

The Effects of Banning Smartphone Use During Lectures in High Schools

An explanatory case study

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Preface

This master thesis marks the end of the master's degree in Information System (IS) at the Department of IS at the University of Agder (UiA). The study was conducted as a part of the course IS-501, the last course of the master program. In this study, I have researched the effect of banning smartphones during lecture in high school. The purpose is to identify how the measure affects student's behaviors. It has been frustrating and challenging, but also interesting and exciting at the same time. During the master project, the Covid-19 pandemic was still ongoing, which affected the quality of collected data.

I would like to thank my advisor, associate professor Peter André Busch, for providing me excellent guidance and constructive feedback on the project. I am grateful for the support I have received throughout the semester. Without your help and expertise, the project outcome would have been different. A special thanks to all the participants for their time and effort who have participated and contributed to the project. I also would like to thank my close friends and family members for the enriching discussions and continual support I have received along the way.

Kristiansand, 04.06.2021

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Abstract

Research context – During the last decade, smartphone has become an integral part of our lives. It is undeniable that the smartphone has impacted almost every aspect of our lives, and education is no exception. Banning smartphone use is one of the measures that has been implemented in high school to manage excessive smartphone use among students. Developing an appropriate policy to manage smartphone use during lectures can be a difficult task, because it can have a positive impact on their attention and academic performance, while also having a negative impact on their behavior and mentality.

Purpose - This study addresses the issue regarding smartphone addiction among students in high schools. The purpose of this study is to identify how banning students from using their smartphones during lectures affects their behavior and mentality.

Methods - This study was conducted using semi-structured interview, following qualitative method, with high school students as participants considering their personal smartphone use and experiences in high school.

Findings - The results revealed that banning smartphone use during lectures affects students' attention and learning. I have discovered that students who were characterized as being overly concerned about their social media prone to get anxious and easily distracted and disturbed when smartphones are taken away from them or when it is prohibited to use. Some of them admitted that constant stream of likes and snaps (Snapchat notifications) gives them an uncontrollable desire to check notifications on their smartphones. At the same time, banning smartphone use during lectures also increases concentration and academic performance in some students. The results indicated that the measure works as intended. Especially when the lectures are not tedious, students tend to be more engaged during lectures and possibly forget to check their smartphone.

Conclusion – The aim of this research is to identify how banning smartphone use during lectures affects students' behavior and mentality. Through the data analysis, this study has identified the following effects: academic performance, mental health, behavior, self-control, learning enhancements, and awareness of smartphone addiction.

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1. Introduction

Smartphone addiction is considered as a new phenomenon and has gained a lot of traction in the recent year. Recently, smartphone has become one of the most widely used digital devices worldwide. It has been an integral part of our life, regardless of gender, age, race, or religion (Samaha & Hawi, 2015). Based on Statistic Norway, approximately 95% of population in Norway have access to smartphones and 73% of them use social media daily (Statistic Norway, 2019).

The smartphone as of now has replaced personal computers with their large screen and mobility with functions that can be accessed anytime and anywhere (Busch & McCarthy, 2021). There is a need for smartphone as it helps us to connect with each other and keep us busy with its functions. The entertainment, communication, reminder for urgent events, and safety are some of the basic reasons why a smartphone is a necessity these days. With provided functions on a smartphone, people can reach each other with phone calls and messages, send e-mails, and entertain themselves with photos and videos, play video games and music. Checking and scrolling through social media feeds (e.g., Facebook) using smartphone has become an increasingly popular activity among students (Samaha & Hawi, 2015).

Since smartphones have become an important part of our lives, addiction has also become a major issue among smartphone users. Although the majority of students use smartphones regularly, not all of them are genuinely addicted. Smartphone use becomes problematic when users view it as a tool to relieve their stress, loneliness, or depression, as well as when users have difficulties controlling its usage (Busch & McCarthy, 2021). Excessive use of smartphone will eventually lead to multiple interpersonal problems, such as ignoring real life events, work, or school responsibilities (Mendoza et al., 2018). It also has negative affect both on mental health and well-being. The desire to constantly check and use of smartphone functions or applications many hours a day will lead to development of smartphone dependency, which can be considered as addiction (Samaha & Hawi, 2015).

1.1 Research question

Smartphones can have several negative use consequences. Smartphone use becomes a major issue when users have difficulties managing their use and as a result suffers impaired daily functioning (Busch & McCarthy, 2021). I have discovered several side effects of excessive smartphone use, as well as measures to prevent smartphone addiction and balance the smartphone use. However, based on the literature review, I have noticed that complete ban of smartphone use during lectures is still a controversial topic as smartphones can serve as a potential learning tool that help enhance students learning. Pivetta et al (2019) stated that smartphone use during lectures impairs students' comprehension and academic performance. Students tend be more engaged when they grant the ability to access learning material on their smartphones (Derounian, 2017). My initial curiosity started from the question of whether or not using smartphone during lectures should be allowed. Based on the controversy of this topic, I, therefore, want to investigate the effects of banning smartphones during lectures in high schools in the context of smartphone addiction among high school students. In this master thesis, I want to take a closer look at how it affects students' behavior and mentality. Limiting smartphone use, especially when students are supposed to be studying, has a lot of benefits, but it also has some negative impacts on their behavior and mentality. In order to address the

issues, I have thus developed the following research question (RQ) I want to answer in this study:

RQ: How do the ban on smartphone use during lectures affect students' behavior and mentality

In order to answer the research question, I have conducted a qualitative case study using semistructure interviews as data generation method. The interviews were conducted with high school students across Norway.

1.2 Thesis disposition

The structure of this thesis consists of six chapters: Introduction, Related Research, Research Approach, Results, Discussion and Conclusion & Implications.

Chapter 1: Introduction: Introduction of the topic and description of its relevancy. The RQ for this study is also presented in this chapter. The purpose is to get better understanding of the topic and why it is important to investigate.

Chapter 2: Related research: The main purpose of this chapter is to present literature review that was conducted to find the research gaps use it as the foundation of this study.

Chapter 3: Research approach: The research approach used in this study will be presented in this chapter. This chapter also explains the reason for choosing research approach used in this study.

Chapter 4: Results: This chapter represents the findings from data analysis based on collected data from interviews.

Chapter 5: Discussion: Finding from the previous chapter will be discussed here and compare to related research to gain a better insight on the topic.

Chapter 6: Conclusion and Implications: This chapter presents important findings and implications, as well as limitations of this study. Suggestions for further research based on limitations will also be present in this chapter.

2. Related research

The purpose of this chapter is to find a particular issue that lacks information and evidence to establish new knowledge in a particular area (Qates, 2006, p. 34). This chapter is entirely based on a systematic literature review that was conducted in the previous semester to identify research gaps to explore further and use as the foundation of this study. The previous systematic literature review is being revised and extended with newer acquired relevant literature to identify research gaps and serves as the foundation of this thesis.

How the systematic literature review was conducted will be presented in this chapter and followed with the presentation of identified concepts of the study, which consists of four main concepts: factors, effects, measures, and users. Thereafter, the results of the systematic literature review will be presented and concluded.

2.1 Literature review approach

A systematic literature review is an approach that is widely used to get an overview of the previous research. By reviewing the existing literature, it is easier to identify the gaps that need more research and attention. In order to identify research gaps based on related research, I have conducted a systematic literature review in the concept of *Smartphone Addiction*. To carry out this literature study, I have chosen to focus on empirical studies and follow the guidelines based on Kitchenham's approach, which the processes are grouped into three main phases: planning, conducting the review, and reporting the review (Kitchenham et la. 2007).

Although smartphone addiction is a relatively new and interesting topic, but a simple search on Google Scholar results with over 43,000 hits, and more advanced search in Scopus database give over 500 hits. Therefore, planning and delimitation of what is relevant is very important when performing a literature review.

2.1.1 Search process and criteria

To be able to perform literature review and make the process easier, I have divided the RQ into small parts and use Scopus alternative advanced search to optimize the process to get better hits on a single search. The search process is done in Scopus. In order to limit the search, I have used Boolean search method. The chosen criteria that were used to determine relevant paper are listed below:

- The articles must be written in English or Norwegian.
- The articles must not be older than ten years old.
- The articles must have an author.
- The articles must be peer-reviewed and published by a trustworthy journal.
- The articles must contain research methods, empirical results, as well as citing and explaining the limitations of the study.

By including keywords from the topic and research question as well as the subject areas, which recommended by the supervisor (i.e., Computer Science, and Social Science) in the search string, it allowed me to limit the search to find the article that could possibly be relevant for the study (Oates, 2006, p.80-81). The string below illustrates the final search string, which resulted in retrieving 78 papers in late 2019. As of early 2021, the same search string resulted in 114 papers in total. This indicates that the topic has gain more traction in the recent year.

TITLE-ABS-KEY ("smartphone" *OR* "mobile phone" *AND* "addiction" *AND* prevent *OR* measure *OR* treatment) *AND* (*LIMIT-TO* (*SUBJAREA* , "COMP") *OR LIMIT-TO* (*SUBJAREA* , "SOCI")) *AND PUBYEAR* > 2010

2.1.2 Literature Review Process

The search process consists of five phases., which illustrates in the table 2 below. The first phase of the process started with collecting articles from search results and added to a sheet in order to get an overview of the relevant articles. In the second phase, including- and excluding criteria were applied to eliminate and choose articles to ensure its quality. The including- and excluding criteria is illustrated below in table 1.

Table 1. Including and excluding criteria.

Including criteria	Excluding criteria						
Peer reviewed	No authors						
Conference	Published before 2010						
Norwegian and English articles	Irrelevant title						
Available in Scopus database	Irrelevant for research question						
IS-related or strongly linked to IS field							
(e.g., social science, behavioral							
research, psychology, and medical)							

The articles that are not written in Norwegian or English, no author and duplicates were removed from the list before the title scan to make the process easier. Third phase started with reviewing the search results and focusing on the headlines to ensure relevance in each article. By reading what the title presents, one can avoid reading the abstract, thus saving more time in the process. After the irrelevant were removed, the fourth phase of abstract reading started. Abstract reading was done in order to assess the quality of the articles. The purpose is to get a better understanding of the content of the articles for further review. The final phase started by skimming through the articles and evaluating its content to narrow down and choose a total sample of 20 publications. The final phase was done to ensure that the chosen articles were related to the topic as closely as possible.

