



Harjono Padmono Putro <harjonopputro@unkris.ac.id>

Submit Manuscripts Seyboald

5 pesan

Harjono Padmono Putro <harjonopputro@unkris.ac.id>
Kepada: Jonathan Dingel, Ph.D <editor@seyboldreport.org>

10 September 2023 09.20

Dear Mr. Jonathan Dingel
Editor The Seybold Report Journal (TSRJ)

I hope this email finds you well. I am a lecturer from Universitas Krisnadwipayana, Jakarta, Indonesia.

I have completed an article entitled "**The Development Of Mobile Phone Technology And Its Impact On Education**".

I believe this article adhere to your journal's Aims and Scope.

I hope this article can be published in your journal for its result can contribute to the field of Management.

I am willing to go through the review process following Seybold standards.

Best Regards,

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia

**Harjono Padmono-Article-Seybold.doc**

753K

Jonathan Dingel, Ph.D <editor@seyboldreport.org>
Kepada: Harjono Padmono Putro <harjonopputro@unkris.ac.id>

11 Oktober 2023 11.10

Dear
Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia

The Seybold Report Journal (TSRJ), Editorial Board has received your article. We appreciate your interest in TSRJ.

Your article will be processed according to the publication standards at The Seybold Report Journal (TSRJ). I will notify you as soon as there is a decision from the Editorial Board.

Please be sure to check your email, and follow the review instructions.

Best Regards,

--
Jonathan Dingel, Ph.D
Editorial Board Seybold
[Kutipan teks disembunyikan]

Harjono Padmono Putro <harjonopputro@unkris.ac.id>

12 Oktober 2023 11.21

Kepada: Jonathan Dingel, Ph.D <editor@seyboldreport.org>

Dear: Mr. Jonathan Dingel
Editor The Seybold Report Journal (TSRJ)

Thank you for your response.

I look forward to hear from you.

Best Regards,

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia
[Kutipan teks disembunyikan]

Jonathan Dingel, Ph.D <editor@seyboldreport.org>

22 November 2023 10.21

Kepada: Harjono Padmono Putro <harjonopputro@unkris.ac.id>

Dear
Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia

The TSRJ Editorial Board has reviewed your article, the research topic is very interesting, but we decided that your article could not be accepted immediately. You must improve your article on several points.

I am sure you are willing to make this improvement in order to meet TSRJ editorial standards. Please correct your article according to the instructions from the TSRJ Reviewers.

REVIEWER 1

The paper has some interesting information, and the topic is essential: however, there seem to be some basic questions suggesting flaws in the questionnaire which put the conclusions in question.

There is a considerable relationship with the normative literature. However, the authors are advised here to broaden the focus, using a more recent journals.

The research methodology section needs to be added with how the data is collected, because this will be transparent to the reader.

The conclusions are too short and do not clearly interpret the content of the study. Authors are advised to rewrite their conclusions.

There are theoretical implications presented. However, I would like to see the implications for policy recommendation as well and briefly in the abstract.

References are good enough, but we still need to find the latest references so that this research becomes more up to-date.

REVIEWER 2

Author must show why this research is important or urgent to do in relation to the current literature.

The abstract has not discussed the research objectives and results, so readers do not understand this journal.

The introduction provides a clear background and context for this research. This report outlines the importance of creating entrepreneurs. However, this research does not have a specific research problem formulation.

While the results remain clear and well-structured with relevant tables and figures, the discussion section needs to provide a more profound analysis. This should include a thorough interpretation of the results, their implications, and a stronger connection to the research questions and literature.

The research method you use must be more detailed so that it is easy to understand.

The discussion is not in depth, so deepen the discussion with the findings of previous researchers

I hope you can make improvements as soon as possible, and send the revised article again via this email.

Best Regards,

--
Jonathan Dingel, Ph.D
Editorial Board Seybold
[Kutipan teks disembunyikan]

Harjono Padmono Putro <harjonopputro@unkris.ac.id>
Kepada: Jonathan Dingel, Ph.D <editor@seyboldreport.org>

23 November 2023 10.13

Dear: Mr. Jonathan Dingel
Editor The Seybold Report Journal

Thank you for your fast response.

I will immediately revise the article according to reviewers. I will resubmit the revised result and follow all the editor's requests.

Best Regards,

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia
[Kutipan teks disembunyikan]



Revision Article for Seyboald

4 pesan

Harjono Padmono Putro <harjonopputro@unkris.ac.id>

27 November 2023 11.45

Kepada: Jonathan Dingel, Ph.D <editor@seyboldreport.org>

Dear Mr. Jonathan Dingel
Editor The Seybold Report Journal.

I have revised my article following reviewer's instructions.

I have explained in the introduction regarding Digital Marketing, as well as looking for supporting literature to strengthen the results of this study. I hope the editor can provide more input. Thank you for the TSRJ Editorial Board's continuous support and patience for me to revise my article. I here buy attached the revised article.

Best Regards,

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia



Revision1_Harjono.doc

479K

Jonathan Dingel, Ph.D <editor@seyboldreport.org>

17 Desember 2023 10.49

Kepada: Harjono Padmono Putro <harjonopputro@unkris.ac.id>

Dear

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia

Based on Reviewers' considerations, the article has, at some point, increased. However, you have to improve on a few more points. Hopefully, you are willing to do it.

Please follow the following revision instructions:

REVIEWER 1

Abstract must be made in a solid, consisting of all essential things related to the written topic, not repeating the conclusions of the research you have done.

The introduction explains the background, objectives and uses of the research but is not clear.

The discussion section must be deepened, the author must link the topics discussed with previous references. In this section the discussion is still weak because the references cited do not support the research related to the contribution to security studies.

Conclusions must be brief and clear explaining the core research findings related to MSME management research, not just conclusions

REVIEWER 2

The abstract should presenting intro, meth, result and discussion, in chronological. In this section seems the authorforget to put the aims of this study do mention it explicitly.

Literature review needs to be strengthened with current references to discuss the problem you are researching. While the results remain clear and well-structured the discussion section needs to provide a more profound analysis. This should include a thorough interpretation of the results, their implications, and a stronger connection to the research questions and literature

The results and discussion are still superficial and need deepening by comparing with previous studies so that the novelty of the research results can be seen, this is very important.

Articles that have been revised and please send it back via this email.

Best Regards,

--

Jonathan Dingel, Ph.D
Editorial Board Seybold

Harjono Padmono Putro <harjonopputro@unkris.ac.id>
Kepada: Jonathan Dingel, Ph.D <editor@seyboldreport.org>

18 Desember 2023 11.50

Dear Mr. Jonathan Dingel
Editor The Seybold Report Journal.

Thank you for your response, I will be happy to revise the article according to these instructions.

Best Regards,

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia
[Kutipan teks disembunyikan]

Harjono Padmono Putro <harjonopputro@unkris.ac.id>
Kepada: Jonathan Dingel, Ph.D <editor@seyboldreport.org>

21 Desember 2023 10.11


Dear Mr. Jonathan Dingel

Editor The Seybold Report Journal

Thank you for the patience of the TSRJ Editorial Board in waiting for the submission of my second article revision.

I have made improvements according to the instructions from reviewers, regarding abstracts, introductions, methods must be clearer and conclusions are appropriate. I am ready to wait for the next process. Attached Revised Article.
Best Regards,

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia

 **Revision2_Harjono.doc**
493K



Harjono Padmono Putro <ernirusyani@unpas.ac.id>

Acceptance Letter

1 pesan

Jonathan Dingel, Ph.D <editor@seyboldreport.org>

13 Januari 2024 10.50

Kepada: Harjono Padmono Putro <harjonopputro@unkris.ac.id>

Dear

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia

Warm Greetings!

It's a great pleasure to inform you that, after the peer review process, your article entitled: "**The Development Of Mobile Phone Technology And Its Impact On Education**". has been accepted for publication in The Seybold Report Journal (TSRJ) Volume 19, Issue 02 of 2024, please make a payment for publication fee.

Thank you for submitting your work to this journal. We hope to receive it in the future too.

Best Regards,

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Jonathan Dingel, Ph.D
Editorial Board Seybold

 **Accepted Letter_Harjono Padmono Putro.pdf**
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The Development of Mobile Phone Technology and Its Impact on Education

Commented [JD1]: REVIEWER 1

Harjono Padmono Putro
Universitas Krisnadwipayana, Jakarta, Indonesia
Email: harjonopputro@unkris.ac.id

Abstract

This research aims to investigate the impact of developments in mobile phone technology on education and learning in the digital era. This research uses a qualitative approach with descriptive methods. From this research it can be concluded that the use of mobile phones has a significant impact on various aspects of life, be it mental well-being, social relationships, or academic achievement. Research shows that individuals who are addicted to mobile phones tend to experience mental problems such as emotional instability, attention deficit, and depression. Additionally, excessive use can also hinder social interaction and have a negative impact on productivity, especially among students. Although there are positive benefits, such as easy access to information and supporting the learning process, it needs to be emphasized that unwise use of mobile phones can have serious consequences for individual well-being. Therefore, it is important to raise awareness of these negative impacts and encourage policies and norms that support the balanced and responsible use of mobile phones in everyday life.

Commented [JD2]: There are theoretical implications presented. However, I would like to see the implications for policy recommendation as well and briefly in the abstract

Keywords: Mobile Phone, Technology, Education, Addiction, Students.

A. INTRODUCTION

Mobile phones, or better known as mobile phone, are electronic telecommunications devices that have revolutionized the way humans communicate. With basic capabilities similar to conventional fixed line telephones, mobile phone allow users to make voice calls, send text messages, and even make video calls (Wei, 2008). The main uniqueness of mobile phones lies in their portability, allowing users to take these devices wherever they go without being tied to cables or specific telephone infrastructure. This provides unprecedented freedom and flexibility in the world of communications (Schrock, 2015).

In addition, mobile phone have also integrated various additional features, such as cameras, music players, internet access, and applications that further expand their functionality. Wireless capabilities make it easier to connect to cellular networks, enabling access to information, social media and online services anywhere (Lippincott, 2010). Mobile phones are not only a communication tool, but also a multipurpose device that supports various aspects of daily life. With the continued evolution of technology, mobile phones continue to evolve into digital control centers that help users organize and access various aspects of their lives efficiently (Townsend, 2000).

Along with the prevalence of mobile phone use in today's society, the problem of excessive use and even addiction has become a significant global issue (Park, 2005). Although many studies have explored the relationship between cell phone use and educational outcomes, many of them provide varying findings. In contemporary society, the widespread adoption of mobile phones has raised significant concerns regarding overuse and addiction, which is a significant global issue (Hong et al., 2012).

The positive benefits that arise from using mobile phones include strengthening social interactions and optimizing communication between individuals and systems (Geser, 2004). The use of mobile phones has played an important role in improving health promotion programs and patient care. Smartphones have become important tools in conveying health

messages, facilitating lifestyle behavioral adjustments, and monitoring patient health data (Fjeldsoe et al., 2009).

Although there are concerns regarding problematic mobile phone use, research has detailed the educational benefits associated with using mobile phones for a variety of purposes, including mobile learning, personalized instruction, independent learning, classroom engagement, and second language learning. The results of these studies consistently highlight the positive impact of mobile phone use in educational contexts (Traxler, 2009, Liu et al., 2014).

One striking finding was the role of mobile phones in narrowing the digital divide, bringing learning opportunities to those who might previously have had limited access. Additionally, mobile phones help facilitate the completion of assignments and homework, provide convenience in obtaining information quickly, and stimulate collaboration among peers through various applications and platforms. Mobile phone use has also been shown to improve vocabulary and language skills.

However, along with these benefits, there is also a trend of dependence on mobile phone among students. Mobile phone have not only become learning aids, but have also become the main means for completing various academic assignments (Motiwalla, 2007). This phenomenon creates an ongoing pattern of dependency, changing the way students engage in their educational process. While the educational benefits of mobile phone use are worthy of appreciation, it is also necessary to note the impact and implications for dependency which may require further attention in the context of sustainable educational development (Gikas & Grant, 2013).

Research conducted by Choi & Lim (2016) highlighted the negative impact of mobile phone addiction on an individual's mental well-being. They stated that individuals who are addicted to mobile phones have a higher risk of experiencing mental development problems, such as emotional instability, attention deficit, depression, and anger. Apart from that, physical impacts are also a serious concern, including disturbances in the sense of sight and hearing, obesity, body imbalances, and lack of brain development. Thus, excessive use of mobile phones can be detrimental to an individual's mental and physical health.

Vaghefi & Lapointe (2014) complement these findings by highlighting the social and productivity impacts of excessive mobile phone use. They found that mobile phone addiction can hinder social relationships with other people, result in decreased productivity, and potentially cause psychological problems. Therefore, mobile phone addiction not only affects individuals personally but can also damage social interactions and productivity performance in work or educational environments.

The research results of Klimova (2019) highlight the impact of mobile phone use on student learning achievement. They stated that excessive use of mobile phones can affect students' learning achievement levels by disrupting concentration during class hours. Mobile phones, if used for too long, can inhibit brain function and result in weakened brain power. Therefore, it is necessary to be aware of the time limits for using mobile phones to maintain the focus and quality of student learning in the educational environment. Thus, this research highlights the importance of balanced management of mobile phone use to prevent its negative impact on mental well-being, social relationships, productivity and learning achievement.

Research by Jiang & Zhao (2016) provides valuable insight into self-control factors in pathological mobile phone use. Their findings showed that individuals with low levels of self-control had a higher tendency to use mobile phones excessively. In this context, low self-control leads to a higher priority of pleasure and personal satisfaction, which in turn drives individuals to use mobile phones pathologically. Additionally, individuals with low self-control tend to exhibit low self-esteem, suboptimal academic performance, and poor interpersonal

relationships, as well as adopting unhealthy lifestyles. This shows that low self-control can have a broad impact on various aspects of an individual's life.

