	③	④	⑤	⑥
14. คนถ่ายวิดีโอที่ฉันในขณะที่ฉันกำลังทำสิ่งที่น่าเขินอายและเผยแพร่โดยที่ฉันไม่ได้อนุญาต	①	②	③	④	⑤	⑥
15. คนเผยแพร่ภาพถ่ายของฉันโดยที่ฉันไม่ได้อนุญาต	①	②	③	④	⑤	⑥

ส่วนที่ 3 แบบสอบถามด้านการเสพติดสมาร์ทโฟนแบบสั้น (Smartphone Addiction Scale: Short Version) มี 10 ข้อ

<u>คำชี้แจง</u> โปรดอ่านข้อความในแต่ละข้อและเขียน ✓ ในช่อง 1, 2, 3, 4, 5, หรือ 6 ที่ระบุข้อความที่คุณเห็นด้วยมากที่สุด *จากสถานการณ์ปัจจุบันของคุณ* ทั้งนี้ไม่มีคำตอบที่ถูกหรือผิด

เกณฑ์การประเมิน:

1 – ไม่เห็นด้วยเป็นอย่างยิ่ง
2 – ไม่เห็นด้วย
3 – ไม่เห็นด้วยนิดหน่อย
4 – เห็นด้วยนิดหน่อย
5 – เห็นด้วย
6 – เห็นด้วยเป็นอย่างยิ่ง

จากสถานการณ์ปัจจุบันของคุณคุณเห็นด้วยกับข้อความต่อไปนี้มากน้อยเพียงใด	ไม่เห็นด้วยเป็นอย่างยิ่ง (1)	ไม่เห็นด้วย (2)	ไม่เห็นด้วยนิดหน่อย (3)	เห็นด้วยนิดหน่อย (4)	เห็นด้วย (5)	เห็นด้วยเป็นอย่างยิ่ง (6)
1. ไม่ได้ทำงานที่วางแผนไว้เนื่องจากการใช้สมาร์ทโฟนเพลิน						
2. มีปัญหาการมีสมาธิในชั้นเรียนในการทำการบ้าน หรือระหว่างทำงานเนื่องจากจดจ่อในการใช้สมาร์ทโฟน						
3. รู้สึกปวดที่ข้อมือ หรือ ด้านหลังคอในระหว่างที่ใช้สมาร์ทโฟน						
4. ทนไม่ได้เมื่อไม่มีสมาร์ทโฟน						
5. รู้สึกกระวนกระวายและหงุดหงิดเมื่อไม่ได้ถือสมาร์ทโฟน						

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จากสถานการณ์ปัจจุบันของคุณคุณเห็นด้วยกับข้อความต่อไปนี้มากน้อยเพียงใด	ไม่เห็นด้วยเป็นอย่างยิ่ง (1)	ไม่เห็นด้วย (2)	ไม่เห็นด้วยนิดหน่อย (3)	เห็นด้วยนิดหน่อย (4)	เห็นด้วย (5)	เห็นด้วยเป็นอย่างยิ่ง (6)
6. ในใจจะมีแต่นึกถึงสมาร์ทโฟนอยู่ตลอดเวลาแม้ว่าตอนนั้นจะไม่ได้ใช้งานก็ตาม						
7. ฉันจะไม่มีวันเลิกใช้สมาร์ทโฟน ไม่ว่าการใช้ชีวิตประจำวันของฉันจะได้รับผลกระทบจากมันมากเพียงใดก็ตาม						
8. คอยเช็คสมาร์ทโฟนตลอดเวลาเพื่อที่จะได้ไม่พลาดการสนทนาของคนอื่น ๆ ที่อยู่บนสังคมออนไลน์ เช่น Twitter หรือ Facebook						
9. ฉันใช้สมาร์ทโฟนเป็นระยะเวลานานกว่าที่ฉันตั้งใจไว้						
10. ผู้คนที่อยู่รอบ ๆ ฉัน บอกฉันว่าฉันใช้สมาร์ทโฟนมากเกินไป						

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ส่วนที่ 4 แบบสอบถามด้านภาวะสุขภาพจิต (DASS-21) มี 21 ข้อ

คำชี้แจง โปรดอ่านข้อความในแต่ละข้อและเขียน ✓ ในช่อง 0, 1, 2, หรือ 3 ที่ระบุข้อความที่ตรงกับคุณมากที่สุด*ในช่วงสัปดาห์ที่ผ่านมา* ทั้งนี้ไม่มีคำตอบที่ถูกหรือผิด และคุณไม่ไม่ควรใช้เวลามากนักในแต่ละข้อความ