Phase	Process				
Phase 1	Save the search results in a list				
Phase 2	Remove duplicates, articles without an author, and articles that are not				
	written in Norwegian or English language				
Phase 3	Tittle scanning				
Phase 4	Abstract reading				
Phase 5	Skimming and evaluating the content				

Table 2 Search process

The results from this process gave me the ability to develop a concept matrix, which presents connections between each article and aspects of the topic. (Oates, 2012, p.87-88). The purpose of concept matrix is to keep control of what articles discuss and entail, as well as a presentation of the concepts, which were defined based on the literature related to the topic. The identified articles in the concept matrix discussed a multitude of factors that lead to smartphone addiction and its effects, as well as measures to balance the smartphone use. The concept matrix is attached in Appendix 1.

2.2 Literature review results

The concept matrix was developed during pre-study on a smaller scale last semester. Since the concept matrix was developed, a lot of newer literature have been published. I have then decided to extend the current concept matrix and add more recent articles recommended by supervisor to ensure the concept matrix is up to date.

2.2.1 Factors

It is important to identify what may be the causes that can lead to smartphone addiction in order to be able to propose measures to limit or balance the use of smartphones. Measures to reduce the smartphone use are necessary since smartphone has become a psychiatric diagnosis. It is therefore very important to prevent the development of smartphone addiction. Many articles stated that gaming, social media, internet surfing, and communication features such as dialing, and messaging are the main causes of smartphone addiction. Social life, parenting style, and self-regulation are also associated with smartphone addiction. Based on selected articles from the concept matrix, these factors can have a major impact on smartphone use, which can lead to addiction.

Gaming on smartphone has become increasingly popular among adolescents in the recent years. The increase rate of mobile gaming has become one growing issue in our society that causes serious consequences (Chen, C., Zhang, K. Z., Gong, X., & Lee, M. K., 2019). The results showed that men tend to be more interested in mobile gaming than women. Smartphone users are unlikely to reduce smartphone use as they have committed and invested a lot of time into the game. (Chen, B., Liu, F., Ding, S., Ying, X., Wang, L., & Wen, Y., 2017).

Smartphones can be seen as an important tool that helps improving our lives. Over the past decade, smartphone have revolutionized the way we communicate. With the ability to make calls, send messages and emails makes our lives better. More than 85 percent use instant messaging very frequently to communicate with others (RuizPalmero, J., Sánchez-Rivas, E., Gómez-García, M., & Sánchez Vega, E., 2019). Individuals can easily become addicted to smartphone if they feel lonely or neglected. Students tend to easily become addicted to smartphone as they struggle to socialize, which may cause by social anxiety and depression. Many of them prefer to use social media over interacting with others to entertain themselves and minimize loneliness (Mahapatra, S, 2019).

Fear of missing out (FOMO) is related to problematic smartphone use as it is associated with increased usage of a smartphone. Some smartphone users have an intense desire to stay consistently connected to social media so that they do not miss any events (Elhai, J. D., Levine, J. C., Alghraibeh, A. M., Alafnan, A. A., Aldraiweesh, A. A., & Hall, B. J., 2018). Excessive smartphone use leads to, for instance, a negative impact on academic performance. (Pivetta, E., Harkin, L., Billieux, J., Kanjo, E., & Kuss, D. J., 2019). The results indicated that there is a strong connection between smartphone addiction and social media (Guazzini, A., Duradoni, M., Capelli, A., & Meringolo, P., 2019). The study also showed that smartphone addiction increases the probability of traffic accident and privacy breach (Amankwaa, E. F., & Blay, K. B., 2018).

Parenting style has been mentioned in many of the identified articles as a factor that lead to smartphone addiction among adolescents. Negative parenting style involving rejection and overprotection significantly affects the adolescent's smartphone use. The study showed that negative parenting style is most likely to affect men to a greater extent than women as men are more sensitive when it comes to relationship between them and parents (Lian, L., You, X., Huang, J., & Yang, R., 2016).

2.2.2 Effects of smartphone use

Being dependent on smartphone can have both negative and positive effects on personality traits, behavior, and mentality. Social media along with gaming are major causes of excessive use of smartphone and internet, which leads to negative effects such as increased stress, emotional instability, and poor sleep patterns (Hughes, N., & Burke, J., 2018). Smartphone users who are addicted to mobile games will suffer from physiological and psychological disorders, as well as serious conflicts (Chen, C. et al., 2019). Smartphone addiction can disrupt concentration, sleeping routines and productivity. The electromagnetic wave from the smartphone has temporary effects on brain functions. Adolescents with poor physical and psychosocial health have a greater risk of developing smartphone addiction (Kumcagiz, H., 2019). The purpose of smartphone use during bedtime is very important as it has negative effects on sleep pattern and duration, which can lead to depression and anxiety. Using smartphone at night also effects eye movement, and sleep efficiency (Demirci, K., Akgönül, M., & Akpinar, A., 2015). Excessive use of smartphone can also reduce sleep quality and affect users' mentality and physical health (Lee, E. J., & Ogbolu, Y., 2018).

The constant connectivity and access to features that smartphones offer have made the devices hard live without. Studies suggest that smartphone users are increasingly spending less time in the real world and diving deeply into the virtual world to eliminate anxiety and loneliness. People with loneliness tend to use their smartphone excessively to get rid of anxiety. People with shyness prefer to communicate with others via messaging and social media to avoid physical interaction. With said circumstance, they can easily become addicted to smartphone as they have to use the device more frequently. Too much free time can lead to the development of loneliness and shyness, which means that they are more likely to use smartphone even more to eliminate these symptoms (Bian, M., & Leung, L., 2015). Smartphone reduces the physical interaction, as well as distracts individuals from their social lives and results in feelings of loneliness (Kumcagiz, H, 2019). There is a disagreement among researchers that whether there is a connection between smartphone addiction and loneliness. According to Mahapatra (2019), loneliness and self-regulation are associated with smartphone addiction. The results based on their study showed that there is a strong connection between them. The author believes that adolescents see smartphone as a solution to relieve the feelings of loneliness and anxiety. Adolescents has become impatient, bored, and depressed as the result of not being able to use smartphone for certain reasons. Neglecting other activities, and poor academic performance are the results of smartphone addiction. Smartphone addiction can also lead to other issues such as physical pain in the neck and sleep disturbance (Ruiz-Palmero et al., 2019).

2.2.3 Measures

Smartphones can be seen as our best friend and many smartphone users struggle to put it away as can it create a distraction, and a fear of missing out events. According to a research study from 2015, conducted at Norwegian School of Economics, smartphone users check their smartphone 150 times a day, every day (Eidem, 2018). Five hours a day is now dedicated to the smartphone, and those hours are mostly spent on social media, internet, and features such as calling and messaging (Ruiz-Palmero et al., 2019). Excessive use of smartphone can lead to bad habits and mental health issues (Hughes, N., & Burke, J., 2018). Researchers have realized that smartphone addiction is a serious issue and the need for measures to reduce and balance

smartphone use is required. As mentioned earlier in this chapter, all the selected articles argue and discuss various causes that lead to smartphone addiction, but only half of the article list suggest measures to reduce and balance the smartphone use.

Students who experience less rejection and overprotection tend to have higher morals than those who experience the opposite. High moral is associated with increased self-regulation. With positive and stable family relationships, and increased self-regulation, this can help individuals to balance smartphone use and spend more time together with family (Lian, L., You, X., Huang, J., & Yang, R., 2016). Parents and psychologists can children that suffer from smartphone addiction by offer other interesting activities to attract their attention and distract them away from mobile games. Building an environment where smartphone is prohibited can be helpful to avoid the development of smartphone addiction (Chen, C. et al., 2019). Some experts use parental control as a strategy to avoid the development of smartphones can lead to children and adolescents to behave negatively and emotionally express their feelings (Lee, E. J., & Ogbolu, Y., 2019).

Awareness campaigns, seminars and workshops that illustrate negative consequences of smartphone addiction can provide useful insights to smartphone users, as well as psychological support through counseling can help young people cope with stress, conflict, and loneliness in order to prevent the development of smartphone addiction (Mahapatra, S, 2019). Elhai, J. D. et al., (2018) argues that psychiatric treatment is needed to reduce and balance smartphone use to increase academic performance and improve mental health.

Podo et al. propose a concept for reducing and balancing the use of smartphone by using the mobile application to fight smartphone addiction using smartphone itself. The application concept is based on a "Work Reward System" that rewards users based on how long they have put away the smartphone. Authors believe that the application concept can be a great alternative for resolving smartphone addiction among children and adolescents (Podo, L., Taccardi, B., Colonna, A., & Patrono, L., 2019).

Hughes & Burke propose limiting smartphone use in the bedroom as a measure to deal with smartphone addiction. The results showed that people are happier, and the level of anxiety is gradually reduced (Hughes, N., & Burke, J., 2018).

Stress has a significant impact on smartphone addiction and self-control. Self-control was identified and confirmed as an important factor in reducing and preventing the development of smartphone addiction. As stress increases, self-control decreases at the same time, which can lead to smartphone addiction. Building and improving self-control will have a positive impact on smartphone users, thus gaining the ability to avoid the development of smartphone addiction (Cho, H. Y., Kim, D. J., & Park, J. W., 2017).

Elhai, J. D. et al. (2018) believe that smartphone use can be gradually reduced by monitoring the smartphone users. Constant surveillance can make people feel anxious and change their behavior without them realizing.

2.2.4 Users

Smartphone use is more popular among users aged between 16 and 34 who regularly use social media tend to be exposed to smartphone addiction. (Cocoradă, E., Maican, C. I., Cazan, A. M., & Maican, M. A., 2018). Based on all the selected articles presented in the concept matrix, studies find men are more interested in gaming, while women spend most of their time on social media and multimedia applications using smartphones. Smartphone addiction mostly affects men's behavior, while smartphone addiction affects women more in the emotional field, in matters related to boredom, impatience, and irritability (Ruiz-Palmero et al., 2019).

2.3 Literature review conclusion

This literature study helped identify factors that lead to smartphone addiction, as well as measures to balance the smartphone use. Various factors affect smartphone users differently. It depends on their personality and society they live in. Based on related research, gaming, social media, texting, calling, social life, parenting style, and self-regulation are the major causes of the smartphone addiction. These identified factors were extensively mentioned in the chosen articles. The authors argue and emphasize the importance of these factors and how it affects smartphone users' behaviors.

The results showed that excessive use of smartphone is widespread among teenagers as they are more concerned with always being available on social media. They have the need to consistently get updates from others to avoid missing out of something they care about. Family relationships and the environment play important roles of smartphone addiction. Social anxiety, loneliness, depression, and lack of close friends can lead to smartphone addiction as they struggle to socialize. Excessive use of smartphone can cause various psychological and behavioral problems such as depression, anxiety, sleep disorders, patience, mentality, and emotional stability. It can also adversely affect academic performances.