Another finding by Dong et al. (2012) highlighted the relationship between high internet addiction scores and impaired brain cortex function. They note that high levels of addiction can cause impaired brain cortex function which can inhibit cognitive and brain control mechanisms. Thus, high self-control may be a protective factor that has the potential to reduce the risk of internet addiction in individuals. The ability to control impulses and the desire to use technology wisely can provide protection against the negative impacts of excessive use.

B. LITERATURE REVIEW

Development of Mobile Phone Technology

The mobile phones we use today are always developing, one of the developments can be seen in their shape which is getting thinner and thinner. Therefore, in its development, mobile phones have been divided into several generations (Bhalla & Bhalla, 2010). Each generation is an improvement on the previous generation. Therefore, every time a new mobile phone appears, it will definitely have better specifications (Brohl et al., 2017). The mobile phone itself was first discovered by someone named Martin Cooper. Therefore, the first mobile phone invented by Martin Cooper could be said to be the first generation of mobile phone (Katz, 2008). After the first generation of mobile phones appeared, in the following years a new generation emerged.

Until now, mobile technology has developed to generation 4 or what we usually call 4G, scientists have even developed generation 5/5G technology (Yu et al., 2017). With the advent of 4th generation technology, the world has now experienced extraordinary internet speeds and can access things very easily and quickly without waiting long (Paixao & Bernard Marlow, 2003). Just imagine if we went back to 2nd generation or 1st generation technology, maybe people would be very annoyed and angry because data transfer was very slow and took a very long time (Tadayoni et al., 2018). Below, I will explain the development of mobile technology from generation to generation.

Generation 1 was originally introduced by Martin Cooper from Motorola in 1973, this technology uses an analog system or AMPS (Advanced Mobile Phone System). which uses a frequency of 825 Mhz to 894 Mhz (Cooper, 2021). This technology has many shortcomings, including weighing almost 800 grams and only having regional coverage, so this technology is starting to be developed into the 2nd generation. You can just call neighbors near your house while carrying a device that is almost one kilogram. It's better if you just shout from window (Kaur, 2012).

Generation 2 first appeared in the 1990s. Generation 2 is the result of developments from the previous generation, if generation 1 uses analog signals while generation 2 uses digital signals. GSM and CDMA networks have emerged at this time, the United States uses CDMA networks and European countries use GSM (Prasad & Ojanpera, 1998). In Generation 2 technology, you can do voice messages and SMS. An example of a device that can use Generation 2 is the legendary cellphone that we usually see as a joke in memes, namely the Nokia 3310 which is famous for its durability (Vykoukalova, 2007)

Generation 3 has been able to provide a wider reach, in this generation video calls can be used, but not as well as now, in this generation there have also been many smart phones or what we usually call mobile phones, many mobile vendors have appeared. Phones compete with each other to create the best cellphone that can be accepted by the market (Mogal, 2012). The operating systems that are starting to develop in this era are Android, iOS, Symbian and Windows Mobile. As 3G technology progresses, 3.5G technology has also been developed which is faster because it uses HSDPA technology.

Commented [JD3]: The paper has some interesting information, and the topic is essential: however, there seem to be some basic questions suggesting flaws in the questionnaire which put the conclusions in question

Commented [JD4]: There is a considerable relationship with the normative literature. However, the authors are advised here to broaden the focus, using a more recent journals

In generation 4 all generations are integrated starting from 2G, 3G and 4G. This allows you to choose the generation you want to use and can adjust it to the existing connectivity in a particular area (Ashiho, 2003). This technology has quite high data transmission, namely 100Mb/sec and 1Gb/sec. this technology can allow people to download films in just a few minutes. In this generation, many vendors are developing smartphone variants (Zhao et al., 2013).

5th generation technology, or 5G, has been deployed in several countries, offering incredible speed and security. With speeds 10 to 100 times faster than previous technologies, 5G enables super-fast data transfers of up to 800Gbps/second (Janevski, 2009). This speed supports advanced applications such as the Internet of Things (IoT) and augmented reality. Additionally, 5G is considered more secure with better encryption capabilities, increasing the security of sensitive data transmission. With its innovative potential, 5G is expected to form the basis for the development of more advanced and efficient technology in various sectors.

Concept of Addiction to Mobile Phone

Mobile phone addiction has been studied through various operationalizations, including excessive use, compulsive use, addiction, intensive use, and dependence on mobile phones (Gao et al., 2018). Scientists are engaged in intense debate regarding the conceptualization of mobile phone addiction, often referring to the behavioral addiction framework. Leung, (2007) defines mobile phone addiction as attachment behavior towards mobile phones which is accompanied by a lack of control and has a negative impact on the individual. The concept of addiction can be applied to behavior broadly, including addiction to information communication technology.

Chen et al. (2016) states that the term mobile phone addiction is a behavior that is attached or addicted to mobile phones which can cause social problems such as withdrawal and difficulties. in the performance of daily activities or as an impulse control disorder in a person. In addition, Park et al. (2019) stated that the definition of mobile phone addiction is the behavior of excessive use of mobile phones which can be considered a non-intoxicating impulse control disorder and is similar to pathological gambling. The opinion of Chen et al., (2016) also states that mobile phone addiction is an addiction that has a lighter risk than alcohol addiction or drug addiction.

This conceptualization defines mobile phone addiction as a behavioral addiction involving neglect of other aspects of life due to excessive mobile phone use, guiding the inclusion criteria for the meta-analysis (Billieux et al., 2015). Individuals who experience salience, mood modification, tolerance, withdrawal symptoms, conflict, and craving are considered to have developed a behavioral addiction to mobile phone use (Wang et al., 2016).

According to Walsh, White, and Young (2007), the causes of mobile phone addiction can be grouped into two main aspects. First, self-gratification, where mobile phone use is triggered by the individual's desire to entertain themselves or achieve personal pleasure with the aim of making themselves feel comfortable or relaxed. In this context, mobile phones become a means to obtain personal satisfaction and emotional comfort. Second, social gratification, reflects the need to maintain contact with other people (Chan, 2015). With advances in mobile phone technology, individuals can continue to connect with other people without having to meet face to face, facilitating social interactions without physical boundaries. This factor shows that the development of mobile phones not only meets the personal needs of users, but also facilitates social interactions, which can trigger addiction in an effort to stay constantly connected (Sbarra et al., 2019).

The high media exposure to mobile phones and the availability of facilities and application features on these devices have created a perception of ease and comfort in their use. Especially among teenagers who tend to be hungry for information and sophisticated

technology, mobile phones provide unlimited access to new worlds and various information (Mihailidis, 2014). This convenience triggers teenagers' tendency to constantly use mobile phones, even to the point where they find it difficult to let go and lose control over their use, which can ultimately lead to mobile phone addiction (Thulin, 2018). This phenomenon illustrates how dependence on mobile phones can arise from a combination of convenience, technological sophistication, and teenagers' interest in new things.

C. **METHOD**

The research approach used in this research is qualitative research. According Cresswell & Poth (2016) what is meant by qualitative research is a type of research that produces discoveries that cannot be achieved using statistical procedures or other methods of quantitative (measurement). Qualitative research can generally be used for research on community life, history, behavior, organizational functionalization, social activities, and so on. One of the reasons for using a qualitative approach is the researchers' experience that this method can be used to discover and understand what is hidden behind phenomena which are sometimes difficult to understand satisfactorily. This research uses descriptive methods in analyzing research results. Descriptive research focuses on solving actual problems as at the time the research was conducted, (Lans & Van der Voordt, 2002). Researchers try to photograph events and events that are the center of their attention, then describe or depict them as they really are so that the use of research findings applies at that time and is not necessarily relevant. In this research, the data used is secondary data in the form of archives or other written documents that support the researcher's research. Data collection was carried out using observation, interviews and document study techniques and was equipped with instruments equipped with guidelines. Then the research results are analyzed, data reduction, data display, verification, data validity testing.

Commented [JD5]: The research methodology section needs to be added with how the data is collected, because this will be transparent to the reader

D. **RESULTS AND DISCUSSION**

Mobile phones can be called mini computers in the form of mobile phones. People can access various communication, educational and social applications by just using a mobile phone without having to open a computer. It cannot be avoided that the use of mobile phones is sometimes really needed by students. It is not uncommon for assignments at school to make them inevitably access the internet on their mobile phones because the information they are looking for is not in their textbooks. However, there are quite a few negative impacts from using mobile phones for students of science. This is what creates the pros and cons between the benefits and disadvantages of using mobile phones in the world of education.

The Positive Impact of Mobile Phones on Education

1. Make Communication Easier

The high media exposure to mobile phones and the abundance of facilities and application features on these devices have a significant impact, especially among teenagers. Teenagers, as a group that tends to be hungry for information and new experiences, feel lured by the comfort and convenience provided by mobile phones. The availability of the internet, social applications, and various multimedia features make mobile phones a tool that not only makes access to information easier but also opens the door to unlimited entertainment and social interaction. As a result, teenagers often find themselves constantly connected to their mobile phones, integrating these devices as an integral part of everyday life.

However, excessive use of mobile phones among teenagers does not always end in positive impacts. This phenomenon often develops into mobile phone addiction, where individuals have difficulty breaking away from using these devices. Mobile phone addiction in teenagers can disrupt life balance, affect productivity, and even create an imbalance in direct social interactions. Therefore, while technological developments provide significant benefits,

it is also important to understand and manage the psychological and behavioral impacts that may arise from uncontrolled mobile phone use among teenagers.

2. Entertainment Media

Mobile phones are not just a communication tool, but also provide various entertainment features that can be an interesting and effective learning tool. For students and teachers, mobile phones provide the possibility to take a break from the monotonous learning routine. Many entertainment applications not only entertain but also provide added value to the learning process. Educational games, for example, not only provide fun but can also improve students' abilities. Through games, students can practice skills that can be applied in everyday life, such as communicating, collaborating, or solving problems. In addition, there are games specifically designed to hone cognitive abilities, such as memory or calculation skills, providing a fun and interactive learning approach.

However, along with its benefits, using mobile phones in a learning context also requires a good balance. It is important for students and teachers to ensure that time spent on entertainment on mobile phones does not distract from the main focus of learning. Apart from that, choosing entertainment applications that support effective learning needs to be considered. By wisely utilizing mobile phone entertainment features, both students and teachers can create a more dynamic and interactive learning experience, enriching the learning process with elements of fun and creativity.

3. Increase knowledge

The use of mobile phones has a positive impact on learning, especially for students, by making it easier to access information from various subjects. Mobile phones are equipped with a variety of educational applications that can provide additional interactive learning resources. The existence of this application makes learning more dynamic and interesting, helping students understand lesson concepts in a more enjoyable way. Apart from that, with search engines like Google, students can easily find information to support their assignments. This not only makes the research process easier, but also gives them the ability to check the accuracy of the information they have collected.

The use of mobile phones in the learning context makes a positive contribution to increasing students' knowledge and academic achievement. They can learn independently and more efficiently, utilizing technology to access educational resources more quickly and effectively. Thus, the use of mobile phones is not only a communication tool, but also a learning support tool that enriches students' learning experiences.

4. Increase comfort in learning

Many students and teachers find comfort in using mobile phones as learning tools, especially when compared to searching for information sources in the library. Mobile phones allow them to save time that might otherwise be spent searching for physical information. With one click inside their room, they can quickly access a variety of learning resources, study materials, and relevant information.

The use of mobile phones not only contributes to time efficiency, but also allows students and teachers to maximize the use of their time. With the speed of information access made possible by mobile phones, they can focus on studying or even communicating with friends, family, or teachers without having to shift from their location. This creates a more flexible and integrated learning experience, where they can use their time more effectively to improve their understanding of course material and carry out communication activities without obstacles. Thus, the mobile phone is not only a tool of convenience but also opens up opportunities for more efficient time management in the educational context.

5. Availability of more sophisticated technology

Mobile phones have become a very useful tool in the world of education by providing various applications that support the learning process. Through various useful applications,

both students and teachers can easily access the information needed to improve their understanding of the subject matter. This convenience provides an efficient alternative for gathering information without having to rely on traditional sources such as books or printed materials.

Apart from being a source of information, mobile phones also make it possible to hold virtual classes via smartphones. This opens up opportunities for distance learning, allowing interaction between teachers and students without having to be in the same physical location. Additionally, mobile phones not only facilitate formal learning, but also open the door to learning new skills and hobbies. For example, students and teachers can use mobile phones to learn foreign languages, develop drawing, cooking techniques, or even improve public speaking skills. Thus, mobile phones are not only educational tools, but also multifunctional resources that can enrich learning and teaching experiences.

6. Sharpen students' memory skills

The use of mobile phones as a learning tool is not only limited to accessing information, but can also be an effective medium for sharpening students' memories. With the ability to record, take pictures and take notes, students can comprehensively store entire lessons using their mobile phones. This process allows them to review and re-study course material at home.

Mobile phones are a very useful tool in facilitating students' learning process before exams or when doing assignments. By listening again to the recording or reviewing the pictures and notes they have taken, students can strengthen their understanding of the lesson material. This also opens up opportunities to memorize important information or concepts that may be difficult to understand at first. Thus, mobile phones not only act as a note-taking tool, but also as a tool that supports independent learning practices and increases efficiency in students' academic preparation.

7. Improve the ability to manage time

The use of mobile phones has a significant positive impact in increasing users' ability to manage time. The various applications available can help them become more organized in scheduling and managing their time, especially in the context of studying. Applications such as notepads, stopwatches, calendars, alarms, recorders, Google Drive and other office applications are effective tools for recording, storing and sending documents.

The application's various features enable users, especially students, to be more efficient in handling their assignments and study schedules. By using mobile phones, they can organize study time in a structured manner, activate alarms as reminders, and use calendars to plan daily activities. This not only increases discipline in studying, but also helps them set priorities in completing their assignments.