เกณฑ์การประเมิน:

0 - ไม่ตรงกับฉันเลย

1 - ตรงกับฉันบ้าง หรือเกิดขึ้นเป็นบางครั้ง

2 - ตรงกับฉัน หรือเกิดขึ้นบ่อย

3 - ตรงกับฉันมาก หรือเกิดขึ้นบ่อยมากที่สุด

ในช่วงสัปดาห์ที่ผ่านมา...	ไม่ตรงกับฉันเลย (0)	ตรงกับฉันบ้าง หรือเกิดขึ้นเป็นบางครั้ง (1)	ตรงกับฉันหรือเกิดขึ้นบ่อย (2)	ตรงกับฉันมาก หรือเกิดขึ้นบ่อยมากที่สุด (3)
1. ฉันรู้สึกว่ายากที่จะทำใจให้สงบลงได้หลังจากมีอารมณ์โกรธ/หงุดหงิด				
2. ฉันรู้ตัวว่าฉันมีอาการปากแห้ง				
3. ดูเหมือนว่าฉันไม่อาจจะมีความรู้สึกที่ดี ๆ ได้อีกเลย				
4. ฉันรู้สึกหายใจลำบาก (เช่น มีอาการหายใจเร็วขึ้นอย่างผิดปกติ หรือหายใจไม่ออกในขณะที่ร่างกายไม่ได้ออกแรง)				
5. ฉันรู้สึกว่ามันยากที่จะริเริ่มทำอะไร				
6. ฉันมักที่จะมีปฏิกิริยาตอบสนองต่อสถานการณ์ที่เกิดขึ้นมากเกินไป				
7. ฉันมีอาการสั่น (เช่น มือสั่น)				
8. ฉันรู้สึกว่าฉันกระวายกระวายใจมาก				

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ในช่วงสัปดาห์ที่ผ่านมา...	ไม่ตรงกับฉันเลย (0)	ตรงกับฉันบ้าง หรือเกิดขึ้นเป็นบางครั้ง (1)	ตรงกับฉัน หรือเกิดขึ้นบ่อย (2)	ตรงกับฉันมาก หรือเกิดขึ้นบ่อยมากที่สุด (3)
9. ฉันรู้สึกกังวลเกี่ยวกับสถานการณ์ที่อาจทำให้ฉันตื่นตระหนก และสร้างความน่าขายหน้าแก่ตนเองได้				
10. ฉันรู้สึกว่าฉันไม่มีเป้าหมาย				
11. ฉันมีอาการกระสับกระส่าย				
12. ฉันมีความรู้สึกว่ายากที่จะผ่อนคลาย				
13. ฉันมีความรู้สึกจิตใจย่อท้อ และเศร้าซึม				
14. ฉันไม่อดทนต่อการถูกขัดจังหวะในระหว่างที่ฉันกำลังทำบางสิ่งบางอย่างอยู่				
15. ฉันรู้สึกว่าฉันเกือบจะอยู่ในอาการตระหนก				
16. ฉันไม่สามารถรู้สึกกระตือรือร้นในเรื่องใด ๆ ได้				
17. ฉันรู้สึกว่าตัวเองไม่มีค่า				
18. ฉันรู้สึกว่าตัวเองนั้นค่อนข้างฉุนเฉียวง่าย				
19. ฉันรับรู้ถึงจังหวะการเต้นของหัวใจของฉันในขณะตอนที่ไม่ได้ออกแรง (เช่น จังหวะการเต้นของหัวใจที่เพิ่มขึ้น และ จังหวะการหยุดเต้นของหัวใจ)				
20. ฉันรู้สึกกลัวแบบไม่มีเหตุผล				
21. ฉันรู้สึกว่าชีวิตนั้นไม่มีความหมาย				

เลขที่โครงการวิจัย 138.1/62
วันที่รับรอง 30 ก.ย. 2562
วันหมดอายุ 29 ก.ย. 2563

VITA

NAME	Suphasuta Doungraksa
DATE OF BIRTH	24 July 1993
PLACE OF BIRTH	Bangkok, Thailand
INSTITUTIONS ATTENDED	Loyola University Chicago
HOME ADDRESS	8/368 Soi 5 Moo 12 Rattanathibeth Rd. Bangrakpattana Bangbuathong, Nonthaburi Thailand 11110