Even though smartphone addiction has gained a lot of traction in recent years, only half of the chosen articles proposed measures to manage smartphone addiction, which can indicate that this area has received less focus than others. Surveillance, restriction of smartphone use, self-regulation, parental control, and psychiatric treatment were proposed as measures to balance smartphone use and prevent users to get addicted. Authors recommend that those who identify as smartphone addicts should consult a psychologist for help as smartphone addiction has many negative consequences.

There are several calls for future research to focus on measures to balance the smartphone use. Most of the articles mainly focus on the causes and the effects of smartphone addiction, but only a small amount of research that emphasizes the pros and cons of the specific measures. This study is dedicated to filling this gap by providing insight how a specific measure can affect smartphone users.

3. Research approach

Research approach will be presented in this chapter, followed by the explanation of chosen research method, research design, pre-study, and case study. Case study section will include data collection, data analysis, validity and reliability, and possible ethical issues as well as limitations to research design.

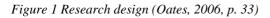
3.1 Research perspective

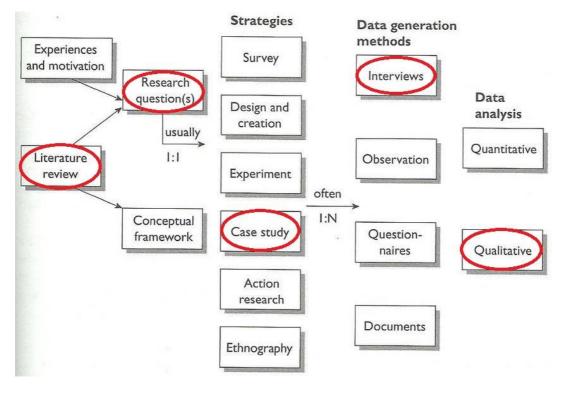
Research perspective consists of three different philosophical paradigms, and each om them have different views about the nature of our world and the way we can acquire knowledge (Oates, 2006, p. 282). The three different philosophical paradigms consist of positivistic, interpretive, and critical research. To identify which research paradigm is the most suitable for a specific project can be challenging. This project leans towards an interpretivist approach as I seek to identify and explain a specific phenomenon. I have decided to follow the interpretivist approach that the interpretive paradigm is more suitable for the project. According to Oates (2006, p 292) "Interpretive research in IS and computing is concerned with understanding the social context of an information system: the social processes by which it is developed and construed by people and through which it influences, and is influenced by, its social setting". Interpretive approach does not justify a hypothesis and give no universal answer. People has their own perception and perceive the world differently based on their own experiences (Oates, 2006, p. 292). The interpretive paradigm is associated with qualitative approach, as there is a strong preference for generating and analyzing qualitative data. The qualitative data is collected through the words people use, the metaphors they employ, and the images they construct (Oates, 2006, p. 293). I believe that the interpretivist approach enables me to identify and get better understanding of the effect of banning smartphones during lectures in high schools. To obtain a good understanding of the phenomenon can be done by collecting qualitative data through interviews and develop a good understanding through interpretations of the data.

3.2 Research design

The proposed research question can be answered by using both qualitative and quantitative approach. Both methods have their advantages and disadvantages. It is also possible to use mixed of both methods to find similarities in the results. It is important to establish a most suitable research design for the project. Quantitative approach was used in all the articles in the literature review that was done in the previous semester and did not cover the research question presented in this study (Busch & McCarthy, 2021). Based on the research question and suggestion from Busch & McCarthy (2121), I found that the qualitative approach is the most suitable option for the study as I have the desire to dive more deeper into the topic. A qualitative approach is designed to understand a social and cultural phenomenon using data from participant's point of view (Myers, 2010). In order to address the research question, I have thus chosen qualitative approach with an explanatory case study followed by the interpretive paradigm. To dive more deeper into the topic, I have decided to use semi-structure interview as data-generation method guided by the qualitative approach. By applying qualitative research methods, it is possible to access unquantifiable data about actual persons and this allows me as a researcher to get a better understanding and perception of how

respondents actually think and feel. Literature reviews of smartphone addiction is used as a foundation for this study to identify the research gaps in related research to create a relevant research question. Related to research question, high school students from several high schools across Norway will be picked as research participants. The figure below illustrates the overview of the research design for this study based on Oates (2006, p. 33).





3.3 Case study

According to Yin (2003, p.142) "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". There are three types of case studies: explorative, descriptive, and explanatory. This study is conducted with an explanatory case study as I sought to explain the phenomenon to answer the research question. Yin (2003, p. 143) states that

"An explanatory study goes further than a descriptive study in trying to explain why events happened as they did or particular outcomes occurred. The case study analysis seeks to identify the multiple, often inter-linked, factors that had an effect, or compares what was found in the case to theories from the literature in order to see whether one theory matches the case better than others".

It can be time-consuming to obtain the needed data, but with the right choice of method, the time spent can be reduced. As a researcher, the case study as a research method offers the opportunity to obtain rich and deep insight of a topic by conducting interviews (Oates, 2012, p. 142). In this case, I have studied the informant's behaviors and activities to identify the

effects of the measure presented in the introduction. By applying the case study method, it enabled me to obtain a more detailed description of the topic.

3.4 Pre-research

Pre-research is the process of collecting basic information about a topic using variety of references sources. Pre-research allowed me to learn more facts, information and people's opinions about the topic, and helps narrow and expand ideas regarding topic and gives a clearer picture about the said topic.

In this case, Facebook post and poll were used to collect information regarding the effects of banning smartphones during lectures. In order to collect the information, I have created a post in a Facebook group consists of group members age between 15-30, directly asked for their opinions regarding the topic. the question has caused a schism in public opinion on topic. People have discussed the benefits and drawbacks of using smartphones during lectures, which has sparked a debate whether smartphone use during lectures should be allowed. The information gathered during this process was used to develop the interview guide.

3.5 Data collection

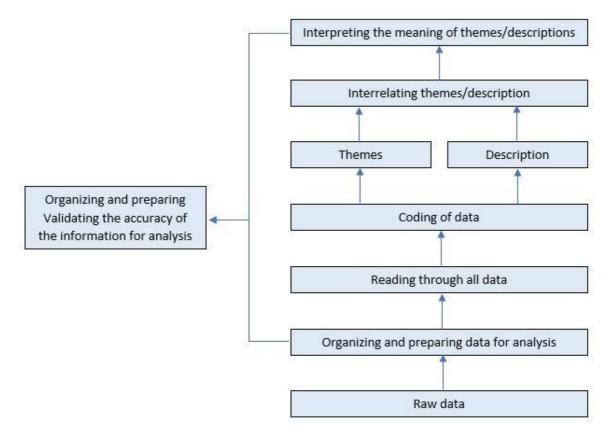
The purpose of data collection is to obtain data that contains the respondents' opinions and perspectives regarding their smartphone use. I have the intend to investigate the phenomenon qualitatively. As this study used qualitative approach, data collection was performed by using semi-structured interview format, which was the only source of data generation for this study. By applying semi-structured interviews, the questions are often predetermined with the possibility to change the order of the questions or skip a specific question depending on the flow of the conversation. It is also possible to ask additional or follow up questions if respondent brings up issues that I have not prepared for the interviews. To be able to obtain data for the topic, I have developed an interview guide for the interviews, which attached in appendix 2. The interview questions were developed based on pre-research and previous research regarding smartphone use (Oates, 2006, p. 188). The purpose of developing interview guide was to assist me to stay on track and obtain data using a set of predetermined open-ended questions, while giving the informant room to speak freely. A set of open-ended questions was sent to the respondents in advance so that they have enough time to think (Oates, 2006, p. 189). The interview guide was structured in four main parts: respondent's background, smartphone use, effects of banning smartphones, and respondent's opinion on measure. It is important to be professional, polite, and neutral at the same time as it has been shown that people respond differently depending on how they perceive the person asking the questions, which can affect the collected data (Oates, 2006, p. 188).

3.6 Data analysis

To analyze the collected data, transcription method along with notes reading were used in this study to ensure the quality of the data, as it is much easier to analyze and search through when the data is in written form (Oates, 2006, p.193). As mentioned above, our memories can possibly fade away over time and can be forgotten. Transcription enabled me to revisit the interview sessions, ensuring that I have not missed any key points. When conducting the data

analysis, I have followed Creswell's (2009) model, as well as inductive approach to ensure the quality of the data. By following the inductive approach, the coding process can be done with open coding, meaning that new codes can be added, and existing codes can be re-evaluated based on transcriptions of the interviews (Oates, 2006, p. 275). All the interviews were fully transcribed and analyzed using coding to get a general understanding of the information. Each interview had different views and experiences. With coding, I was able to get an overview of what was often mentioned during the interviews. The codes were structured into a table to visualize the information that I have gathered through interviews. Throughout the analysis, I mainly focused on the context of how banning of smartphone use during lectures affects the students' behavior. Figure 2 illustrates the overall process of the data analysis.

Figure 2 Data analysis



3.7 Validity and reliability

Many different criteria can be used to improve the validity and reliability of the data. Validation involves checking the accuracy and credibility of the collected data. Implementation of the qualitative approach, such as semi-structured interview gives validity in itself as everything that is said during interviews will be recorded and transcribed. Audio files give the opportunity to go through the files to ensure that the gathered information is correctly understood. Oates (2006, p. 294) states that there is still a disagreement among interpretivist researchers regarding which set of criteria should be used to assess the quality of the data. However, Lincoln & Guba (1985) proposed a set of criteria to evaluate interpretive studies. The criteria are built around trustworthiness and involves establishing the following criteria: credibility, transferability, dependability, and confirmability. While there are more recently criteria to choose to ensure

the quality of the study, I have chosen to use criteria introduced by Lincoln & Guba, as it is widely accepted and easily recognized to demonstrate trustworthiness in this study. The following table presented below illustrates the different criteria, and how they were adapted in this study (Oates 2006, p. 294):

Criteria	Purpose	Strategies applied in this study
Credibility	To establish confidence that the results of the study are true, credible, and believable	Discuss of the data and results with respondents and external peers (supervisor)
Dependability	To establish confidence that the research process is documented, traceable, and research can be repeated	Rich description of the study methods
Transferability	To establish confidence that the study has applicability in other contexts	Providing thick descriptions
Confirmability	To establish confidence that the data accurately presents the information provided by participants, a degree of neutrality and not researcher bias, motivation, or interest	Examining that the findings are supported by data

Table 3 Criteria used to evaluate research study.

A degree of neutrality is needed in order to achieve credibility. The results were presented to the respondents in order to give them the ability to check that their statements are correctly presented in the study to eliminate the bias in the results. The purpose of this process is to ensure that my interpretation of the data was right corresponding to their statements during data collection process.