Implementing effective time management through mobile phones can have a wider positive impact, helping students be the best in their academic achievements. In addition, time management skills gained through using mobile phones can also help them improve various aspects of their lives, create positive habits, and have a positive influence on their personal development.

Negative Impact of Mobile Phones on Education

Apart from having a positive impact, mobile phones also have several negative impacts in the world of education. Following are some of the negative impacts of using mobile phones.

1. Not focused when studying

The use of mobile phones by students in the learning context can have a negative impact on their concentration and attention during the teaching and learning process. The temptation to check text messages, play games, or browse social media often becomes a significant distraction. This condition can cause some students to miss some parts of the lesson because they are too focused on activities on their mobile phones.

Not only does it reduce focus, uncontrolled use of mobile phones can also have an impact on social interactions in the classroom and the overall quality of learning. Students who prefer to be involved with mobile phones rather than listening to teacher explanations or participating in class discussions can experience lagging behind in understanding lesson material. Therefore, it is important for educators and parents to provide an understanding of the limits of mobile phone use during class hours and encourage students to prioritize focusing on learning in order to achieve optimal academic results.

2. Lack of social interaction in real life

The emergence of various social media platforms has had a significant impact on students' social lives, especially through their use of mobile phones. This phenomenon can lead to a decrease in social interactions in real life, as they tend to be more focused and involved in various social media platforms. Activities such as renewing their lives, sharing moments, and interacting online are becoming more dominant than social interactions in everyday life.

It is important to recognize that excessive engagement in social media can disrupt interpersonal relationships with friends and family. Even though they are connected virtually, direct interactions in the real world are neglected. Additionally, too much focus on social media activities can also have a negative impact on academic performance. An imbalance between the use of mobile phones for social media purposes and focus on learning can cause a lack of attention to school assignments, learning, and interactions in the classroom environment.

3. Academic achievement will decrease

Improper use of mobile phones can be a factor in reducing academic achievement, especially because of its impact on concentration and information retention during the teaching and learning process. One of the main causes is the distraction caused by mobile phones, which results in students not being able to fully focus or remember the information conveyed by the teacher during learning. The inability to capture information well during the learning process can hinder understanding of subject matter and reduce students' ability to apply the knowledge gained in assignments or exams. Mobile phones used inappropriately, such as checking messages, playing games, or browsing social media during class hours, can be a significant obstacle to learning effectiveness.

The importance of creating a learning environment that is free from mobile phone distractions and providing students with an understanding of the importance of focus during learning is a critical aspect in efforts to improve academic achievement. Therefore, collaboration between educators, parents and students is needed to create healthy mobile phone usage habits and support optimal academic achievement.

4. Makes you less empathetic with the surrounding environment

Mobile phone addiction can affect a person's social behavior, making them tend to be less concerned and less empathetic towards their surroundings. Individuals who are trapped in the habit of constantly using mobile phones often seem indifferent to gatherings with family or friends. Instead, they are more interested in looking down and engrossed in their mobile phones rather than actively interacting with the people around them.

For example, when at a family or friends gathering, some people who are addicted to mobile phones may prefer to continue playing with their devices rather than chatting or exchanging stories with the people around them. This behavior can create a communication gap and reduce the quality of social interactions that should occur in the situation. The importance of realizing the negative impact of mobile phone addiction on social interactions can encourage individuals to value shared moments more and prioritize healthy interpersonal relationships. Therefore, it is important to create a balance in the use of mobile phones so as not to sacrifice the quality of social interactions in everyday life.

5. anxiety and depression levels

Social media, as a sharing platform, allows people to show happy moments in their lives, from holiday photos, culinary experiences, to other positive news. Even though the main purpose of this sharing is to connect and share happiness, the impact can be different for the people who see it. Sometimes, constant exposure to other people's happiness on social media can increase levels of anxiety and depression, especially for those who feel they have not had similar opportunities or experiences.

Observing other people's happy lives online can trigger feelings of inadequacy or feeling left behind by other people's seemingly more perfect lives. This can be a source of significant psychological distress, especially when comparisons are constant. People need to realize that what is seen on social media is only a selection of lives and moments chosen to be shared, not a comprehensive picture of someone's life.

In this context, it is important to raise awareness of the psychological impact of social media exposure and promote the message that each person has their own life journey. Empowering yourself to focus on internal happiness, rather than comparing yourself to standards that appear on social media, can help reduce psychological distress and improve mental well-being.

6. Mobile phone misuse

Easy internet access via mobile phone carries certain risks, especially if it is misused by students to access sites they should not access. One example that often occurs is the use of mobile phones to access pornographic content. In some cases, addiction to pornography can arise as a result of the easy access afforded by mobile phones, and this can lead to harmful inappropriate behavior.

The importance of being aware of the negative impacts of uncontrolled mobile phone use in this case is very crucial. Easy access to pornographic content can result in detrimental behavioral changes, especially at the student level. Awareness of these risks must be increased among students, parents, and educators to take necessary preventive measures, including monitoring mobile phone use and open conversations about the risks and consequences of accessing inappropriate content. Education focused on digital awareness and safe internet use can help protect students from these negative impacts.

7. Reduces brain memory

Excessive use of mobile phones in the learning process can potentially result in a decrease in students' brain power and memory. This phenomenon can occur because of their tendency to rely on mobile phones as their main tool, such as recording conversations or relying on search engines to find answers to questions that arise.

Brain comprehension and memory are critical aspects in the learning process, and excessive use of mobile phones can cause the brain to become less trained to think independently. Relying too much on technology, without making an active effort to cognitively process information, can lead to a decline in the brain's ability to understand and retain information.

Therefore, awareness and a balanced approach are needed in the use of mobile phones during the learning process. The habit of continuing to involve the brain in critical thinking, analysis and reflection, without relying too much on technology, can help maintain and improve students' comprehension and memory. Education regarding the wise and effective use of mobile phones in learning contexts is also important to maximize the benefits of technology without sacrificing fundamental brain abilities.

8. Avoiding Fraud

Ease of access and use of mobile phones opens up opportunities for students to engage in cheating during exams. In this context, mobile phones can be a tool used to cheat by accessing the internet or sharing answers with friends via communication media. This kind of cheating often arises from lazy learning behavior, which can be caused by excessive

dependence on mobile phones. Students who are too engrossed in their devices may tend to neglect exam preparation and focus less on understanding the lesson material. This can lead to efforts to find instant methods, such as cheating, as an alternative to overcome their lack of understanding of the material.

Addressing the issue of cheating during exams requires a holistic approach. Educators, parents, and schools need to work together to provide an understanding of the consequences of cheating, motivate students to study diligently, and monitor the use of mobile phones during exams. In addition, it is important to encourage a positive learning culture and prioritize the values of academic integrity so that students understand the importance of serious effort in achieving academic success.

E. **CONCLUSION**

Mobile phone use has a complex impact on various aspects of life, including social, academic and mental well-being. Positively, mobile phones provide easy access to information, support the teaching and learning process, and increase efficiency in various daily activities. However, unwise use can cause various problems, including addiction, decreased quality of social relationships, and negative impacts on academic performance. In the context of mobile phone addiction, many studies have shown a link between excessive use and mental well-being problems, such as emotional instability, attention deficit, and depression. In addition, uncontrolled use of mobile phones can disrupt social relationships with other people and have a negative impact on productivity. Apart from that, excessive use of mobile phones can also affect academic performance, especially in terms of concentration and brain comprehension. Regarding security and ethics, mobile phones carry risks such as easy access to inappropriate content, especially for students who are vulnerable to negative influences. Apart from that, the sophistication of technology in mobile phones also opens up opportunities for cheating during exams. Thus, it is important to develop awareness and a balanced approach to mobile phone use. Education regarding digital ethics, awareness of the impact on mental well-being, as well as the promotion of policies and norms that support wise use need to be a focus in facing the challenges that arise due to the development of mobile phone technology.

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The Development of Mobile Phone Technology and Its Impact on Education

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Abstract

This research aims to investigate the impact of developments in mobile phone technology on education and learning in the digital era. This research uses a qualitative approach with descriptive methods. From this research it can be concluded that the use of mobile phones has a significant impact on various aspects of life, be it mental well-being, social relationships, or academic achievement. Research shows that individuals who are addicted to mobile phones tend to experience mental problems such as emotional instability, attention deficit, and depression. Additionally, excessive use can also hinder social interaction and have a negative impact on productivity, especially among students. Although there are positive benefits, such as easy access to information and supporting the learning process, it needs to be emphasized that unwise use of mobile phones can have serious consequences for individual well-being. Therefore, it is important to raise awareness of these negative impacts and encourage policies and norms that support the balanced and responsible use of mobile phones in everyday life.

Keywords: Mobile Phone, Technology, Education, Addiction, Students.

A. INTRODUCTION

Mobile phones, or better known as mobile phone, are electronic telecommunications devices that have revolutionized the way humans communicate. With basic capabilities similar to conventional fixed line telephones, mobile phone allow users to make voice calls, send text messages, and even make video calls (Wei, 2008). The main uniqueness of mobile phones lies in their portability, allowing users to take these devices wherever they go without being tied to cables or specific telephone infrastructure. This provides unprecedented freedom and flexibility in the world of communications (Schrock, 2015).

In addition, mobile phone have also integrated various additional features, such as cameras, music players, internet access, and applications that further expand their functionality. Wireless capabilities make it easier to connect to cellular networks, enabling access to information, social media and online services anywhere (Lippincott, 2010). Mobile phones are not only a communication tool, but also a multipurpose device that supports various aspects of daily life. With the continued evolution of technology, mobile phones continue to evolve into digital control centers that help users organize and access various aspects of their lives efficiently (Townsend, 2000).

Along with the prevalence of mobile phone use in today's society, the problem of excessive use and even addiction has become a significant global issue (Park, 2005). Although many studies have explored the relationship between cell phone use and educational outcomes, many of them provide varying findings. In contemporary society, the widespread adoption of mobile phones has raised significant concerns regarding overuse and addiction, which is a significant global issue (Hong et al., 2012).

The positive benefits that arise from using mobile phones include strengthening social interactions and optimizing communication between individuals and systems (Geser, 2004). The use of mobile phones has played an important role in improving health promotion programs and patient care. Smartphones have become important tools in conveying health

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messages, facilitating lifestyle behavioral adjustments, and monitoring patient health data (Fjeldsoe et al., 2009).

Although there are concerns regarding problematic mobile phone use, research has detailed the educational benefits associated with using mobile phones for a variety of purposes, including mobile learning, personalized instruction, independent learning, classroom engagement, and second language learning. The results of these studies consistently highlight the positive impact of mobile phone use in educational contexts (Traxler, 2009, Liu et al., 2014).

One striking finding was the role of mobile phones in narrowing the digital divide, bringing learning opportunities to those who might previously have had limited access. Additionally, mobile phones help facilitate the completion of assignments and homework, provide convenience in obtaining information quickly, and stimulate collaboration among peers through various applications and platforms. Mobile phone use has also been shown to improve vocabulary and language skills.

However, along with these benefits, there is also a trend of dependence on mobile phone among students. Mobile phone have not only become learning aids, but have also become the main means for completing various academic assignments (Motiwalla, 2007). This phenomenon creates an ongoing pattern of dependency, changing the way students engage in their educational process. While the educational benefits of mobile phone use are worthy of appreciation, it is also necessary to note the impact and implications for dependency which may require further attention in the context of sustainable educational development (Gikas & Grant, 2013).

Research conducted by Choi & Lim (2016) highlighted the negative impact of mobile phone addiction on an individual's mental well-being. They stated that individuals who are addicted to mobile phones have a higher risk of experiencing mental development problems, such as emotional instability, attention deficit, depression, and anger. Apart from that, physical impacts are also a serious concern, including disturbances in the sense of sight and hearing, obesity, body imbalances, and lack of brain development. Thus, excessive use of mobile phones can be detrimental to an individual's mental and physical health.

Vaghefi & Lapointe (2014) complement these findings by highlighting the social and productivity impacts of excessive mobile phone use. They found that mobile phone addiction can hinder social relationships with other people, result in decreased productivity, and potentially cause psychological problems. Therefore, mobile phone addiction not only affects individuals personally but can also damage social interactions and productivity performance in work or educational environments.

The research results of Klimova (2019) highlight the impact of mobile phone use on student learning achievement. They stated that excessive use of mobile phones can affect students' learning achievement levels by disrupting concentration during class hours. Mobile phones, if used for too long, can inhibit brain function and result in weakened brain power. Therefore, it is necessary to be aware of the time limits for using mobile phones to maintain the focus and quality of student learning in the educational environment. Thus, this research highlights the importance of balanced management of mobile phone use to prevent its negative impact on mental well-being, social relationships, productivity and learning achievement.

Research by Jiang & Zhao (2016) provides valuable insight into self-control factors in pathological mobile phone use. Their findings showed that individuals with low levels of self-control had a higher tendency to use mobile phones excessively. In this context, low self-control leads to a higher priority of pleasure and personal satisfaction, which in turn drives individuals to use mobile phones pathologically. Additionally, individuals with low self-control tend to exhibit low self-esteem, suboptimal academic performance, and poor interpersonal

relationships, as well as adopting unhealthy lifestyles. This shows that low self-control can have a broad impact on various aspects of an individual's life.

Another finding by Dong et al. (2012) highlighted the relationship between high internet addiction scores and impaired brain cortex function. They note that high levels of addiction can cause impaired brain cortex function which can inhibit cognitive and brain control mechanisms. Thus, high self-control may be a protective factor that has the potential to reduce the risk of internet addiction in individuals. The ability to control impulses and the desire to use technology wisely can provide protection against the negative impacts of excessive use.

B. LITERATURE REVIEW

Development of Mobile Phone Technology

The mobile phones we use today are always developing, one of the developments can be seen in their shape which is getting thinner and thinner. Therefore, in its development, mobile phones have been divided into several generations (Bhalla & Bhalla, 2010). Each generation is an improvement on the previous generation. Therefore, every time a new mobile phone appears, it will definitely have better specifications (Brohl et al., 2017). The mobile phone itself was first discovered by someone named Martin Cooper. Therefore, the first mobile phone invented by Martin Cooper could be said to be the first generation of mobile phone (Katz, 2008). After the first generation of mobile phones appeared, in the following years a new generation emerged.

Until now, mobile technology has developed to generation 4 or what we usually call 4G, scientists have even developed generation 5/5G technology (Yu et al., 2017). With the advent of 4th generation technology, the world has now experienced extraordinary internet speeds and can access things very easily and quickly without waiting long (Paixao & Bernard Marlow, 2003). Just imagine if we went back to 2nd generation or 1st generation technology, maybe people would be very annoyed and angry because data transfer was very slow and took a very long time (Tadayoni et al., 2018). Below, I will explain the development of mobile technology from generation to generation.

Generation 1 was originally introduced by Martin Cooper from Motorola in 1973, this technology uses an analog system or AMPS (Advanced Mobile Phone System). which uses a frequency of 825 Mhz to 894 Mhz (Cooper, 2021). This technology has many shortcomings, including weighing almost 800 grams and only having regional coverage, so this technology is starting to be developed into the 2nd generation. You can just call neighbors near your house while carrying a device that is almost one kilogram. It's better if you just shout from window (Kaur, 2012).

Generation 2 first appeared in the 1990s. Generation 2 is the result of developments from the previous generation, if generation 1 uses analog signals while generation 2 uses digital signals. GSM and CDMA networks have emerged at this time, the United States uses CDMA networks and European countries use GSM (Prasad & Ojanpera, 1998). In Generation 2 technology, you can do voice messages and SMS. An example of a device that can use Generation 2 is the legendary cellphone that we usually see as a joke in memes, namely the Nokia 3310 which is famous for its durability (Vykoukalova, 2007)

Generation 3 has been able to provide a wider reach, in this generation video calls can be used, but not as well as now, in this generation there have also been many smart phones or what we usually call mobile phones, many mobile vendors have appeared. Phones compete with each other to create the best cellphone that can be accepted by the market (Mogal, 2012). The operating systems that are starting to develop in this era are Android, iOS, Symbian and Windows Mobile. As 3G technology progresses, 3.5G technology has also been developed which is faster because it uses HSDPA technology.

In generation 4 all generations are integrated starting from 2G, 3G and 4G. This allows you to choose the generation you want to use and can adjust it to the existing connectivity in a particular area (Ashiho, 2003). This technology has quite high data transmission, namely 100Mb/sec and 1Gb/sec. this technology can allow people to download films in just a few minutes. In this generation, many vendors are developing smartphone variants (Zhao et al., 2013).

5th generation technology, or 5G, has been deployed in several countries, offering incredible speed and security. With speeds 10 to 100 times faster than previous technologies, 5G enables super-fast data transfers of up to 800Gbps/second (Janevski, 2009). This speed supports advanced applications such as the Internet of Things (IoT) and augmented reality. Additionally, 5G is considered more secure with better encryption capabilities, increasing the security of sensitive data transmission. With its innovative potential, 5G is expected to form the basis for the development of more advanced and efficient technology in various sectors.

Concept of Addiction to Mobile Phone

Mobile phone addiction has been studied through various operationalizations, including excessive use, compulsive use, addiction, intensive use, and dependence on mobile phones (Gao et al., 2018). Scientists are engaged in intense debate regarding the conceptualization of mobile phone addiction, often referring to the behavioral addiction framework. Leung, (2007) defines mobile phone addiction as attachment behavior towards mobile phones which is accompanied by a lack of control and has a negative impact on the individual. The concept of addiction can be applied to behavior broadly, including addiction to information communication technology.

Chen et al. (2016) states that the term mobile phone addiction is a behavior that is attached or addicted to mobile phones which can cause social problems such as withdrawal and difficulties. in the performance of daily activities or as an impulse control disorder in a person. In addition, Park et al. (2019) stated that the definition of mobile phone addiction is the behavior of excessive use of mobile phones which can be considered a non-intoxicating impulse control disorder and is similar to pathological gambling. The opinion of Chen et al., (2016) also states that mobile phone addiction is an addiction that has a lighter risk than alcohol addiction or drug addiction.

This conceptualization defines mobile phone addiction as a behavioral addiction involving neglect of other aspects of life due to excessive mobile phone use, guiding the inclusion criteria for the meta-analysis (Billieux et al., 2015). Individuals who experience salience, mood modification, tolerance, withdrawal symptoms, conflict, and craving are considered to have developed a behavioral addiction to mobile phone use (Wang et al., 2016).

According to Walsh, White, and Young (2007), the causes of mobile phone addiction can be grouped into two main aspects. First, self-gratification, where mobile phone use is triggered by the individual's desire to entertain themselves or achieve personal pleasure with the aim of making themselves feel comfortable or relaxed. In this context, mobile phones become a means to obtain personal satisfaction and emotional comfort. Second, social gratification, reflects the need to maintain contact with other people (Chan, 2015). With advances in mobile phone technology, individuals can continue to connect with other people without having to meet face to face, facilitating social interactions without physical boundaries. This factor shows that the development of mobile phones not only meets the personal needs of users, but also facilitates social interactions, which can trigger addiction in an effort to stay constantly connected (Sbarra et al., 2019).

The high media exposure to mobile phones and the availability of facilities and application features on these devices have created a perception of ease and comfort in their use. Especially among teenagers who tend to be hungry for information and sophisticated

technology, mobile phones provide unlimited access to new worlds and various information (Mihailidis, 2014). This convenience triggers teenagers' tendency to constantly use mobile phones, even to the point where they find it difficult to let go and lose control over their use, which can ultimately lead to mobile phone addiction (Thulin, 2018). This phenomenon illustrates how dependence on mobile phones can arise from a combination of convenience, technological sophistication, and teenagers' interest in new things.

C. **METHOD**

The research approach used in this research is qualitative research. According Cresswell & Poth (2016) what is meant by qualitative research is a type of research that produces discoveries that cannot be achieved using statistical procedures or other methods of quantitative (measurement). Qualitative research can generally be used for research on community life, history, behavior, organizational functionalization, social activities, and so on. One of the reasons for using a qualitative approach is the researchers' experience that this method can be used to discover and understand what is hidden behind phenomena which are sometimes difficult to understand satisfactorily. This research uses descriptive methods in analyzing research results. Descriptive research focuses on solving actual problems as at the time the research was conducted, (Lans & Van der Voordt, 2002). Researchers try to photograph events and events that are the center of their attention, then describe or depict them as they really are so that the use of research findings applies at that time and is not necessarily relevant. In this research, the data used is secondary data in the form of archives or other written documents that support the researcher's research. Data collection was carried out using observation, interviews and document study techniques and was equipped with instruments equipped with guidelines. Then the research results are analyzed, data reduction, data display, verification, data validity testing.

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D. **RESULTS AND DISCUSSION**

Mobile phones can be called mini computers in the form of mobile phones. People can access various communication, educational and social applications by just using a mobile phone without having to open a computer. It cannot be avoided that the use of mobile phones is sometimes really needed by students. It is not uncommon for assignments at school to make them inevitably access the internet on their mobile phones because the information they are looking for is not in their textbooks. However, there are quite a few negative impacts from using mobile phones for students of science. This is what creates the pros and cons between the benefits and disadvantages of using mobile phones in the world of education.

The Positive Impact of Mobile Phones on Education

1. Make Communication Easier

The high media exposure to mobile phones and the abundance of facilities and application features on these devices have a significant impact, especially among teenagers. Teenagers, as a group that tends to be hungry for information and new experiences, feel lured by the comfort and convenience provided by mobile phones. The availability of the internet, social applications, and various multimedia features make mobile phones a tool that not only makes access to information easier but also opens the door to unlimited entertainment and social interaction. As a result, teenagers often find themselves constantly connected to their mobile phones, integrating these devices as an integral part of everyday life.

However, excessive use of mobile phones among teenagers does not always end in positive impacts. This phenomenon often develops into mobile phone addiction, where individuals have difficulty breaking away from using these devices. Mobile phone addiction in teenagers can disrupt life balance, affect productivity, and even create an imbalance in direct social interactions. Therefore, while technological developments provide significant benefits,

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it is also important to understand and manage the psychological and behavioral impacts that may arise from uncontrolled mobile phone use among teenagers.

2. Entertainment Media

Mobile phones are not just a communication tool, but also provide various entertainment features that can be an interesting and effective learning tool. For students and teachers, mobile phones provide the possibility to take a break from the monotonous learning routine. Many entertainment applications not only entertain but also provide added value to the learning process. Educational games, for example, not only provide fun but can also improve students' abilities. Through games, students can practice skills that can be applied in everyday life, such as communicating, collaborating, or solving problems. In addition, there are games specifically designed to hone cognitive abilities, such as memory or calculation skills, providing a fun and interactive learning approach.

However, along with its benefits, using mobile phones in a learning context also requires a good balance. It is important for students and teachers to ensure that time spent on entertainment on mobile phones does not distract from the main focus of learning. Apart from that, choosing entertainment applications that support effective learning needs to be considered. By wisely utilizing mobile phone entertainment features, both students and teachers can create a more dynamic and interactive learning experience, enriching the learning process with elements of fun and creativity.

3. Increase knowledge

The use of mobile phones has a positive impact on learning, especially for students, by making it easier to access information from various subjects. Mobile phones are equipped with a variety of educational applications that can provide additional interactive learning resources. The existence of this application makes learning more dynamic and interesting, helping students understand lesson concepts in a more enjoyable way. Apart from that, with search engines like Google, students can easily find information to support their assignments. This not only makes the research process easier, but also gives them the ability to check the accuracy of the information they have collected.

The use of mobile phones in the learning context makes a positive contribution to increasing students' knowledge and academic achievement. They can learn independently and more efficiently, utilizing technology to access educational resources more quickly and effectively. Thus, the use of mobile phones is not only a communication tool, but also a learning support tool that enriches students' learning experiences.

4. Increase comfort in learning

Many students and teachers find comfort in using mobile phones as learning tools, especially when compared to searching for information sources in the library. Mobile phones allow them to save time that might otherwise be spent searching for physical information. With one click inside their room, they can quickly access a variety of learning resources, study materials, and relevant information.

The use of mobile phones not only contributes to time efficiency, but also allows students and teachers to maximize the use of their time. With the speed of information access made possible by mobile phones, they can focus on studying or even communicating with friends, family, or teachers without having to shift from their location. This creates a more flexible and integrated learning experience, where they can use their time more effectively to improve their understanding of course material and carry out communication activities without obstacles. Thus, the mobile phone is not only a tool of convenience but also opens up opportunities for more efficient time management in the educational context.

5. Availability of more sophisticated technology

Mobile phones have become a very useful tool in the world of education by providing various applications that support the learning process. Through various useful applications,

both students and teachers can easily access the information needed to improve their understanding of the subject matter. This convenience provides an efficient alternative for gathering information without having to rely on traditional sources such as books or printed materials.

Apart from being a source of information, mobile phones also make it possible to hold virtual classes via smartphones. This opens up opportunities for distance learning, allowing interaction between teachers and students without having to be in the same physical location. Additionally, mobile phones not only facilitate formal learning, but also open the door to learning new skills and hobbies. For example, students and teachers can use mobile phones to learn foreign languages, develop drawing, cooking techniques, or even improve public speaking skills. Thus, mobile phones are not only educational tools, but also multifunctional resources that can enrich learning and teaching experiences.

6. Sharpen students' memory skills

The use of mobile phones as a learning tool is not only limited to accessing information, but can also be an effective medium for sharpening students' memories. With the ability to record, take pictures and take notes, students can comprehensively store entire lessons using their mobile phones. This process allows them to review and re-study course material at home.

Mobile phones are a very useful tool in facilitating students' learning process before exams or when doing assignments. By listening again to the recording or reviewing the pictures and notes they have taken, students can strengthen their understanding of the lesson material. This also opens up opportunities to memorize important information or concepts that may be difficult to understand at first. Thus, mobile phones not only act as a note-taking tool, but also as a tool that supports independent learning practices and increases efficiency in students' academic preparation.

7. Improve the ability to manage time

The use of mobile phones has a significant positive impact in increasing users' ability to manage time. The various applications available can help them become more organized in scheduling and managing their time, especially in the context of studying. Applications such as notepads, stopwatches, calendars, alarms, recorders, Google Drive and other office applications are effective tools for recording, storing and sending documents.

The application's various features enable users, especially students, to be more efficient in handling their assignments and study schedules. By using mobile phones, they can organize study time in a structured manner, activate alarms as reminders, and use calendars to plan daily activities. This not only increases discipline in studying, but also helps them set priorities in completing their assignments.

Implementing effective time management through mobile phones can have a wider positive impact, helping students be the best in their academic achievements. In addition, time management skills gained through using mobile phones can also help them improve various aspects of their lives, create positive habits, and have a positive influence on their personal development.

Negative Impact of Mobile Phones on Education

Apart from having a positive impact, mobile phones also have several negative impacts in the world of education. Following are some of the negative impacts of using mobile phones.

1. Not focused when studying

The use of mobile phones by students in the learning context can have a negative impact on their concentration and attention during the teaching and learning process. The temptation to check text messages, play games, or browse social media often becomes a significant distraction. This condition can cause some students to miss some parts of the lesson because they are too focused on activities on their mobile phones.

Not only does it reduce focus, uncontrolled use of mobile phones can also have an impact on social interactions in the classroom and the overall quality of learning. Students who prefer to be involved with mobile phones rather than listening to teacher explanations or participating in class discussions can experience lagging behind in understanding lesson material. Therefore, it is important for educators and parents to provide an understanding of the limits of mobile phone use during class hours and encourage students to prioritize focusing on learning in order to achieve optimal academic results.