A rich description of the study methods was made to achieve dependability. I have provided reasons for theoretical, methodological, and analytical choices why they were chosen throughout the study. The purpose of this is to provide researcher with information of how the research can be conducted using the same approach.

In order to achieve transferability, I have ensured that I have given a detailed description of the results, can be transferred to other contexts or settings by researcher if they find it applicable.

Confirmability is established when credibility, transferability, and dependability are all achieved. In order to achieve this, data were made available, but some were restricted due to respondents' privacy to protect them from being exposed. The process of transforming data into results is described.

3.8 Research context

Initially, this study was originally planned to be conducted in the Agder area but ended up being conducted across the country both physically and digitally due to the covid-19 pandemic. A large number of research focus on presenting the results of banning smartphones during

lectures such as improved academic performance, but only a few of them actually focus on how banning smartphones can affect students' behavior and mentality. As mentioned above, the majority of found literature showed that high school students prone to use smartphone more frequently and excessively. Thus, I have chosen to conduct this study in academic settings. To cover this gap, this study will focus on identifying how banning smartphones can affects students' behavior and mentality. In this context, the interviews were conducted with high school students who were not allowed to use smartphones during lectures.

3.8.1 Selection of respondents

High school students were chosen as a target group for this study as they prone to use smartphone regularly and excessively based on my own experience and previous research. I have personally experienced that people around me aged between 15-18 spent a lot of time on their smartphones. I had no requirements for the respondents regarding their gender or behavior. The only requirement I had was that they must be high school student with a smartphone where smartphone use during lectures is not allowed. To get in touch with high school students, I directly contacted them via messaging, and indirectly contacted them through people I know and fellow students. Although data collection through interviews and data processing is a time-consuming process, I wanted to interview at least 8 students was simply because of the convenience of being able to meet up on-site and read their expressions and situation in general. However, it was difficult to find respondents that willingly participate in physical interviews with high school students across the country, both physically and digitally.

3.8.2 Overview of data sources

I have conducted eight interviews in total. Half of the interviews were conducted physically on-site, and the other half were conducted digitally through Discord video meetings and phone calls due to COVID-19 and geographical distance. The interviews were recorded with respondents' permission, and with the approval of Norwegian Centre for Research Data (NSD). Audio files allowed me to concentrate on the process of the interview and provided me with the ability to revisit and transcribe the interviews. It was not an ideal to rely on memory, because memories can fade over time. Notes were taken at the same time to back up the audio files. (Oates, 2006, p. 190-191). I originally expected the interviews to last approximately 15-20 minutes but ended up with the average of ten minutes. The process of conducting interviews was divided into rounds. The first round involved interviewing respondent number 1-3. The second round involved interviewing respondent number 4-6. The last round involved interviewing respondent number 7-8. The shortest interview lasted 7 minutes and the longest lasted 14 minutes. I realized after the first round of conducting interviews that the content of the interview guide was too thin, and the questions were not sufficiently precise, which was later revised before the start of second round of conducting interviews. Apart from interview guide issues I also noticed that some of the respondents were not fully prepared for the questions, thus providing less information than I anticipated. These issues were resolved shortly after by providing respondents with clear instructions prior to the actual interviews.

Some of the audio files were badly recorded due to noisy background and environment, which resulted in a time-consuming transcription process. Regarding privacy, I have informed the respondents that the audio files will be deleted once the project is handed in to ensure privacy. Table 1 illustrates an overview of the interviews that were conducted for this study. All the respondents are anonymized to protect their privacy. Table 2 illustrates overview of respondents participated in this study.

Respondent nr.	Length in minutes	Interview type						
Respondent 1	7	Physical						
Respondent 2	8	Physical						
Respondent 3	9	Digital						
Respondent 4	10	Digital						
Respondent 5	11	Physical						
Respondent 6	11	Digital						
Respondent 7	13	Digital						
Respondent 8	14	Physical						

Table 4 Overview of respondents.

3.9 Ethical issues

Oates (2006, p. 54) states that, everyone involves in the project, either directly or indirectly must be treated fairly and with honesty. I have followed ethical guidelines provided by Oates to ensure that everyone involved in the project has been treated with respect and dignity. In this study, each respondent has been informed regarding their rights when participating in such project and the information regarding purpose and context of the research has also been given. The document used in this process is based on a template provided by NSD. Oates (2006, p. 60-62) presents four key areas of responsibility for researchers. The four key areas include:

- No unnecessary intrusion.
- Behave with integrity.
- Follow appropriate professional codes of conduct.
- No plagiarism.

As a researcher, it is important to ensure that these mentioned measures are taken care of. When conducting interviews, I started off with simple questions and tried to avoid asking personal questions and not bring up personal issues to gain respondents' trust before asking challenging questions. I was aware that the results can be affected by how I, as a researcher interpret and analyze the data, as well as respondents' behavior and attitudes. I also have taken into account that the respondents may withhold data and do not want to share all information and their experiences. All of this can lead to insufficient data. I have ensured that the identify of respondents is fully covered to protect their privacy from being exposed as all the participants participated in the project have the desire to be anonymized. The interviews and transcription were conducted in Norwegian, but respondents' statements quoted in this study were translated into English. When translating, I have ensured to precisely translate from Norwegian to English as close as possible to avoid changing the context or answers of the respondents.

The data collected during this study will be stored in encrypted UiA's server and will be used for the purpose of this study only. All the respondents' personal data will be deleted by the end of this study. The main purpose of this study is not just to pass the master program but also to contribute to the field of Social Sciences.

5. Findings

In this case, research was conducted in academic settings to uncover how banning smartphone use affects students' behavior and mentality. This chapter presents the findings of the case study based on data analysis of interviews collected through qualitative approach. First, the effects of banning smartphone use during lectures will be presented, followed by summary table as a form of data visualization. In correlation with the purpose of this study, I have identified the following effects: academic performance, mental health, behavior, leaning enhancement, self-control, and awareness of smartphone addiction. This chapter mainly focus on respondents' perspective on the topic. The questions asked during the interviews related to their smartphone use and how it affects their life.

5.1 Academic performance

Smartphones are arguably useful in many circumstances and help improve the quality of life. Despite its negative effects, smartphones have a lot of potential as a learning tool. There is divided opinion about whether smartphones have any impact on students' academic performance. It is a known issue that students struggle to keep themselves engaged in class and off their smartphones as they get easily distracted by their smartphone notifications. Based on the results, students with low achievement levels or learning problems underperform when they have access to smartphones during lectures. It seemed that students with low academic performance cannot handle the multitasking as they have trouble using a smartphone and focusing on a lesson at simultaneously, which indicated that students with poor academic performance might perform better when smartphone use is not allowed.

"I am doing terrible at school in general as I have reading and writing difficulties. Having access to smartphone during lectures makes it even worse for me to concentrate. I think I might do better without the presence of my smartphone."

Respondent 2

Students with high academic performance seemed to not have any issue with smartphone during lectures as they have the ability to prioritize what to focus and handle the multitasking exceptionally well. Respondents with high academic performance stated that the visible presence of a smartphone has no effects on their academic performance but might affect students with poor academic performance as they seem to lack the ability to perform multitasking effectively as they get easily distracted by electronic devices. A laptop, which is allowed during lectures can cause distraction if not focus properly.

"It does not seem to have any effects on my grades as I prioritize what to focus even when smartphone is accessible. It may have some effects on those that perform poorly in school and in general as they cannot properly focus on lectures due to the visible presence of the smartphone. Even a laptop can cause them to pull away their focus."

Respondent 3

In order to be successful at school, one must have the ability to focus and pay attention. Respondents stated that not being able to use smartphone during lectures improves their ability to concentrate and become more attentive, especially students with poor academic performance as they tend to become more focused and have better attention as they do not have anything else to turn their focus to.

"I am more focused and engaged during lectures when smartphone is not accessible as I am forced to focus on the activities during the lectures instead of the smartphone."

Respondent 7

Respondents stated that most of their teachers do not enforce the rules, which allows them to use their smartphones without any consequences, thus cause some students to neglect the course or class activities. There are some teachers that enforce the rules by requesting students to put their smartphones in a place called phone hotel in the beginning of the lectures and retrieve them back after the lectures is over. Respondents that experienced this situation stated that they were dissatisfied with the measure.

"Some of our teachers are extremely strict regarding smartphone use as they request every student to put their smartphones on the shelf before the lectures begins and return them after the lectures is over, which I am not a fan of. Some of them are not strict at all as we can use it freely without getting punished, causing some of us neglecting the course and class activities.

Respondent 7

5.2 Mental health

Based on previous research, excessive smartphone use seems to have a direct correlation to anxious tendencies. Separating students from their smartphones can cause negative effects on their mental health as it may trigger higher anxiety levels which in turn may lower the quality of classroom learning. Not having the ability to check social media feeds and messages on a regular basis, as well as lack of self-control causes students to stress out.

"I struggle to put my smartphone away as I have the desire to constantly check the notifications and see who is messaging me. [,,,] my anxiety would go up if I do not have access to my smartphone"

Respondent 7

Taking away smartphones from students can cause dissatisfaction and frustration among students. Respondents stated they feel upset and annoyed because of inability to keep their smartphones with them as they have to collaborate with teachers and have their smartphones taken away during lectures.

"I feel upset and annoyed when I have to give my smartphone to the teacher for the duration of the lectures."

Apart from acknowledging the presence of the smartphones and not being able to use them is quite tough for some students. Endless notifications updates can be exhausting for students at certain points, even for students with high academic performance. Respondents stated that the constant vibrating makes them feel anxious as it is almost irresistible to check the notifications.

"It is almost impossible to resist the desire to pick up the smartphone when it constantly vibrating. My anxiety will rise if it keeps continuing to vibrate."

Respondent 2

Some students use their smartphones as a means of escapism to alleviate boredom or even distract themselves from people around them. A respondent stated that she finds it difficult not being allowed to use smartphone when she feels uncomfortable given certain circumstances.

"I often use smartphone to distract myself when I feel uncomfortable. I occasionally use smartphone to reduce interaction with other people, despite know the fact that smartphone is not allowed during lectures."

Respondent 3

5.3 Behavior

Based on the results, it is not surprising that FoMO is associated with excessive smartphone use, and a lack of self-control has become problematic among smartphone users, especially high school students. Some students have become addicted to constant checking their smartphones for updates, leading them to anxiously check their smartphones in fear of missing out on important updates on social media.