2. Lack of social interaction in real life

The emergence of various social media platforms has had a significant impact on students' social lives, especially through their use of mobile phones. This phenomenon can lead to a decrease in social interactions in real life, as they tend to be more focused and involved in various social media platforms. Activities such as renewing their lives, sharing moments, and interacting online are becoming more dominant than social interactions in everyday life.

It is important to recognize that excessive engagement in social media can disrupt interpersonal relationships with friends and family. Even though they are connected virtually, direct interactions in the real world are neglected. Additionally, too much focus on social media activities can also have a negative impact on academic performance. An imbalance between the use of mobile phones for social media purposes and focus on learning can cause a lack of attention to school assignments, learning, and interactions in the classroom environment.

3. Academic achievement will decrease

Improper use of mobile phones can be a factor in reducing academic achievement, especially because of its impact on concentration and information retention during the teaching and learning process. One of the main causes is the distraction caused by mobile phones, which results in students not being able to fully focus or remember the information conveyed by the teacher during learning. The inability to capture information well during the learning process can hinder understanding of subject matter and reduce students' ability to apply the knowledge gained in assignments or exams. Mobile phones used inappropriately, such as checking messages, playing games, or browsing social media during class hours, can be a significant obstacle to learning effectiveness.

The importance of creating a learning environment that is free from mobile phone distractions and providing students with an understanding of the importance of focus during learning is a critical aspect in efforts to improve academic achievement. Therefore, collaboration between educators, parents and students is needed to create healthy mobile phone usage habits and support optimal academic achievement.

4. Makes you less empathetic with the surrounding environment

Mobile phone addiction can affect a person's social behavior, making them tend to be less concerned and less empathetic towards their surroundings. Individuals who are trapped in the habit of constantly using mobile phones often seem indifferent to gatherings with family or friends. Instead, they are more interested in looking down and engrossed in their mobile phones rather than actively interacting with the people around them.

For example, when at a family or friends gathering, some people who are addicted to mobile phones may prefer to continue playing with their devices rather than chatting or exchanging stories with the people around them. This behavior can create a communication gap and reduce the quality of social interactions that should occur in the situation. The importance of realizing the negative impact of mobile phone addiction on social interactions can encourage individuals to value shared moments more and prioritize healthy interpersonal relationships. Therefore, it is important to create a balance in the use of mobile phones so as not to sacrifice the quality of social interactions in everyday life.

5. anxiety and depression levels

Social media, as a sharing platform, allows people to show happy moments in their lives, from holiday photos, culinary experiences, to other positive news. Even though the main purpose of this sharing is to connect and share happiness, the impact can be different for the people who see it. Sometimes, constant exposure to other people's happiness on social media can increase levels of anxiety and depression, especially for those who feel they have not had similar opportunities or experiences.

Observing other people's happy lives online can trigger feelings of inadequacy or feeling left behind by other people's seemingly more perfect lives. This can be a source of significant psychological distress, especially when comparisons are constant. People need to realize that what is seen on social media is only a selection of lives and moments chosen to be shared, not a comprehensive picture of someone's life.

In this context, it is important to raise awareness of the psychological impact of social media exposure and promote the message that each person has their own life journey. Empowering yourself to focus on internal happiness, rather than comparing yourself to standards that appear on social media, can help reduce psychological distress and improve mental well-being.

6. Mobile phone misuse

Easy internet access via mobile phone carries certain risks, especially if it is misused by students to access sites they should not access. One example that often occurs is the use of mobile phones to access pornographic content. In some cases, addiction to pornography can arise as a result of the easy access afforded by mobile phones, and this can lead to harmful inappropriate behavior.

The importance of being aware of the negative impacts of uncontrolled mobile phone use in this case is very crucial. Easy access to pornographic content can result in detrimental behavioral changes, especially at the student level. Awareness of these risks must be increased among students, parents, and educators to take necessary preventive measures, including monitoring mobile phone use and open conversations about the risks and consequences of accessing inappropriate content. Education focused on digital awareness and safe internet use can help protect students from these negative impacts.

7. Reduces brain memory

Excessive use of mobile phones in the learning process can potentially result in a decrease in students' brain power and memory. This phenomenon can occur because of their tendency to rely on mobile phones as their main tool, such as recording conversations or relying on search engines to find answers to questions that arise.

Brain comprehension and memory are critical aspects in the learning process, and excessive use of mobile phones can cause the brain to become less trained to think independently. Relying too much on technology, without making an active effort to cognitively process information, can lead to a decline in the brain's ability to understand and retain information.

Therefore, awareness and a balanced approach are needed in the use of mobile phones during the learning process. The habit of continuing to involve the brain in critical thinking, analysis and reflection, without relying too much on technology, can help maintain and improve students' comprehension and memory. Education regarding the wise and effective use of mobile phones in learning contexts is also important to maximize the benefits of technology without sacrificing fundamental brain abilities.

8. Avoiding Fraud

Ease of access and use of mobile phones opens up opportunities for students to engage in cheating during exams. In this context, mobile phones can be a tool used to cheat by accessing the internet or sharing answers with friends via communication media. This kind of cheating often arises from lazy learning behavior, which can be caused by excessive

dependence on mobile phones. Students who are too engrossed in their devices may tend to neglect exam preparation and focus less on understanding the lesson material. This can lead to efforts to find instant methods, such as cheating, as an alternative to overcome their lack of understanding of the material.

Addressing the issue of cheating during exams requires a holistic approach. Educators, parents, and schools need to work together to provide an understanding of the consequences of cheating, motivate students to study diligently, and monitor the use of mobile phones during exams. In addition, it is important to encourage a positive learning culture and prioritize the values of academic integrity so that students understand the importance of serious effort in achieving academic success.

E. CONCLUSION

Mobile phone use has a complex impact on various aspects of life, including social, academic and mental well-being. Positively, mobile phones provide easy access to information, support the teaching and learning process, and increase efficiency in various daily activities. However, unwise use can cause various problems, including addiction, decreased quality of social relationships, and negative impacts on academic performance. In the context of mobile phone addiction, many studies have shown a link between excessive use and mental well-being problems, such as emotional instability, attention deficit, and depression. In addition, uncontrolled use of mobile phones can disrupt social relationships with other people and have a negative impact on productivity. Apart from that, excessive use of mobile phones can also affect academic performance, especially in terms of concentration and brain comprehension. Regarding security and ethics, mobile phones carry risks such as easy access to inappropriate content, especially for students who are vulnerable to negative influences. Apart from that, the sophistication of technology in mobile phones also opens up opportunities for cheating during exams. Thus, it is important to develop awareness and a balanced approach to mobile phone use. Education regarding digital ethics, awareness of the impact on mental well-being, as well as the promotion of policies and norms that support wise use need to be a focus in facing the challenges that arise due to the development of mobile phone technology.

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The Development of Mobile Phone Technology and Its Impact on Education

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Abstract

This research aims to investigate the impact of developments in mobile phone technology on education and learning in the digital era. This research uses a qualitative approach with descriptive methods. From this research it can be concluded that the use of mobile phones has a significant impact on various aspects of life, be it mental well-being, social relationships, or academic achievement. Research shows that individuals who are addicted to mobile phones tend to experience mental problems such as emotional instability, attention deficit, and depression. Additionally, excessive use can also hinder social interaction and have a negative impact on productivity, especially among students. Although there are positive benefits, such as easy access to information and supporting the learning process, it needs to be emphasized that unwise use of mobile phones can have serious consequences for individual well-being. Therefore, it is important to raise awareness of these negative impacts and encourage policies and norms that support the balanced and responsible use of mobile phones in everyday life.

Keywords: Mobile Phone, Technology, Education, Addiction, Students.

A. INTRODUCTION

Mobile phones, or better known as mobile phone, are electronic telecommunications devices that have revolutionized the way humans communicate. With basic capabilities similar to conventional fixed line telephones, mobile phone allow users to make voice calls, send text messages, and even make video calls (Wei, 2008). The main uniqueness of mobile phones lies in their portability, allowing users to take these devices wherever they go without being tied to cables or specific telephone infrastructure. This provides unprecedented freedom and flexibility in the world of communications (Schrock, 2015).

In addition, mobile phone have also integrated various additional features, such as cameras, music players, internet access, and applications that further expand their functionality. Wireless capabilities make it easier to connect to cellular networks, enabling access to information, social media and online services anywhere (Lippincott, 2010). Mobile phones are not only a communication tool, but also a multipurpose device that supports various aspects of daily life. With the continued evolution of technology, mobile phones continue to evolve into digital control centers that help users organize and access various aspects of their lives efficiently (Townsend, 2000).

Along with the prevalence of mobile phone use in today's society, the problem of excessive use and even addiction has become a significant global issue (Park, 2005). Although many studies have explored the relationship between cell phone use and educational outcomes, many of them provide varying findings. In contemporary society, the widespread adoption of mobile phones has raised significant concerns regarding overuse and addiction, which is a significant global issue (Hong et al., 2012).

The positive benefits that arise from using mobile phones include strengthening social interactions and optimizing communication between individuals and systems (Geser, 2004). The use of mobile phones has played an important role in improving health promotion programs and patient care. Smartphones have become important tools in conveying health

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messages, facilitating lifestyle behavioral adjustments, and monitoring patient health data (Fjeldsoe et al., 2009).

Although there are concerns regarding problematic mobile phone use, research has detailed the educational benefits associated with using mobile phones for a variety of purposes, including mobile learning, personalized instruction, independent learning, classroom engagement, and second language learning. The results of these studies consistently highlight the positive impact of mobile phone use in educational contexts (Traxler, 2009, Liu et al., 2014).

One striking finding was the role of mobile phones in narrowing the digital divide, bringing learning opportunities to those who might previously have had limited access. Additionally, mobile phones help facilitate the completion of assignments and homework, provide convenience in obtaining information quickly, and stimulate collaboration among peers through various applications and platforms. Mobile phone use has also been shown to improve vocabulary and language skills.

However, along with these benefits, there is also a trend of dependence on mobile phone among students. Mobile phone have not only become learning aids, but have also become the main means for completing various academic assignments (Motiwalla, 2007). This phenomenon creates an ongoing pattern of dependency, changing the way students engage in their educational process. While the educational benefits of mobile phone use are worthy of appreciation, it is also necessary to note the impact and implications for dependency which may require further attention in the context of sustainable educational development (Gikas & Grant, 2013).

Research conducted by Choi & Lim (2016) highlighted the negative impact of mobile phone addiction on an individual's mental well-being. They stated that individuals who are addicted to mobile phones have a higher risk of experiencing mental development problems, such as emotional instability, attention deficit, depression, and anger. Apart from that, physical impacts are also a serious concern, including disturbances in the sense of sight and hearing, obesity, body imbalances, and lack of brain development. Thus, excessive use of mobile phones can be detrimental to an individual's mental and physical health.

Vaghefi & Lapointe (2014) complement these findings by highlighting the social and productivity impacts of excessive mobile phone use. They found that mobile phone addiction can hinder social relationships with other people, result in decreased productivity, and potentially cause psychological problems. Therefore, mobile phone addiction not only affects individuals personally but can also damage social interactions and productivity performance in work or educational environments.

The research results of Klimova (2019) highlight the impact of mobile phone use on student learning achievement. They stated that excessive use of mobile phones can affect students' learning achievement levels by disrupting concentration during class hours. Mobile phones, if used for too long, can inhibit brain function and result in weakened brain power. Therefore, it is necessary to be aware of the time limits for using mobile phones to maintain the focus and quality of student learning in the educational environment. Thus, this research highlights the importance of balanced management of mobile phone use to prevent its negative impact on mental well-being, social relationships, productivity and learning achievement.

Research by Jiang & Zhao (2016) provides valuable insight into self-control factors in pathological mobile phone use. Their findings showed that individuals with low levels of self-control had a higher tendency to use mobile phones excessively. In this context, low self-control leads to a higher priority of pleasure and personal satisfaction, which in turn drives individuals to use mobile phones pathologically. Additionally, individuals with low self-control tend to exhibit low self-esteem, suboptimal academic performance, and poor interpersonal

relationships, as well as adopting unhealthy lifestyles. This shows that low self-control can have a broad impact on various aspects of an individual's life.

Another finding by Dong et al. (2012) highlighted the relationship between high internet addiction scores and impaired brain cortex function. They note that high levels of addiction can cause impaired brain cortex function which can inhibit cognitive and brain control mechanisms. Thus, high self-control may be a protective factor that has the potential to reduce the risk of internet addiction in individuals. The ability to control impulses and the desire to use technology wisely can provide protection against the negative impacts of excessive use.

B. LITERATURE REVIEW

Development of Mobile Phone Technology

The mobile phones we use today are always developing, one of the developments can be seen in their shape which is getting thinner and thinner. Therefore, in its development, mobile phones have been divided into several generations (Bhalla & Bhalla, 2010). Each generation is an improvement on the previous generation. Therefore, every time a new mobile phone appears, it will definitely have better specifications (Brohl et al., 2017). The mobile phone itself was first discovered by someone named Martin Cooper. Therefore, the first mobile phone invented by Martin Cooper could be said to be the first generation of mobile phone (Katz, 2008). After the first generation of mobile phones appeared, in the following years a new generation emerged.

Until now, mobile technology has developed to generation 4 or what we usually call 4G, scientists have even developed generation 5/5G technology (Yu et al., 2017). With the advent of 4th generation technology, the world has now experienced extraordinary internet speeds and can access things very easily and quickly without waiting long (Paixao & Bernard Marlow, 2003). Just imagine if we went back to 2nd generation or 1st generation technology, maybe people would be very annoyed and angry because data transfer was very slow and took a very long time (Tadayoni et al., 2018). Below, I will explain the development of mobile technology from generation to generation.

Generation 1 was originally introduced by Martin Cooper from Motorola in 1973, this technology uses an analog system or AMPS (Advanced Mobile Phone System). which uses a frequency of 825 Mhz to 894 Mhz (Cooper, 2021). This technology has many shortcomings, including weighing almost 800 grams and only having regional coverage, so this technology is starting to be developed into the 2nd generation. You can just call neighbors near your house while carrying a device that is almost one kilogram. It's better if you just shout from window (Kaur, 2012).