"I feel that I cannot just get rid of the smartphone as I need to be able to communicate with my friends or checking for updates on social media. I would have been unreachable and miss every update on social media if I do not have access to my smartphone, even during lectures."

Respondent 1

Respondents were aware of the consequences of the smartphone use during lectures such as distraction. Student will most likely shift their focus away from class when they lose interest in the topic or the entire course. As class becomes tedious, the majority of respondents stated that they find it difficult to concentrate and become easily distracted. This circumstance may trigger their anxiety and lead them to think of their smartphone as they tend to use them to alleviate boredom.

"I know the fact that smartphone can cause distraction but if we have such a boring class that it is barely possible to follow, I will constantly think of my smartphone and lose focus of what teacher is saying. Being able to use smartphone to alleviate boredom while having a boring class would be great."

Respondents stated that they occasionally find themselves in a class that they find to be unengaging throughout their academic experience. They believed that smartphones can be used as a tool to assist them regulate their moods so that they can refocus on the lecture and stay awake once they have lost interest in the class as it is becoming tedious.

"Regardless of how boring the lecture is, being able to use my smartphone helps alleviate boredom and put me back in a good mood so that I can stay focused in the class without falling asleep."

Respondent 8

Strong state of patience allows students to be more focused, which can be achieved through a variety of approaches. Based on the results, students tend to become more focused in the class when smartphone use is not allowed. However, they are growing impatient with the lack of smartphone accessibility as they have the need to constantly check notifications on their smartphones.

"I do not think that not being able to use smartphone over a period of time would increase my patience as I constantly want to check my smartphone for notifications."

Respondent 3

Not being able to use a smartphone to do an important task such as replying to an important message that needs to be answered urgently can make students uncomfortable and trigger their impatience. Some of the respondents stated that they can easily become irritated when they lose their patience very quickly.

"[...] I can quickly get frustrated when I cannot use smartphone for something important such as replying to a message that needs to be answered urgently."

Respondent 7

5.4 Learning enhancements

It is undeniable that technology has impacted almost every aspect of life today, and education is no exception. As of today, technology has significantly transformed how classroom operates as it brings a lot of opportunities and possibilities to both teachers and students. For many years, high schools across Norway have been implementing a "bring your own device" (BYOD) policy in an effort to maximize and enhance students' learning experience. Every high school student is now required to bring their own laptop or tablet that is capable of running educational applications such as Microsoft Words to help enhancing their learning.

Although laptops and tablets are allowed to use during lectures, but smartphones are not, prompting students to question why smartphone use is not allowed, given that smartphones can also perform the same tasks as laptops or tablets.

"I do not think it makes sense that laptops are allowed while smartphones are not, because laptops and smartphones are exactly the same, both of them can basically perform the same tasks. I think both should be allowed".

Respondents understood that smartphone use during lectures is one of the causes that lead into distraction. One of them stated that smartphones gain them the ability to retrieve quick information, which encourages them to participate more fully in discussions and answer questions in class. The ability to prioritize what is the most important during lectures was also mentioned.

"Both smartphones and laptops have almost the same basic functionality, and what is the point of banning them? I do understand that smartphones can cause distraction, but I think most of us are able to priority what comes first. Just think how handy it would become when you can find a quick answer to the question given in class."

Respondent 7

Policies are important as it helps the school to establish rules and procedures in order to shape the behavior of students and to foster a better learning environment. Respondents were aware of the policies and its purpose. The majority of respondents expressed a desire to change the policy of smartphone use during lectures.

"I do not agree that smartphones should be banned, because you can use it for something useful. [...] it is understandable that we must follow school's policies, but if something can bring improvements, why not just allow it?

Respondent 6

Seven out of eight respondents agreed that smartphones should be allowed in class as it can improve learning environments, as well as enhance their learning. Smartphones improve the way they retrieve knowledge and information. The use of smartphone makes knowledge and information more easily accessible, and in this circumstance, students are no longer dependent on laptop.

"If smartphone use is allowed, then it must be used for the right purpose. [...] Smartphone can be used as a tool to find information online that is not available in the textbook. Take pictures of the board to avoid having to write it down in the notebook. Communicate, share or exchange knowledge with fellow students in the class".

Respondent 6

5.5 Self-control

The majority of respondents wanted smartphone use to be allowed during lectures, considering that the benefits of the smartphone can possibly outweigh its disadvantages. It is a known issue that controlling and limiting smartphone use is quite challenging for some of the students.

"I do not think I can control the desire to use my smartphone. I would stealthily use it even I am not allowed to."

Respondent 1

Allowing students to use their smartphones during lectures implies that they have to be able to control and limit their smartphone use in order to be able to focus during lectures.

"I think I can control when and how much I should use my smartphone. You have to prioritize what is most important when you are at school. But some may be bad at it."

Respondent 6

The results revealed that students with poor self-control and poor multitasking skill might be less likely to be able to limit and control their smartphone use as they are most likely to respond to notifications as soon as they appear on their smartphone screen. Respondent 2 is one perfect example of students who is incapable of multitasking. Performing two tasks simultaneously can be challenging for some students as it can affect their ability to learn. Multitasking sometimes makes it harder to give full attention to one thing. For instance, some students might focus less to what teacher is saying while they are on smartphones. The results showed that some students do not have the ability to effectively perform two tasks simultaneously.

"[...] I find that focusing on two things at the same time is difficult. For instance, I cannot text and stay focused on the lectures at the same time."

Respondent 2

Although performing two tasks simultaneously can affect students' ability to focus. The majority of respondents claimed that they are aware of the issue with multitasking, thus knowing what to prioritize and when to focus is the key to deal with the issue.

"[...] following or focusing on two things at once is not an easy task, you just need to prioritize what should come first".

Respondent 3

As mentioned previously, respondents were aware of the school's policies, not allowing students to use smartphones during lectures. Despite knowing the fact that smartphone use is not allowed, they still use them regardless. They mostly use smartphones to check and update their social media feeds, search for information, and listen to music.

"I usually follow the rules, but I sometimes use my smartphone to search for information, reply to messages and listen to music while studying to avoid being distracted by other people around me, despite not being allowed to use it."

Respondent 4

5.6 Awareness of smartphone addiction

The average smartphone use among the respondents is at approximately ten hours per day, which considered normal according to respondents. Social media applications such as Facebook, Messenger, Instagram, Snapchat are the most commonly used applications during lectures. Regarding smartphone addiction, respondents see themselves to be around seven based on addiction scale ranged from 1-10. More than half admitted that they struggle to put away their smartphone and have trouble managing time to interact with other people.

"I can see that this can be a big issue as you spend less time interacting with other people around you when you use smartphone a lot."

All of the respondents realized that smartphone addiction is becoming a major issue with serious consequences if fail to manage. A respondent described that smartphone addiction is associated ones' ability to prioritize what is the most important between smartphone use and study.

"Being addicted to smartphone can lead to negative consequences, for instance one cannot prioritize what is the most important between smartphone and study."

Respondent 8

Respondents realized that spending too much time on their smartphones has negative effects on their character/personality. For instance, one of the respondents stated that she feels guilty for spending too much time starring at the screen while having a conversation with fellow students during class activities as it causes her to easily get distracted and ignore the conversation. They also stated that the need of picking up the smartphone is increasing as the conversation becomes tedious. They also described that ignoring the conversation is considered rude in certain circumstances. They were aware of when it is appropriate or inappropriate to use their smartphone.

"I sometimes feel guilty when spending too much time starring at the smartphone and ignoring the conversation. Ignoring a conversation is considered rude in certain circumstances. [...] I try to put the smartphone away when having a discussion with fellow students, but when things become boring, it is very hard to not picking up the smartphone.

Respondent 5

Respondents were aware that exposing eyes to light from smartphone screen over an extended period of time is extremely harmful and have the ability to negatively affect eyesight. Respondents stated that they will continue to use smartphone during lectures, despite knowing the fact that smartphone use is not allowed and that smartphones can negatively affect their health.

"I spend a lot of time on smartphone as it is undeniably useful, despite knowing the fact that smartphone harms our vision and cause serious issue to our eyes. Banning them during lectures would not stop me from using it."

5.7 Summary of the results

The table below illustrates the findings of this study, along with descriptions based on the qualitative data collection approach.

Findings	Description
Focus	Students with high academic performance believed that banning smartphone use during lectures barely had any effects on them as they were capable of prioritizing study over smartphone use in class. The results indicated that banning smartphone use during lectures mostly helped students with poor academic performance to stay more focused in class as they had nothing else to focus on.
Capability of performing multitasking	Students with poor academic performance struggle to perform two tasks simultaneously. Thus, banning the smartphone use can improve their ability to focus during lectures. On the other hand, students with high academic performance were capable of multitasking. Thus, banning or allowing smartphone use will barely affect them.
Rules	Failure to enforce the rules allows students to use their smartphones without any consequences causing them to neglect the lectures or class activities.
Effects on academic performance	Respondents had divided opinions about how banning smartphone use during lectures affects their grades. Some of them believed it had an effect on their grades, while other did not.
Anxiety	Not having the ability to constantly check notifications on regular basis may trigger higher anxiety levels in some students due to lack of self-control, causing them to stress out.
Boredom	Some students use smartphone during lectures as a means of escapism to alleviate boredom when they feel uncomfortable given certain circumstances.
FoMo	Some students feel compelled to always keep their smartphones on them, even during lectures, in order to keep up with social media updates in their networks, leading them to anxiously check their smartphones for fear of missing out on important updates on social media.
Distraction	Students will quickly lose interest in the topic or the entire course as class becomes tedious as they find it difficult to focus and become easily distracted, causing them to think about checking their smartphones.
Allowing smartphone helps students stay awake and focused.	Respondents believed that smartphones can be used as a tool to assist them to control their mood so that they can stay awake and focused as lectures become tedious.

Impatient	Respondents stated that not being able to use smartphones							
	over a period of time would not increase their patience.							
Frustration	Students can easily become frustrated when they quickly lose							
	their patience, as well as not allowed to use smartphone to							
	perform an important task.							
Laptop/tablet vs.	Laptop and tablet are allowed, prompting students to							
smartphone	question why smartphone is not as it can basically perform							
	the same tasks as laptop and tablet.							
Policies	Respondents were aware of the policies and expressed a							
	desire for regulations to be changed to leverage the benefits							
	of the smartphone use during lectures.							
Control of smartphone use	Respondents stated that they were capable of controlling							
	when and how much they should be using smartphones							
	during lectures if it were allowed, while the minority ma							
	struggle to control their smartphone use.							
Spending too much time on	Respondents realized that spending too much time on							
a smartphone is a major	smartphone is becoming a major issue, causing serious							
issue	consequences affecting health. Spending too much time on							
	screen implies spending less time interacting with other							
	people							
Feeling guilty for	Respondents stated that they occasionally feel guilty for							
inappropriate smartphone	spending too much time on smartphone while having a class							
use	discussion, causing them ignoring the conversation.							
Negative effects on	Respondents insisted to use smartphones regardless,							
eyesight	including during lectures, despite knowing the fact that							
	smartphones can cause damage to eyesight.							