Generation 2 first appeared in the 1990s. Generation 2 is the result of developments from the previous generation, if generation 1 uses analog signals while generation 2 uses digital signals. GSM and CDMA networks have emerged at this time, the United States uses CDMA networks and European countries use GSM (Prasad & Ojanpera, 1998). In Generation 2 technology, you can do voice messages and SMS. An example of a device that can use Generation 2 is the legendary cellphone that we usually see as a joke in memes, namely the Nokia 3310 which is famous for its durability (Vykoukalova, 2007)

Generation 3 has been able to provide a wider reach, in this generation video calls can be used, but not as well as now, in this generation there have also been many smart phones or what we usually call mobile phones, many mobile vendors have appeared. Phones compete with each other to create the best cellphone that can be accepted by the market (Mogal, 2012). The operating systems that are starting to develop in this era are Android, iOS, Symbian and Windows Mobile. As 3G technology progresses, 3.5G technology has also been developed which is faster because it uses HSDPA technology.

In generation 4 all generations are integrated starting from 2G, 3G and 4G. This allows you to choose the generation you want to use and can adjust it to the existing connectivity in a particular area (Ashiho, 2003). This technology has quite high data transmission, namely 100Mb/sec and 1Gb/sec. this technology can allow people to download films in just a few minutes. In this generation, many vendors are developing smartphone variants (Zhao et al., 2013).

5th generation technology, or 5G, has been deployed in several countries, offering incredible speed and security. With speeds 10 to 100 times faster than previous technologies, 5G enables super-fast data transfers of up to 800Gbps/second (Janevski, 2009). This speed supports advanced applications such as the Internet of Things (IoT) and augmented reality. Additionally, 5G is considered more secure with better encryption capabilities, increasing the security of sensitive data transmission. With its innovative potential, 5G is expected to form the basis for the development of more advanced and efficient technology in various sectors.

Concept of Addiction to Mobile Phone

Mobile phone addiction has been studied through various operationalizations, including excessive use, compulsive use, addiction, intensive use, and dependence on mobile phones (Gao et al., 2018). Scientists are engaged in intense debate regarding the conceptualization of mobile phone addiction, often referring to the behavioral addiction framework. Leung, (2007) defines mobile phone addiction as attachment behavior towards mobile phones which is accompanied by a lack of control and has a negative impact on the individual. The concept of addiction can be applied to behavior broadly, including addiction to information communication technology.

Chen et al. (2016) states that the term mobile phone addiction is a behavior that is attached or addicted to mobile phones which can cause social problems such as withdrawal and difficulties. in the performance of daily activities or as an impulse control disorder in a person. In addition, Park et al. (2019) stated that the definition of mobile phone addiction is the behavior of excessive use of mobile phones which can be considered a non-intoxicating impulse control disorder and is similar to pathological gambling. The opinion of Chen et al., (2016) also states that mobile phone addiction is an addiction that has a lighter risk than alcohol addiction or drug addiction.

This conceptualization defines mobile phone addiction as a behavioral addiction involving neglect of other aspects of life due to excessive mobile phone use, guiding the inclusion criteria for the meta-analysis (Billieux et al., 2015). Individuals who experience salience, mood modification, tolerance, withdrawal symptoms, conflict, and craving are considered to have developed a behavioral addiction to mobile phone use (Wang et al., 2016).

According to Walsh, White, and Young (2007), the causes of mobile phone addiction can be grouped into two main aspects. First, self-gratification, where mobile phone use is triggered by the individual's desire to entertain themselves or achieve personal pleasure with the aim of making themselves feel comfortable or relaxed. In this context, mobile phones become a means to obtain personal satisfaction and emotional comfort. Second, social gratification, reflects the need to maintain contact with other people (Chan, 2015). With advances in mobile phone technology, individuals can continue to connect with other people without having to meet face to face, facilitating social interactions without physical boundaries. This factor shows that the development of mobile phones not only meets the personal needs of users, but also facilitates social interactions, which can trigger addiction in an effort to stay constantly connected (Sbarra et al., 2019).

The high media exposure to mobile phones and the availability of facilities and application features on these devices have created a perception of ease and comfort in their use. Especially among teenagers who tend to be hungry for information and sophisticated

technology, mobile phones provide unlimited access to new worlds and various information (Mihailidis, 2014). This convenience triggers teenagers' tendency to constantly use mobile phones, even to the point where they find it difficult to let go and lose control over their use, which can ultimately lead to mobile phone addiction (Thulin, 2018). This phenomenon illustrates how dependence on mobile phones can arise from a combination of convenience, technological sophistication, and teenagers' interest in new things.

C. METHOD

The research approach used in this research is qualitative research. According Cresswell & Poth (2016) what is meant by qualitative research is a type of research that produces discoveries that cannot be achieved using statistical procedures or other methods of quantitative (measurement). Qualitative research can generally be used for research on community life, history, behavior, organizational functionalization, social activities, and so on. One of the reasons for using a qualitative approach is the researchers' experience that this method can be used to discover and understand what is hidden behind phenomena which are sometimes difficult to understand satisfactorily. This research uses descriptive methods in analyzing research results. Descriptive research focuses on solving actual problems as at the time the research was conducted, (Lans & Van der Voordt, 2002). Researchers try to photograph events and events that are the center of their attention, then describe or depict them as they really are so that the use of research findings applies at that time and is not necessarily relevant. In this research, the data used is secondary data in the form of archives or other written documents that support the researcher's research. Data collection was carried out using observation, interviews and document study techniques and was equipped with instruments equipped with guidelines. Then the research results are analyzed, data reduction, data display, verification, data validity testing.

D. RESULTS AND DISCUSSION

Mobile phones can be called mini computers in the form of mobile phones. People can access various communication, educational and social applications by just using a mobile phone without having to open a computer. It cannot be avoided that the use of mobile phones is sometimes really needed by students. It is not uncommon for assignments at school to make them inevitably access the internet on their mobile phones because the information they are looking for is not in their textbooks. However, there are quite a few negative impacts from using mobile phones for students of science. This is what creates the pros and cons between the benefits and disadvantages of using mobile phones in the world of education.

The Positive Impact of Mobile Phones on Education

1. Make Communication Easier

The high media exposure to mobile phones and the abundance of facilities and application features on these devices have a significant impact, especially among teenagers. Teenagers, as a group that tends to be hungry for information and new experiences, feel lured by the comfort and convenience provided by mobile phones. The availability of the internet, social applications, and various multimedia features make mobile phones a tool that not only makes access to information easier but also opens the door to unlimited entertainment and social interaction. As a result, teenagers often find themselves constantly connected to their mobile phones, integrating these devices as an integral part of everyday life.

However, excessive use of mobile phones among teenagers does not always end in positive impacts. This phenomenon often develops into mobile phone addiction, where individuals have difficulty breaking away from using these devices. Mobile phone addiction in teenagers can disrupt life balance, affect productivity, and even create an imbalance in direct social interactions. Therefore, while technological developments provide significant benefits,

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it is also important to understand and manage the psychological and behavioral impacts that may arise from uncontrolled mobile phone use among teenagers.

2. Entertainment Media

Mobile phones are not just a communication tool, but also provide various entertainment features that can be an interesting and effective learning tool. For students and teachers, mobile phones provide the possibility to take a break from the monotonous learning routine. Many entertainment applications not only entertain but also provide added value to the learning process. Educational games, for example, not only provide fun but can also improve students' abilities. Through games, students can practice skills that can be applied in everyday life, such as communicating, collaborating, or solving problems. In addition, there are games specifically designed to hone cognitive abilities, such as memory or calculation skills, providing a fun and interactive learning approach.

However, along with its benefits, using mobile phones in a learning context also requires a good balance. It is important for students and teachers to ensure that time spent on entertainment on mobile phones does not distract from the main focus of learning. Apart from that, choosing entertainment applications that support effective learning needs to be considered. By wisely utilizing mobile phone entertainment features, both students and teachers can create a more dynamic and interactive learning experience, enriching the learning process with elements of fun and creativity.

3. Increase knowledge

The use of mobile phones has a positive impact on learning, especially for students, by making it easier to access information from various subjects. Mobile phones are equipped with a variety of educational applications that can provide additional interactive learning resources. The existence of this application makes learning more dynamic and interesting, helping students understand lesson concepts in a more enjoyable way. Apart from that, with search engines like Google, students can easily find information to support their assignments. This not only makes the research process easier, but also gives them the ability to check the accuracy of the information they have collected.

The use of mobile phones in the learning context makes a positive contribution to increasing students' knowledge and academic achievement. They can learn independently and more efficiently, utilizing technology to access educational resources more quickly and effectively. Thus, the use of mobile phones is not only a communication tool, but also a learning support tool that enriches students' learning experiences.

4. Increase comfort in learning

Many students and teachers find comfort in using mobile phones as learning tools, especially when compared to searching for information sources in the library. Mobile phones allow them to save time that might otherwise be spent searching for physical information. With one click inside their room, they can quickly access a variety of learning resources, study materials, and relevant information.

The use of mobile phones not only contributes to time efficiency, but also allows students and teachers to maximize the use of their time. With the speed of information access made possible by mobile phones, they can focus on studying or even communicating with friends, family, or teachers without having to shift from their location. This creates a more flexible and integrated learning experience, where they can use their time more effectively to improve their understanding of course material and carry out communication activities without obstacles. Thus, the mobile phone is not only a tool of convenience but also opens up opportunities for more efficient time management in the educational context.

5. Availability of more sophisticated technology

Mobile phones have become a very useful tool in the world of education by providing various applications that support the learning process. Through various useful applications,

both students and teachers can easily access the information needed to improve their understanding of the subject matter. This convenience provides an efficient alternative for gathering information without having to rely on traditional sources such as books or printed materials.

Apart from being a source of information, mobile phones also make it possible to hold virtual classes via smartphones. This opens up opportunities for distance learning, allowing interaction between teachers and students without having to be in the same physical location. Additionally, mobile phones not only facilitate formal learning, but also open the door to learning new skills and hobbies. For example, students and teachers can use mobile phones to learn foreign languages, develop drawing, cooking techniques, or even improve public speaking skills. Thus, mobile phones are not only educational tools, but also multifunctional resources that can enrich learning and teaching experiences.

6. Sharpen students' memory skills

The use of mobile phones as a learning tool is not only limited to accessing information, but can also be an effective medium for sharpening students' memories. With the ability to record, take pictures and take notes, students can comprehensively store entire lessons using their mobile phones. This process allows them to review and re-study course material at home.

Mobile phones are a very useful tool in facilitating students' learning process before exams or when doing assignments. By listening again to the recording or reviewing the pictures and notes they have taken, students can strengthen their understanding of the lesson material. This also opens up opportunities to memorize important information or concepts that may be difficult to understand at first. Thus, mobile phones not only act as a note-taking tool, but also as a tool that supports independent learning practices and increases efficiency in students' academic preparation.

7. Improve the ability to manage time

The use of mobile phones has a significant positive impact in increasing users' ability to manage time. The various applications available can help them become more organized in scheduling and managing their time, especially in the context of studying. Applications such as notepads, stopwatches, calendars, alarms, recorders, Google Drive and other office applications are effective tools for recording, storing and sending documents.

The application's various features enable users, especially students, to be more efficient in handling their assignments and study schedules. By using mobile phones, they can organize study time in a structured manner, activate alarms as reminders, and use calendars to plan daily activities. This not only increases discipline in studying, but also helps them set priorities in completing their assignments.

Implementing effective time management through mobile phones can have a wider positive impact, helping students be the best in their academic achievements. In addition, time management skills gained through using mobile phones can also help them improve various aspects of their lives, create positive habits, and have a positive influence on their personal development.

Negative Impact of Mobile Phones on Education

Apart from having a positive impact, mobile phones also have several negative impacts in the world of education. Following are some of the negative impacts of using mobile phones.

1. Not focused when studying

The use of mobile phones by students in the learning context can have a negative impact on their concentration and attention during the teaching and learning process. The temptation to check text messages, play games, or browse social media often becomes a significant distraction. This condition can cause some students to miss some parts of the lesson because they are too focused on activities on their mobile phones.

Not only does it reduce focus, uncontrolled use of mobile phones can also have an impact on social interactions in the classroom and the overall quality of learning. Students who prefer to be involved with mobile phones rather than listening to teacher explanations or participating in class discussions can experience lagging behind in understanding lesson material. Therefore, it is important for educators and parents to provide an understanding of the limits of mobile phone use during class hours and encourage students to prioritize focusing on learning in order to achieve optimal academic results.

2. Lack of social interaction in real life

The emergence of various social media platforms has had a significant impact on students' social lives, especially through their use of mobile phones. This phenomenon can lead to a decrease in social interactions in real life, as they tend to be more focused and involved in various social media platforms. Activities such as renewing their lives, sharing moments, and interacting online are becoming more dominant than social interactions in everyday life.

It is important to recognize that excessive engagement in social media can disrupt interpersonal relationships with friends and family. Even though they are connected virtually, direct interactions in the real world are neglected. Additionally, too much focus on social media activities can also have a negative impact on academic performance. An imbalance between the use of mobile phones for social media purposes and focus on learning can cause a lack of attention to school assignments, learning, and interactions in the classroom environment.

3. Academic achievement will decrease

Improper use of mobile phones can be a factor in reducing academic achievement, especially because of its impact on concentration and information retention during the teaching and learning process. One of the main causes is the distraction caused by mobile phones, which results in students not being able to fully focus or remember the information conveyed by the teacher during learning. The inability to capture information well during the learning process can hinder understanding of subject matter and reduce students' ability to apply the knowledge gained in assignments or exams. Mobile phones used inappropriately, such as checking messages, playing games, or browsing social media during class hours, can be a significant obstacle to learning effectiveness.