6. Discussion

This chapter discusses the findings of the data analysis in light of previous literature related to smartphone addiction, with the intention to answer the research question presented early in this study. The purpose of this study is to explore the impact of banning smartphone use on students' behavior and mentality. In correlation with this, I have identified the following effects: academic performance, mental health, behavior, learning enhancement, control, and awareness of smartphone addiction. These will be discussed below respectively.

6.1 Academic performance

In recent years, more studies were conducted on smartphone use in relation to academic performance and found a negative relationship between excessive smartphone use and academic performance. In the literature review, both positive and negative impacts of the use of smartphones on the academic performance were revealed.

It is no surprising that the use of smartphones has become a core part of students' lives. Despite the ban of smartphone use in class, they actively use their smartphones in their academic activities to exchange information with fellow students, and coordinate group work (Ruiz-Palmero et al. 2019). This is a clear indication that students use their smartphones to help them carry out academic activities, which is true based on the results of this study. Students prefer to communicate and manage information on their smartphones using social media applications instead of using laptops as it is more convenient for most of them. Smartphones are often connected to social media and students use them to update their social media feeds while studying or working on academic activities. Despite providing the users with the ability to enhance their learning, smartphones as a handheld device are considered to be a major source of distraction as students spend a significant amount of time checking their social media feeds while studying, which can result in poor academic performance (e.g., Mahapatra 2019; Ruiz-Palmero et al, 2019; Samaha & Hawi).

Mahapatra (2017) stated that a significant amount of time spent interacting with smartphone leads into divided attention in class, resulting in poor academic performance as the use of smartphones during lectures impairs student's comprehension and academic performance with the visible presence of the smartphone. Respondents stated that teachers not enforcing the rules is one of the reasons that cause students to neglect the lectures or class activities as they can use smartphones freely without receiving any punishments, resulting in poor academic performance. This part of the results seemed to correspond with the Mahapatra's (2017) study.

Ruiz-Palmero et al (2019) argued that the ban of smartphone use during lectures increases academic performance and such increases are higher in students with poor academic performance. I found this to be very accurate, as the results of this study indicated that banning smartphones during lectures mostly improves outcomes for the students with poor academic performance as they become more focused while not being able to use their smartphones. Students who struggle with multitasking might perform better at school when smartphone use is not allowed as it will keep them focused more on the lectures. Aside from this, I found that banning smartphone use during lectures had very different effects on different types of students. On the other hand, the data revealed that banning smartphone use during lectures had slightly to no impact on students with high academic performance as they were capable of focusing on the lectures regardless of whether smartphone is allowed or not.

6.2 Mental health

Excessive smartphone use appears to have a direct correlation to users' mental and physical health (Lee & Ogbolu, 2018). Spending too much time on smartphone screen browsing social media feeds can cause negative effects on students' mental health such as increased stress, emotional instability, and poor sleep patterns (Hughes & Burke, 2018), which turns out to be very accurate according to the analyzed data. The results showed that separating students from their smartphones may trigger higher anxiety levels in some students, which in turn may lower the quality of their learning. The data suggested that banning smartphone use during lectures improves students' academic achievement while also contributing to anxiety in some students. Due to lack of self-control, students will stress out and eventually become anxious when they do not have the ability to use their smartphones to check their social media feeds and messages. Students obsessively check their smartphones, usually without an alert of notification, which can be seen as a symptom of anxiety and addiction. Respondents described that it is tough to put smartphones away or have it taken away as they will get highly anxious until it is back in their possession. For instance, another respondent stated that they feel like checking smartphone is like another obligation in life that has to be done regularly to avoid the feeling of anxiety. Some of the students have the anxious need to constantly communicate with their friends in their virtual world at the cost of neglecting other activities around them.

Not being able to use their smartphones caused dissatisfaction and frustration among students as they have a tendency to develop the feeling of being upset and annoyed, especially when their smartphones are taken away. Closely inspecting, the data revealed that such responses were more common among students that spend much time on social media. Large amounts of notifications that one continuously receives under a short period of time while not being able to open them can cause anxiety at certain points as smartphone keep vibrating, which can interfere with ones' concentration. Bian & Leung (2015) state that people with shyness use smartphones to communicate with others to avoid physical interaction and the feeling of anxiety. The results of thisstudy suggested that some students use their smartphones as a means of escapism to alleviate boredom, uncomfortable feelings, and even avoid physical interaction with fellow students under certain circumstances. The results of this study were almost identical compared to Bian & Leung's (2015) study, given that this study does not cover personality traits aspect.

6.3 Behavior

Several studies suggested that smartphones provide a host of distractions as users can typically receive large amounts of notifications in a short period of time, depending on how many applications they have on their smartphones and how active they are on social media. The fear to be disconnected from virtual world increases the use of smartphones, which cause distraction among students during some activities such as studying (Podo et al. 2019). Elhai et al. (2018) stated that FoMo is related to problematic smartphone use as it is associated with increased usage of a smartphone in fear of missing out on social media contents. I found this to be very accurate as this study revealed that some students have an intense desire to stay consistently connected to social media through their smartphones to avoid missing out on updates from their friends in virtual world. Banning them can cause distraction and increase anxiety in some

students as some of them have the need to anxiously check their smartphones in fear of missing out on important updates or contents on social media. Interestingly, the respondents felt more comfortable with their smartphones, thus breaking the rules to chat with virtual friends at the expense of attending to tasks and activities, which typically results in poor academic performance.

The majority of respondents described tedious class as a source of distraction besides the need to consistently stay connected on social media. It is important to acknowledge that students may have different backgrounds and interests. Students found it difficult to fully concentrate on lectures and that they can easily become distracted as class becomes tedious. Students will potentially shift their focus away from lectures or class activities as soon as they lose motivation or interest in the topic or the entire course, which leads them to think of their smartphones as they frequently use them to entertain themselves or alleviate boredom. Bian & Leung (2015) stated that smartphones with the access to entertainment help people to escape from uncomfortable situations, which indicated that the results of this study correspond with their results. The results of this study also revealed that students see their smartphones as a tool to help them re-engage in class and avoid falling asleep after losing interest.

The results revealed that banning smartphone use during lectures improves concentration among students with poor academic performance. However, the results also revealed that not being able to use smartphone over a short period of time lead some students to grow impatient, especially those that have the need to constantly check their smartphones for notifications. It was obvious that students who obsessively use their smartphone for social media often get impatient when they cannot use their smartphones or when it is taken away from them. Respondents explained that they sometimes need to respond quickly to an important text message, but not being able to do so makes them feel uncomfortable and easily become irritated because they lose their patience over the fact that they cannot reply to an important text message. The effects of excessive smartphone use do not stop there and while smartphones can be a useful tool, students have to be careful with when and how they should use it, especially during lectures.

6.4 Smartphone as an optional learning tool

It is undeniable that technology has impacted almost every aspect of life today, and education is no exception. As of today, technology has significantly transformed how classroom operates as it brings a lot of opportunities and possibilities to both teachers and students. For many years, high schools in Norway have been implementing a "bring your own device" (BYOD) policy in an effort to maximize and enhance students' learning experience. Every high school student is now required to bring their own laptop or tablet that is capable of running educational applications such as Microsoft Words to help enhancing their learning.

Smartphone has evolved into a very useful tool that can improve learning outcomes when use appropriately. Despite its usefulness, smartphones are widely recognized and considered as a distraction in academic performance (Chen & Yan, 2016). While that still remains true, educational institutions should consider turning them into an optional learning tool to leverage its benefits. Respondents expressed their dissatisfaction with the fact that laptops can be used as a learning tool, while smartphones cannot, despite the fact that laptops and smartphones are

both clearly sources of distraction. In fact, smartphones are just as powerful as current generation of laptops and outperform the laptops from previous generations, while occupying a fraction of space and can perform almost the same tasks as laptops. The results revealed that students use their smartphones to carry out their academic activities to improve their learning, despite the ban of smartphone use during lectures and the distraction caused by it. Ruiz-Palmero et al (2019) argued that smartphones should not be thought of as an object of distraction, but as a tool that improves students learning. The majority of students want the role of smartphones during lectures to be reconsidered as it can play an important part in their learning. Students can benefit a lot from using smartphones as a learning tool because it allows them to conveniently search for quick information, which encourages them to participate more in class discussions and be more engage during lectures. Smartphones have the mobility and convenience of being used anytime and anywhere, which is the reason why it is better than most laptops. Despite the challenges such as distraction, educational institutions have come to terms with the advances in technology and consider accepting the role of smartphones in the classroom.

Regardless of the controversy if smartphones use should be allowed or not, we have to adapt and embrace to the upcoming changes as technology is evolving. It is undeniable that smartphones can be used as a learning tool to enhance students learning, but because of the distractibility factor, smartphones should be avoided in class. Allowing the use of the smartphones during lectures can be challenging for students with the frequent desire to multitask on social media. The potential advantage as an optional learning tool can goes to waste if failed to manage. Educational institutions have to take both advantages and disadvantages of smartphones into consideration if they want to allow and integrate the use of smartphone as a learning tool. However, it is important to take into account that appropriate guidelines have to be developed in order to manage the use of smartphones among students, and that smartphones have to be used for the intended purposes during lectures. The question here is how to correctly utilize smartphone and transform it to a learning tool. Possibly every student has their own smartphones and enforcing a "no smartphones allowed" policy in school would require a lot of monitoring from teachers, adding more task to their workload in addition to teaching, just to keep students from using it during lectures.

6.5 Self-control

Many studies suggest that self-control is associated with problematic smartphone use. Six out of eight respondents stated that they have high self-control and can manage when and how much they should use their smartphones. Respondents were aware that using smartphones and focusing on the lectures simultaneously can be challenging, thus prioritizing lectures first is the key to overcome the challenges. They also stated that they have the ability to prioritize what comes first and what they need to do, thus not being able to use smartphones during class would not cause any issue for them. This solution to the challenges will not work for all students because not everyone has the ability to prioritize. However, the last two respondents identified themselves with poor self-control because they find it difficult not to respond to smartphones notifications immediately after it appears on their smartphones even in situations where their attention should be elsewhere such as lectures. Despite the ban of smartphone use during lectures, they would stealthily turn on their smartphones screen as soon as they hear the notification sound or vibration. Based on the results, students can be easily distracted, especially those who are incapable of performing multitask. I have found that banning smartphone use during lectures does not prevent or stop some students from using them because the habit is difficult to change. One respondent stated that she generally followed the rules, but sometimes ended up using smartphone during lectures for entertainment and social media, as well as a tool to distract herself from fellow students. This is due to too little self-control and inability to resist the desire to use smartphones in class. The results indicated that inability to control the desire to use smartphone can impair students' ability to learn and focus. These results corresponded with Lian et al.'s (2016) study, where they defined poor self-control as an inability to control the smartphone use and decrease productivity.