The importance of creating a learning environment that is free from mobile phone distractions and providing students with an understanding of the importance of focus during learning is a critical aspect in efforts to improve academic achievement. Therefore, collaboration between educators, parents and students is needed to create healthy mobile phone usage habits and support optimal academic achievement.

4. Makes you less empathetic with the surrounding environment

Mobile phone addiction can affect a person's social behavior, making them tend to be less concerned and less empathetic towards their surroundings. Individuals who are trapped in the habit of constantly using mobile phones often seem indifferent to gatherings with family or friends. Instead, they are more interested in looking down and engrossed in their mobile phones rather than actively interacting with the people around them.

For example, when at a family or friends gathering, some people who are addicted to mobile phones may prefer to continue playing with their devices rather than chatting or exchanging stories with the people around them. This behavior can create a communication gap and reduce the quality of social interactions that should occur in the situation. The importance of realizing the negative impact of mobile phone addiction on social interactions can encourage individuals to value shared moments more and prioritize healthy interpersonal relationships. Therefore, it is important to create a balance in the use of mobile phones so as not to sacrifice the quality of social interactions in everyday life.

5. anxiety and depression levels

Social media, as a sharing platform, allows people to show happy moments in their lives, from holiday photos, culinary experiences, to other positive news. Even though the main purpose of this sharing is to connect and share happiness, the impact can be different for the people who see it. Sometimes, constant exposure to other people's happiness on social media can increase levels of anxiety and depression, especially for those who feel they have not had similar opportunities or experiences.

Observing other people's happy lives online can trigger feelings of inadequacy or feeling left behind by other people's seemingly more perfect lives. This can be a source of significant psychological distress, especially when comparisons are constant. People need to realize that what is seen on social media is only a selection of lives and moments chosen to be shared, not a comprehensive picture of someone's life.

In this context, it is important to raise awareness of the psychological impact of social media exposure and promote the message that each person has their own life journey. Empowering yourself to focus on internal happiness, rather than comparing yourself to standards that appear on social media, can help reduce psychological distress and improve mental well-being.

6. Mobile phone misuse

Easy internet access via mobile phone carries certain risks, especially if it is misused by students to access sites they should not access. One example that often occurs is the use of mobile phones to access pornographic content. In some cases, addiction to pornography can arise as a result of the easy access afforded by mobile phones, and this can lead to harmful inappropriate behavior.

The importance of being aware of the negative impacts of uncontrolled mobile phone use in this case is very crucial. Easy access to pornographic content can result in detrimental behavioral changes, especially at the student level. Awareness of these risks must be increased among students, parents, and educators to take necessary preventive measures, including monitoring mobile phone use and open conversations about the risks and consequences of accessing inappropriate content. Education focused on digital awareness and safe internet use can help protect students from these negative impacts.

7. Reduces brain memory

Excessive use of mobile phones in the learning process can potentially result in a decrease in students' brain power and memory. This phenomenon can occur because of their tendency to rely on mobile phones as their main tool, such as recording conversations or relying on search engines to find answers to questions that arise.

Brain comprehension and memory are critical aspects in the learning process, and excessive use of mobile phones can cause the brain to become less trained to think independently. Relying too much on technology, without making an active effort to cognitively process information, can lead to a decline in the brain's ability to understand and retain information.

Therefore, awareness and a balanced approach are needed in the use of mobile phones during the learning process. The habit of continuing to involve the brain in critical thinking, analysis and reflection, without relying too much on technology, can help maintain and improve students' comprehension and memory. Education regarding the wise and effective use of mobile phones in learning contexts is also important to maximize the benefits of technology without sacrificing fundamental brain abilities.

8. Avoiding Fraud

Ease of access and use of mobile phones opens up opportunities for students to engage in cheating during exams. In this context, mobile phones can be a tool used to cheat by accessing the internet or sharing answers with friends via communication media. This kind of cheating often arises from lazy learning behavior, which can be caused by excessive

dependence on mobile phones. Students who are too engrossed in their devices may tend to neglect exam preparation and focus less on understanding the lesson material. This can lead to efforts to find instant methods, such as cheating, as an alternative to overcome their lack of understanding of the material.

Addressing the issue of cheating during exams requires a holistic approach. Educators, parents, and schools need to work together to provide an understanding of the consequences of cheating, motivate students to study diligently, and monitor the use of mobile phones during exams. In addition, it is important to encourage a positive learning culture and prioritize the values of academic integrity so that students understand the importance of serious effort in achieving academic success.

E. **CONCLUSION**

Mobile phone use has a complex impact on various aspects of life, including social, academic and mental well-being. Positively, mobile phones provide easy access to information, support the teaching and learning process, and increase efficiency in various daily activities. However, unwise use can cause various problems, including addiction, decreased quality of social relationships, and negative impacts on academic performance. In the context of mobile phone addiction, many studies have shown a link between excessive use and mental well-being problems, such as emotional instability, attention deficit, and depression. In addition, uncontrolled use of mobile phones can disrupt social relationships with other people and have a negative impact on productivity. Apart from that, excessive use of mobile phones can also affect academic performance, especially in terms of concentration and brain comprehension. Regarding security and ethics, mobile phones carry risks such as easy access to inappropriate content, especially for students who are vulnerable to negative influences. Apart from that, the sophistication of technology in mobile phones also opens up opportunities for cheating during exams. Thus, it is important to develop awareness and a balanced approach to mobile phone use. Education regarding digital ethics, awareness of the impact on mental well-being, as well as the promotion of policies and norms that support wise use need to be a focus in facing the challenges that arise due to the development of mobile phone technology.

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The Development of Mobile Phone Technology and Its Impact on Education

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Abstract

This research aims to investigate the impact of developments in mobile phone technology on education and learning in the digital era. This research uses a qualitative approach with descriptive methods. From this research it can be concluded that the use of mobile phones has a significant impact on various aspects of life, be it mental well-being, social relationships, or academic achievement. Research shows that individuals who are addicted to mobile phones tend to experience mental problems such as emotional instability, attention deficit, and depression. Additionally, excessive use can also hinder social interaction and have a negative impact on productivity, especially among students. Although there are positive benefits, such as easy access to information and supporting the learning process, it needs to be emphasized that unwise use of mobile phones can have serious consequences for individual well-being. Therefore, it is important to raise awareness of these negative impacts and encourage policies and norms that support the balanced and responsible use of mobile phones in everyday life.

Keywords: Mobile Phone, Technology, Education, Addiction, Students.

A. INTRODUCTION

Mobile phones, or better known as mobile phone, are electronic telecommunications devices that have revolutionized the way humans communicate. With basic capabilities similar to conventional fixed line telephones, mobile phone allow users to make voice calls, send text messages, and even make video calls (Wei, 2008). The main uniqueness of mobile phones lies in their portability, allowing users to take these devices wherever they go without being tied to cables or specific telephone infrastructure. This provides unprecedented freedom and flexibility in the world of communications (Schrock, 2015).

In addition, mobile phone have also integrated various additional features, such as cameras, music players, internet access, and applications that further expand their functionality. Wireless capabilities make it easier to connect to cellular networks, enabling access to information, social media and online services anywhere (Lippincott, 2010). Mobile phones are not only a communication tool, but also a multipurpose device that supports various aspects of daily life. With the continued evolution of technology, mobile phones continue to evolve into digital control centers that help users organize and access various aspects of their lives efficiently (Townsend, 2000).

Along with the prevalence of mobile phone use in today's society, the problem of excessive use and even addiction has become a significant global issue (Park, 2005). Although many studies have explored the relationship between cell phone use and educational outcomes, many of them provide varying findings. In contemporary society, the widespread adoption of mobile phones has raised significant concerns regarding overuse and addiction, which is a significant global issue (Hong et al., 2012).

The positive benefits that arise from using mobile phones include strengthening social interactions and optimizing communication between individuals and systems (Geser, 2004). The use of mobile phones has played an important role in improving health promotion programs and patient care. Smartphones have become important tools in conveying health

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messages, facilitating lifestyle behavioral adjustments, and monitoring patient health data (Fjeldsoe et al., 2009).

Although there are concerns regarding problematic mobile phone use, research has detailed the educational benefits associated with using mobile phones for a variety of purposes, including mobile learning, personalized instruction, independent learning, classroom engagement, and second language learning. The results of these studies consistently highlight the positive impact of mobile phone use in educational contexts (Traxler, 2009, Liu et al., 2014).

One striking finding was the role of mobile phones in narrowing the digital divide, bringing learning opportunities to those who might previously have had limited access. Additionally, mobile phones help facilitate the completion of assignments and homework, provide convenience in obtaining information quickly, and stimulate collaboration among peers through various applications and platforms. Mobile phone use has also been shown to improve vocabulary and language skills.

However, along with these benefits, there is also a trend of dependence on mobile phone among students. Mobile phone have not only become learning aids, but have also become the main means for completing various academic assignments (Motiwalla, 2007). This phenomenon creates an ongoing pattern of dependency, changing the way students engage in their educational process. While the educational benefits of mobile phone use are worthy of appreciation, it is also necessary to note the impact and implications for dependency which may require further attention in the context of sustainable educational development (Gikas & Grant, 2013).

Research conducted by Choi & Lim (2016) highlighted the negative impact of mobile phone addiction on an individual's mental well-being. They stated that individuals who are addicted to mobile phones have a higher risk of experiencing mental development problems, such as emotional instability, attention deficit, depression, and anger. Apart from that, physical impacts are also a serious concern, including disturbances in the sense of sight and hearing, obesity, body imbalances, and lack of brain development. Thus, excessive use of mobile phones can be detrimental to an individual's mental and physical health.

Vaghefi & Lapointe (2014) complement these findings by highlighting the social and productivity impacts of excessive mobile phone use. They found that mobile phone addiction can hinder social relationships with other people, result in decreased productivity, and potentially cause psychological problems. Therefore, mobile phone addiction not only affects individuals personally but can also damage social interactions and productivity performance in work or educational environments.

The research results of Klimova (2019) highlight the impact of mobile phone use on student learning achievement. They stated that excessive use of mobile phones can affect students' learning achievement levels by disrupting concentration during class hours. Mobile phones, if used for too long, can inhibit brain function and result in weakened brain power. Therefore, it is necessary to be aware of the time limits for using mobile phones to maintain the focus and quality of student learning in the educational environment. Thus, this research highlights the importance of balanced management of mobile phone use to prevent its negative impact on mental well-being, social relationships, productivity and learning achievement.

Research by Jiang & Zhao (2016) provides valuable insight into self-control factors in pathological mobile phone use. Their findings showed that individuals with low levels of self-control had a higher tendency to use mobile phones excessively. In this context, low self-control leads to a higher priority of pleasure and personal satisfaction, which in turn drives individuals to use mobile phones pathologically. Additionally, individuals with low self-control tend to exhibit low self-esteem, suboptimal academic performance, and poor interpersonal

relationships, as well as adopting unhealthy lifestyles. This shows that low self-control can have a broad impact on various aspects of an individual's life.

Another finding by Dong et al. (2012) highlighted the relationship between high internet addiction scores and impaired brain cortex function. They note that high levels of addiction can cause impaired brain cortex function which can inhibit cognitive and brain control mechanisms. Thus, high self-control may be a protective factor that has the potential to reduce the risk of internet addiction in individuals. The ability to control impulses and the desire to use technology wisely can provide protection against the negative impacts of excessive use.

B. LITERATURE REVIEW

Development of Mobile Phone Technology

The mobile phones we use today are always developing, one of the developments can be seen in their shape which is getting thinner and thinner. Therefore, in its development, mobile phones have been divided into several generations (Bhalla & Bhalla, 2010). Each generation is an improvement on the previous generation. Therefore, every time a new mobile phone appears, it will definitely have better specifications (Brohl et al., 2017). The mobile phone itself was first discovered by someone named Martin Cooper. Therefore, the first mobile phone invented by Martin Cooper could be said to be the first generation of mobile phone (Katz, 2008). After the first generation of mobile phones appeared, in the following years a new generation emerged.

Until now, mobile technology has developed to generation 4 or what we usually call 4G, scientists have even developed generation 5/5G technology (Yu et al., 2017). With the advent of 4th generation technology, the world has now experienced extraordinary internet speeds and can access things very easily and quickly without waiting long (Paixao & Bernard Marlow, 2003). Just imagine if we went back to 2nd generation or 1st generation technology, maybe people would be very annoyed and angry because data transfer was very slow and took a very long time (Tadayoni et al., 2018). Below, I will explain the development of mobile technology from generation to generation.

Generation 1 was originally introduced by Martin Cooper from Motorola in 1973, this technology uses an analog system or AMPS (Advanced Mobile Phone System). which uses a frequency of 825 Mhz to 894 Mhz (Cooper, 2021). This technology has many shortcomings, including weighing almost 800 grams and only having regional coverage, so this technology is starting to be developed into the 2nd generation. You can just call neighbors near your house while carrying a device that is almost one kilogram. It's better if you just shout from window (Kaur, 2012).

Generation 2 first appeared in the 1990s. Generation 2 is the result of developments from the previous generation, if generation 1 uses analog signals while generation 2 uses digital signals. GSM and CDMA networks have emerged at this time, the United States uses CDMA networks and European countries use GSM (Prasad & Ojanpera, 1998). In Generation 2 technology, you can do voice messages and SMS. An example of a device that can use Generation 2 is the legendary cellphone that we usually see as a joke in memes, namely the Nokia 3310 which is famous for its durability (Vykoukalova, 2007)

Generation 3 has been able to provide a wider reach, in this generation video calls can be used, but not as well as now, in this generation there have also been many smart phones or what we usually call mobile phones, many mobile vendors have appeared. Phones compete with each other to create the best cellphone that can be accepted by the market (Mogal, 2012). The operating systems that are starting to develop in this era are Android, iOS, Symbian and Windows Mobile. As 3G technology progresses, 3.5G technology has also been developed which is faster because it uses HSDPA technology.