6.6 Awareness of smartphone addiction

The results suggested that respondents were aware of the consequences of problematic smartphone use and realized that spending too much time on smartphones can cause a major issue with serious consequences if failed to manage, thus it is important to distinguish or prioritize what one should focus on. Most of them admitted to being dependent on smartphones as they have to maintain their social relationships. The results revealed that respondents spent an average of ten hours per day on their smartphones using social media and multimedia applications. They rated themselves to be around seven on a scale of 1-10 in terms of addiction They also admitted that they struggle to put away their smartphones, resulting in less time interacting with other people. Respondents were aware of when it is appropriate and inappropriate to use their smartphone. Despite being aware of the negative effects, respondents admitted to using their smartphones during lectures when class becomes tedious. They stated that they sometimes feel guilty for using smartphones in certain situations, especially during lectures as it causes them to easily get distracted and ignore the class discussions or class activities. The results also revealed that respondents were aware that exposing their eyes to light from a smartphone screen for an extended period of time can be harmful to their eyesight. Respondents stated that they would never quit using smartphones, despite knowing the fact that it can negatively affect their learning, as well as how harmful it can be for their eyesight. This is due to the fast growth in the use of social media and multimedia, and inability to resist the desire to use smartphones (Chen, Q. & Yan, Z. 2026).

6.7 Limitations

This study was conducted by one master student, which may have an impact on the findings due to time and resource constraints. Conducting this study was quite challenge as covid-19 was still going on. This study was conducted using qualitative approach and its common criticism is that it lacks the possibility of generalizing the findings to a larger population due to a limited number of interviews. Data collection method was conducted using semi-structure interviews, which was the only data generation method used in this study. The respondents were selected based on geographical convenience as I was searching for the most feasible scenario to comply with the deadline for this master thesis. Initially, all of the interviews were scheduled to be conducted physically in order to ensure the quality of the collected data, but the pandemic had an impact on how some of the interviews will be conducted. Some of planned physical interviews were scared to meet up face to face due to

coronavirus outbreak. It was understandable that conducting the interview physically was not always practicable, especially during pandemic. The solution this issue was to conduct the interviews digitally via Discord video meetings. The disadvantages of conducting interviews digitally were lack of impressions of respondents and not being able to read their body language, thus becoming difficult to read the situation in general. Physical interviews were held in coffee shops in the Kristiansand districts, which respondents might be affected by people surround them knowing what was being conducted as we sat next to other people. The covid-19 pandemic had a significant impact on the interview schedules as some of the interviews had to be rescheduled, delaying other processes, and putting this study behind the original schedule.

7. Conclusion and implications

This chapter presents the conclusion and implications related to the topics of this study, as well as suggestions for further research. The purpose of this study is to investigate the impact of banning smartphone use during lectures in school and how it affects students' behavior and mentality, as well as to answer to the RQ:

RQ: How do the ban on smartphone use during lectures affect students' behavior and mentality

To investigate the issue, an explanatory case-study, followed by interpretive paradigm was conducted. Semi-structured interviews were used guided by the qualitative approach to interviewed high school students across Norway.

7.1 Conclusion

In this study, I have identified the following effects of banning smartphone use during lectures in high schools: academic performance, mental health, behavior, learning enhancement, control, and awareness of smartphone addiction. Through this study, I have found that banning smartphone use during lectures in high schools had little to no effects on students with high academic performance because they primarily focus on the lectures rather than smartphones, whereas the measure has a greater impact on students with poor academic performance by improving their focus during the lectures.

Smartphones are considered as a major source of distraction but banning their use may cause some students to become anxious and easily distracted. It has been revealed that students with poor academic performance easily get distracted and will most likely shift their focus away from lectures as soon as they lose motivation or interest in the topic or entire course. As lectures become tedious students tend to use their smartphones to entertain themselves or alleviate boredom, despite the fact that they are not allowed to.

Banning smartphone use during lectures may have a negative impact on some students' mental health. The inability to use smartphones to reply to the messages or update social media resulted in the development of anxiety, frustration, irritation, and dissatisfaction among students. These results revealed an important fact that students were not actually obsessed with their smartphones, especially students with poor academic performance. They were, however, obsessed with the entertainment, information, and social media, all of which can be accessed via laptops, with the exception of applications developed exclusively for smartphones, such as

Snapchat. It has been revealed students have an intense desire to stay connected to social media through their smartphones and the ban of smartphone use has resulted in the development of FoMO among students in high schools.

Respondents described smartphones as a convenient device that allows them to quickly retrieve information, which encourages them to actively participate more in class discussions, as well as helps enhance their learning. With its benefits, they have expressed that they want the role of smartphone to be changed from a regular smartphone to into an optional learning tool. The use of smartphone has both advantages and disadvantages and if educational institutions decide to integrate them as an optional learning tool, appropriate guidelines for managing smartphone use have to be developed in order to effectively utilize the use of it.

Poor self-control was found to be linked with problematic smartphone use. Respondents admitted that they use smartphones a lot even during lectures because they struggle to resist the temptation to use smartphones. This is clearly due to poor self-control because they would immediately open the notifications once it appears on their smartphones. I have found that banning smartphone use during lectures does not prevent some students from using them because some of the students do not have the ability to resist the temptation.

The results revealed that respondents spent an average of ten hours per day were on smartphones and rated themselves to be around seven on a scale of 1-10 in terms of addiction. The majority of the respondents explained that they spend hours on smartphones to entertain themselves and maintain their social relationships. They were aware that spending too much time on smartphones resulted in less time interacting with other people. They were also aware that it can potentially cause serious issue for both their mental and physical health.

7.2 Implications

It is no surprise that smartphones have played an important role in our society today. The impact of smartphones is an interesting topic as it has impacted almost every aspect of our lives. As mentioned earlier in this study, recent research has primarily focused on the effects of excessive smartphone use, with only small number of studies focusing on the effects of preventive and corrective measures to balance smartphone use. This study contributes to the literature specifically focusing on the impact of banning smartphone use in high school and provides insight on how the ban of smartphone use affects students' behavior and mentality. It is possible to highlight both positive and negative aspects of a measure by identifying its effects. This study fulfills the gap by identifying the following effects: academic performance, mental health, behavior, self-control, learning enhancements, and awareness of smartphone addiction. This study revealed both positive and negative effects of banning smartphone use during lecture. This information can be used to supplement the analysis of the measure's effects. It is important that new study should take a closer look at the impact of banning smartphone use and how it affects individuals. Smartphone functions are no longer limited to only texting and calling, and it is truly incredible that how much a portable device such as a smartphone can do. It will be quite interesting to see how the teachers' perceptions of smartphones in school develop over time.

7.3 Future research

The objective of this study is to provide an insight of the effects of banning smartphone use during lectures in high schools and how it affects students' behavior and mentality. This study suggested that banning smartphone use have both positive and negative influence on students' behavior and mentality. It has been observed that the majority of recent studies focus on the effects of smartphone use and measures to avoid and correct smartphone use back to healthy levels. Only small amounts of studies actually investigate how a specific measure affects users' behavior and mentality. Future research should focus on this area and explore more in detail in order to get a better understanding of this topic.

8. Reference

Amankwaa, E. F., & Blay, K. B. (2018). Cities at risk? Exploring the synergies between smartphones and everyday vulnerabilities. *Cities*, *83*, 129-139.

Bian, M., & Leung, L. (2015). Linking loneliness, shyness, smartphone addiction symptoms, and patterns of smartphone use to social capital. *Social Science Computer Review*, *33*(1), 61-79.

Busch, P. A., & McCarthy, S. (2021). Antecedents and consequences of problematic smartphone use: A systematic literature review of an emerging research area. *Computers in Human Behavior*, 114, 106414

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.

Chen, C., Zhang, K. Z., Gong, X., & Lee, M. K. (2019). Failure to decrease the addictive usage of information technologies: A theoretical model and empirical examination of smartphone game users. *Computers in Human Behavior*, 92, 256-265.

Chen, Q., & Yan, Z. (2016). Does multitasking with mobile phones affect learning? A review. *Computers in Human Behavior*, *54*, *34-42*.

Cho, H. Y., Kim, D. J., & Park, J. W. (2017). Stress and adult smartphone addiction: Mediation by self-control, neuroticism, and extraversion. *Stress and Health*, *33*(5), 624-630.

Cocoradă, E., Maican, C. I., Cazan, A. M., & Maican, M. A. (2018). Assessing the smartphone addiction risk and its associations with personality traits among adolescents. *Children and Youth Services Review*, *93*, 345-354.

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.

Derounian, J. G. (2017). Mobiles in class? Active Learning in Higher Education.

Eidem, M. (2018, 6. januar). Apper som hjelper deg å legge bort mobilen. *Dagens Næring*. Hentet fra https://www.dn.no/teknologi/mobil/apper/skjermbruk/apper-som-hjelper-deg-a-legge-bort-mobilen/2-1-245021

Elhai, J. D., Levine, J. C., Alghraibeh, A. M., Alafnan, A. A., Aldraiweesh, A. A., & Hall, B. J. (2018). Fear of missing out: Testing relationships with negative affectivity, online social engagement, and problematic smartphone use. *Computers in Human Behavior*, *89*, 289-298.

Elhai, J. D., Tiamiyu, M. F., Weeks, J. W., Levine, J. C., Picard, K. J., & Hall, B. J. (2018). Depression and emotion regulation predict objective smartphone use measured over one week. *Personality and Individual Differences*, *133*, 21-28.

Elhai, J. D., Vasquez, J. K., Lustgarten, S. D., Levine, J. C., & Hall, B. J. (2018). Proneness to boredom mediates relationships between problematic smartphone use with depression and anxiety severity. *Social Science Computer Review*, *36*(6), 707-720.

Guazzini, A., Duradoni, M., Capelli, A., & Meringolo, P. (2019). An Explorative Model to Assess Individuals' Phubbing Risk. *Future Internet*, 11(1), 21.

Hughes, N., & Burke, J. (2018). Sleeping with the frenemy: How restricting 'bedroom use' of smartphones impacts happiness and wellbeing. *Computers in Human Behavior*, 85, 236-244.

Kumcagiz, H. (2019). Quality of Life as a Predictor of Smartphone Addiction Risk Among Adolescents. *Technology, Knowledge and Learning*, 24(1), 117-127.

Lee, E. J., & Ogbolu, Y. (2018). Does parental control work with smartphone addiction? A cross-sectional study of children in South Korea. *Journal of addictions nursing*, 29(2), 128-138.

Li, L., & Lin, T. T. (2019). Smartphones at work: a qualitative exploration of psychological antecedents and impacts of work-related smartphone dependency. *International Journal of Qualitative Methods*, *18*, 1609406918822240.

Lian, L., You, X., Huang, J., & Yang, R. (2016). Who overuses Smartphones? Roles of virtues and parenting style in Smartphone addiction among Chinese college students. *Computers in Human Behavior*, 65, 92-99.

Mahapatra, S. (2019). Smartphone addiction and associated consequences: role of loneliness and self-regulation. *Behavior & Information Technology*, 1-12.

Oates, B. J. (2006). *Researching information systems and computing*. London: Sage Publications.

Pivetta, E., Harkin, L., Billieux, J., Kanjo, E., & Kuss, D. J. (2019). Problematic smartphone use: An empirically validated model. *Computers in Human Behavior*.

Podo, L., Taccardi, B., Colonna, A., & Patrono, L. (2019, June). A Smart Approach able to face Distraction Issue due to Smartphone Usage running Social Networks. In 2019 4th International Conference on Smart and Sustainable Technologies (SpliTech) (pp. 1-6). IEEE.

Ruiz-Palmero, J., Sánchez-Rivas, E., Gómez-García, M., & Sánchez Vega, E. (2019). Future Teachers' Smartphone Uses and Dependence. *Education Sciences*, 9(3), 194.

Samaha, M. & Hawi, M, S. (2015). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior*.

SSB (2019). *Fakta om Internett og mobil.* Retrieved from https://www.ssb.no/teknologi-og-innovasjon/faktaside

9. Appendices

		Concept													
		Factors/Drivers					Effects Measurements					ts	Population		
No.	References	Gaming	Communication features	Social engagement	Social Media	Parenting	Behavioral effects	Psychological effects	Self control	Parental control	Restriction or Policy	Surveillence / monitoring	Psychological support	Age	Gender
1	Mahapatra, S. (2019)			X	х		Х	х		х	x		x	x	x
2	Cocoradă et al (2018)	х	х		x		Х	Х						x	x
3	Lian et al (2016)					Х	Х	Х	Х				x	x	x
4	Demirci et al (2015)		х		х		Х	х						x	x
5	Bian & Leung (2015)	х	Х	Х	Х	Х		Х					x	x	
6	Pivetta et al (2019)	х			Х		Х	х						x	
7	Ruiz-Palmero et al (2019)	Х	х		х		Х	х						Х	X
8	Podo et al (2019)		Х	Х	X		Х		Х		х	Х		x	
9	Chen, C. et al (2019)	х					Х	Х	Х	х				x	x
10	Guazzini et al (2019)	Х	Х	Х	Х		Х	Х						x	x
11	Li, L., & Lin, T. T. (2019)		х					Х						x	
12	Amankwaa & Blay (2018)		х		Х		Х							x	
13	Chen, B. et al (2017)	х	Х		X		Х	Х						x	x
14	Cho et al (2017)	Х	Х		Х		Х	Х	Х					x	x
15	Hughes & Burke (2018)	х	Х		Х		Х	Х	Х		х			x	x
16	Elhai et al (2018)	х	х		x		Х	Х				х		x	x
17	Elhai et al (2018)			х			Х	х					x	x	x
18	Lee & Ogbolu (2018)					х	Х	х		х				x	x
19	Kumcagiz, H. (2019)	х	х		x		Х	х						x	x
20	Elhai et al (2018)	Х	х		X			х					x	x	х

Appendix 1 - Concept matrix of articles from the literature review

Appendix 2 – Interview guide

Intervjuguide

Introduksjon

Jeg er masterstudent ved institutt for Informasjonssystemer ved Universitetet i Agder, og skal i dette semesteret skrive en oppgave rundt effekt av forbud på mobilbruk i timene ved videregående skole.

Formål

Formålet med denne oppgaven er å identifisere hvordan forbud på bruken av mobiltelefonen i timene ved videregående skole påvirker elever.

Konfidensialitet

For å kunne svare på forskningsspørsmålet må jeg snakke til elever ved videregående skole. Det skal ikke oppgis navn eller noen annen informasjon som kan identifisere deg i denne oppgaven. Personopplysningene vil bli behandlet konfidensielt og i samsvar med personvernregelverket. Universitetet har høyt nivå sikkerhet og gode rutiner rundt oppbevaring av data.

Lydopptak

Hvis det er greit for deg så vil jeg gjerne ta opp intervjuet ved hjelp av godkjent opptaker fra Universitetet slik at jeg kan analysere dette senere.

Tidsramme

Intervjuet tar ca. 15-20 minutter.

Avbryte intervju

Du kan når som helst under intervjuet trekke deg hvis du ønsker det uten å oppgi noen grunn.

Om intervjuobjektet

- 1. Navn
- 2. Kjønn
- 3. Alder
- 4. Studiested

Generelt om mobilbruk

1. Hvor mange timer bruker du mobilen daglig?

- 2. Hvilke app bruke mest tid på?
- 3. Bruker du mobilen i timene mens det er forbud?
- 4. Sliter du med å legge vekk mobilen?
- 5. Føler du deg sosialt avhengig av mobilen?
- 6. Fra skala 1-10, hvor avhengig av mobilen er du?
- 7. Får du dårlig samvittighet på grunn av mobilbruken din?
- 8. Har du innsett at mobilavhengighet er noe veldig alvorlig?

Effekt av forbud mot mobilen i timene

- Blir du forstyrret, uro eller distrahere i timene fordi du ikke kan bruke mobilen? (FOMO / Antar at du mottar veldig mange tekstmeldinger eller snaps i løpet av skoletiden)
- 2. Har du noen ganger blitt tatt for bruk av mobil i timene?
 - a. Hvis ja, hva var konsekvenser? (anmerkning, skjeft, frata mobilen osv.)
 - b. Påvirket det deg mentalt, hvordan reagerte du?
- 3. Stjeler mobilen oppmerksomheten din i timene?
 - a. Hvis ja, på hvilken måte?
- 4. Er du mer fokusert og engasjert i timene når mobiler er forbudt?
- 5. Hvordan har forbud mot mobilen i timene påvirket dine akademiske resultater?

Intervjuobjektets meninger om tiltak

- 1. Synes du at det er fornuftig med forbud mot mobil i timene mens bruk av pc er tillatt?
- 2. Er du enig om at mobiler bør forbys i skoletiden? (Med tanker på at mobilen gir mange muligheter)
- 3. Synes du at skolen burde innføre tillatelse for mobilbruk i timene, og hvorfor?
- 4. Kan mobilen bidra til å skape et bedre læringsmiljø? (søke etter info, fotografering av tavle og til å ta notater)
- 5. Hvordan kan du begrense mobilforbruket i timene hvis mobilen er tillatt?
- 6. Synes du det er vanskelig å følge med på mobilen og på undervisningen samtidig?
 - a. Hvis ja, hva kan være årsaken? (multitasking)

Appendix 3 – Declaration of consent for respondents

Vil du delta i forskningsprosjektet

«The Effects of Banning Smartphone Use During Lectures in High Schools»

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å identifisere hvordan forbud mot mobilbruk i timene ved videregående skole påvirker elever. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål

Gjennom denne masteroppgaven vil jeg se på effekten av forbud mot mobilbruk hos elever ved videregående skole. Formålet er å identifisere hvordan forbud mot mobilbruk i timene ved videregående skole påvirker elever. Dette vil gjøres gjennom en case studie der jeg vil foreta intervjuer med elever ved videregående skole. Forskningsspørsmålet for dette prosjektet er:

RQ: Hvilken effekt har forbud på bruken av mobiltelefonen hos elever ved videregående skole?

Hvem er ansvarlig for forskningsprosjektet?

Universitetet i Agder, institutt for Informasjonssystemer er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Studien setter fokus på elever ved videregående skole, og derfor får du spørsmål om å delta. Jeg vil snakke med deg og vil høre dine meninger og erfaringer rundt forskningsspørsmålet.

Hva innebærer det for deg å delta?

Hvis du velger å delta i prosjektet, innebærer det at du deltar i et intervju med meg. Intervjuet vil ta ca. 30-45 minutter der vi snakker om dine meninger og erfaringer rundt forskningsspørsmålet. Under intervjuet vil jeg stiller spørsmål relatert til effekt av forbud mot mobilbruk på skolen. Intervjuet vil bli tatt opp på lydopptak ved hjelp av godkjent opptaker fra Universitetet i Agder. Hvis du er under 18 år, kan dine foreldre få se intervjuguide på forhånd ved å ta direkte kontakt med meg.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Det vil kun være meg (Thananchai Prasomwong) og veilederen (Peter André Busch) som har tilgang til opplysningene. Data vil bli anonymisert og kodet slik at det ikke kan spores tilbake til deg. Opplysningene vil bli lagret i Universitets database. Universitetet har høyt nivå sikkerhet og gode rutiner rundt oppbevaring av data.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Opplysningene anonymiseres når prosjektet avsluttes/oppgaven er godkjent. Prosjektet skal etter planen avsluttes 04.06.2021. Alle personopplysningene vil bli slettet innen prosjektslutt.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg,
- å få utlevert en kopi av opplysningene,
- å få rettet personopplysninger om deg,
- å få slettet personopplysninger om deg, og
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra Universitetet i Agder har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Student
 - Thananchai Prasomwong (<u>thanap13@uia.no</u> / +4746515589)
- Veileder (Universitetet i Agder)
 - Peter André Busch (peter.a.busch@uia.no / +4738141298)
- Vårt personvernombud:
 - o Ina Danielsen (<u>ina.danielsen@uia.no</u> / +4745254401)

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:

• NSD – Norsk senter for forskningsdata AS på epost (<u>personverntjenester@nsd.no</u>) eller på telefon: 55 58 21 17.

Med vennlig hilsen

(Forsker/veileder)

Thananchai Prasomwong

Peter André Busch

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet *«The Effects of Banning Smartphone Use During Lectures in High Schools»*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

□ å delta i et intervju med lydopptak

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

(Signert av prosjektdeltaker, dato)