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In generation 4 all generations are integrated starting from 2G, 3G and 4G. This allows you to choose the generation you want to use and can adjust it to the existing connectivity in a particular area (Ashiho, 2003). This technology has quite high data transmission, namely 100Mb/sec and 1Gb/sec. this technology can allow people to download films in just a few minutes. In this generation, many vendors are developing smartphone variants (Zhao et al., 2013).

5th generation technology, or 5G, has been deployed in several countries, offering incredible speed and security. With speeds 10 to 100 times faster than previous technologies, 5G enables super-fast data transfers of up to 800Gbps/second (Janevski, 2009). This speed supports advanced applications such as the Internet of Things (IoT) and augmented reality. Additionally, 5G is considered more secure with better encryption capabilities, increasing the security of sensitive data transmission. With its innovative potential, 5G is expected to form the basis for the development of more advanced and efficient technology in various sectors.

Concept of Addiction to Mobile Phone

Mobile phone addiction has been studied through various operationalizations, including excessive use, compulsive use, addiction, intensive use, and dependence on mobile phones (Gao et al., 2018). Scientists are engaged in intense debate regarding the conceptualization of mobile phone addiction, often referring to the behavioral addiction framework. Leung, (2007) defines mobile phone addiction as attachment behavior towards mobile phones which is accompanied by a lack of control and has a negative impact on the individual. The concept of addiction can be applied to behavior broadly, including addiction to information communication technology.

Chen et al. (2016) states that the term mobile phone addiction is a behavior that is attached or addicted to mobile phones which can cause social problems such as withdrawal and difficulties. in the performance of daily activities or as an impulse control disorder in a person. In addition, Park et al. (2019) stated that the definition of mobile phone addiction is the behavior of excessive use of mobile phones which can be considered a non-intoxicating impulse control disorder and is similar to pathological gambling. The opinion of Chen et al., (2016) also states that mobile phone addiction is an addiction that has a lighter risk than alcohol addiction or drug addiction.

This conceptualization defines mobile phone addiction as a behavioral addiction involving neglect of other aspects of life due to excessive mobile phone use, guiding the inclusion criteria for the meta-analysis (Billieux et al., 2015). Individuals who experience salience, mood modification, tolerance, withdrawal symptoms, conflict, and craving are considered to have developed a behavioral addiction to mobile phone use (Wang et al., 2016).

According to Walsh, White, and Young (2007), the causes of mobile phone addiction can be grouped into two main aspects. First, self-gratification, where mobile phone use is triggered by the individual's desire to entertain themselves or achieve personal pleasure with the aim of making themselves feel comfortable or relaxed. In this context, mobile phones become a means to obtain personal satisfaction and emotional comfort. Second, social gratification, reflects the need to maintain contact with other people (Chan, 2015). With advances in mobile phone technology, individuals can continue to connect with other people without having to meet face to face, facilitating social interactions without physical boundaries. This factor shows that the development of mobile phones not only meets the personal needs of users, but also facilitates social interactions, which can trigger addiction in an effort to stay constantly connected (Sbarra et al., 2019).

The high media exposure to mobile phones and the availability of facilities and application features on these devices have created a perception of ease and comfort in their use. Especially among teenagers who tend to be hungry for information and sophisticated

technology, mobile phones provide unlimited access to new worlds and various information (Mihailidis, 2014). This convenience triggers teenagers' tendency to constantly use mobile phones, even to the point where they find it difficult to let go and lose control over their use, which can ultimately lead to mobile phone addiction (Thulin, 2018). This phenomenon illustrates how dependence on mobile phones can arise from a combination of convenience, technological sophistication, and teenagers' interest in new things.

C. METHOD

The research approach used in this research is qualitative research. According Cresswell & Poth (2016) what is meant by qualitative research is a type of research that produces discoveries that cannot be achieved using statistical procedures or other methods of quantitative (measurement). Qualitative research can generally be used for research on community life, history, behavior, organizational functionalization, social activities, and so on. One of the reasons for using a qualitative approach is the researchers' experience that this method can be used to discover and understand what is hidden behind phenomena which are sometimes difficult to understand satisfactorily. This research uses descriptive methods in analyzing research results. Descriptive research focuses on solving actual problems as at the time the research was conducted, (Lans & Van der Voordt, 2002). Researchers try to photograph events and events that are the center of their attention, then describe or depict them as they really are so that the use of research findings applies at that time and is not necessarily relevant. In this research, the data used is secondary data in the form of archives or other written documents that support the researcher's research. Data collection was carried out using observation, interviews and document study techniques and was equipped with instruments equipped with guidelines. Then the research results are analyzed, data reduction, data display, verification, data validity testing.

D. RESULTS AND DISCUSSION

Mobile phones can be called mini computers in the form of mobile phones. People can access various communication, educational and social applications by just using a mobile phone without having to open a computer. It cannot be avoided that the use of mobile phones is sometimes really needed by students. It is not uncommon for assignments at school to make them inevitably access the internet on their mobile phones because the information they are looking for is not in their textbooks. However, there are quite a few negative impacts from using mobile phones for students of science. This is what creates the pros and cons between the benefits and disadvantages of using mobile phones in the world of education.

The Positive Impact of Mobile Phones on Education

1. Make Communication Easier

The high media exposure to mobile phones and the abundance of facilities and application features on these devices have a significant impact, especially among teenagers. Teenagers, as a group that tends to be hungry for information and new experiences, feel lured by the comfort and convenience provided by mobile phones. The availability of the internet, social applications, and various multimedia features make mobile phones a tool that not only makes access to information easier but also opens the door to unlimited entertainment and social interaction. As a result, teenagers often find themselves constantly connected to their mobile phones, integrating these devices as an integral part of everyday life.

However, excessive use of mobile phones among teenagers does not always end in positive impacts. This phenomenon often develops into mobile phone addiction, where individuals have difficulty breaking away from using these devices. Mobile phone addiction in teenagers can disrupt life balance, affect productivity, and even create an imbalance in direct social interactions. Therefore, while technological developments provide significant benefits,

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it is also important to understand and manage the psychological and behavioral impacts that may arise from uncontrolled mobile phone use among teenagers.

2. Entertainment Media

Mobile phones are not just a communication tool, but also provide various entertainment features that can be an interesting and effective learning tool. For students and teachers, mobile phones provide the possibility to take a break from the monotonous learning routine. Many entertainment applications not only entertain but also provide added value to the learning process. Educational games, for example, not only provide fun but can also improve students' abilities. Through games, students can practice skills that can be applied in everyday life, such as communicating, collaborating, or solving problems. In addition, there are games specifically designed to hone cognitive abilities, such as memory or calculation skills, providing a fun and interactive learning approach.

However, along with its benefits, using mobile phones in a learning context also requires a good balance. It is important for students and teachers to ensure that time spent on entertainment on mobile phones does not distract from the main focus of learning. Apart from that, choosing entertainment applications that support effective learning needs to be considered. By wisely utilizing mobile phone entertainment features, both students and teachers can create a more dynamic and interactive learning experience, enriching the learning process with elements of fun and creativity.

3. Increase knowledge

The use of mobile phones has a positive impact on learning, especially for students, by making it easier to access information from various subjects. Mobile phones are equipped with a variety of educational applications that can provide additional interactive learning resources. The existence of this application makes learning more dynamic and interesting, helping students understand lesson concepts in a more enjoyable way. Apart from that, with search engines like Google, students can easily find information to support their assignments. This not only makes the research process easier, but also gives them the ability to check the accuracy of the information they have collected.

The use of mobile phones in the learning context makes a positive contribution to increasing students' knowledge and academic achievement. They can learn independently and more efficiently, utilizing technology to access educational resources more quickly and effectively. Thus, the use of mobile phones is not only a communication tool, but also a learning support tool that enriches students' learning experiences.

4. Increase comfort in learning

Many students and teachers find comfort in using mobile phones as learning tools, especially when compared to searching for information sources in the library. Mobile phones allow them to save time that might otherwise be spent searching for physical information. With one click inside their room, they can quickly access a variety of learning resources, study materials, and relevant information.

The use of mobile phones not only contributes to time efficiency, but also allows students and teachers to maximize the use of their time. With the speed of information access made possible by mobile phones, they can focus on studying or even communicating with friends, family, or teachers without having to shift from their location. This creates a more flexible and integrated learning experience, where they can use their time more effectively to improve their understanding of course material and carry out communication activities without obstacles. Thus, the mobile phone is not only a tool of convenience but also opens up opportunities for more efficient time management in the educational context.

5. Availability of more sophisticated technology

Mobile phones have become a very useful tool in the world of education by providing various applications that support the learning process. Through various useful applications,

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both students and teachers can easily access the information needed to improve their understanding of the subject matter. This convenience provides an efficient alternative for gathering information without having to rely on traditional sources such as books or printed materials.

Apart from being a source of information, mobile phones also make it possible to hold virtual classes via smartphones. This opens up opportunities for distance learning, allowing interaction between teachers and students without having to be in the same physical location. Additionally, mobile phones not only facilitate formal learning, but also open the door to learning new skills and hobbies. For example, students and teachers can use mobile phones to learn foreign languages, develop drawing, cooking techniques, or even improve public speaking skills. Thus, mobile phones are not only educational tools, but also multifunctional resources that can enrich learning and teaching experiences.

6. Sharpen students' memory skills

The use of mobile phones as a learning tool is not only limited to accessing information, but can also be an effective medium for sharpening students' memories. With the ability to record, take pictures and take notes, students can comprehensively store entire lessons using their mobile phones. This process allows them to review and re-study course material at home.

Mobile phones are a very useful tool in facilitating students' learning process before exams or when doing assignments. By listening again to the recording or reviewing the pictures and notes they have taken, students can strengthen their understanding of the lesson material. This also opens up opportunities to memorize important information or concepts that may be difficult to understand at first. Thus, mobile phones not only act as a note-taking tool, but also as a tool that supports independent learning practices and increases efficiency in students' academic preparation.

7. Improve the ability to manage time

The use of mobile phones has a significant positive impact in increasing users' ability to manage time. The various applications available can help them become more organized in scheduling and managing their time, especially in the context of studying. Applications such as notepads, stopwatches, calendars, alarms, recorders, Google Drive and other office applications are effective tools for recording, storing and sending documents.

The application's various features enable users, especially students, to be more efficient in handling their assignments and study schedules. By using mobile phones, they can organize study time in a structured manner, activate alarms as reminders, and use calendars to plan daily activities. This not only increases discipline in studying, but also helps them set priorities in completing their assignments.

Implementing effective time management through mobile phones can have a wider positive impact, helping students be the best in their academic achievements. In addition, time management skills gained through using mobile phones can also help them improve various aspects of their lives, create positive habits, and have a positive influence on their personal development.

Negative Impact of Mobile Phones on Education

Apart from having a positive impact, mobile phones also have several negative impacts in the world of education. Following are some of the negative impacts of using mobile phones.

1. Not focused when studying

The use of mobile phones by students in the learning context can have a negative impact on their concentration and attention during the teaching and learning process. The temptation to check text messages, play games, or browse social media often becomes a significant distraction. This condition can cause some students to miss some parts of the lesson because they are too focused on activities on their mobile phones.

Not only does it reduce focus, uncontrolled use of mobile phones can also have an impact on social interactions in the classroom and the overall quality of learning. Students who prefer to be involved with mobile phones rather than listening to teacher explanations or participating in class discussions can experience lagging behind in understanding lesson material. Therefore, it is important for educators and parents to provide an understanding of the limits of mobile phone use during class hours and encourage students to prioritize focusing on learning in order to achieve optimal academic results.

2. Lack of social interaction in real life

The emergence of various social media platforms has had a significant impact on students' social lives, especially through their use of mobile phones. This phenomenon can lead to a decrease in social interactions in real life, as they tend to be more focused and involved in various social media platforms. Activities such as renewing their lives, sharing moments, and interacting online are becoming more dominant than social interactions in everyday life.

It is important to recognize that excessive engagement in social media can disrupt interpersonal relationships with friends and family. Even though they are connected virtually, direct interactions in the real world are neglected. Additionally, too much focus on social media activities can also have a negative impact on academic performance. An imbalance between the use of mobile phones for social media purposes and focus on learning can cause a lack of attention to school assignments, learning, and interactions in the classroom environment.

3. Academic achievement will decrease

Improper use of mobile phones can be a factor in reducing academic achievement, especially because of its impact on concentration and information retention during the teaching and learning process. One of the main causes is the distraction caused by mobile phones, which results in students not being able to fully focus or remember the information conveyed by the teacher during learning. The inability to capture information well during the learning process can hinder understanding of subject matter and reduce students' ability to apply the knowledge gained in assignments or exams. Mobile phones used inappropriately, such as checking messages, playing games, or browsing social media during class hours, can be a significant obstacle to learning effectiveness.

The importance of creating a learning environment that is free from mobile phone distractions and providing students with an understanding of the importance of focus during learning is a critical aspect in efforts to improve academic achievement. Therefore, collaboration between educators, parents and students is needed to create healthy mobile phone usage habits and support optimal academic achievement.

4. Makes you less empathetic with the surrounding environment

Mobile phone addiction can affect a person's social behavior, making them tend to be less concerned and less empathetic towards their surroundings. Individuals who are trapped in the habit of constantly using mobile phones often seem indifferent to gatherings with family or friends. Instead, they are more interested in looking down and engrossed in their mobile phones rather than actively interacting with the people around them.

For example, when at a family or friends gathering, some people who are addicted to mobile phones may prefer to continue playing with their devices rather than chatting or exchanging stories with the people around them. This behavior can create a communication gap and reduce the quality of social interactions that should occur in the situation. The importance of realizing the negative impact of mobile phone addiction on social interactions can encourage individuals to value shared moments more and prioritize healthy interpersonal relationships. Therefore, it is important to create a balance in the use of mobile phones so as not to sacrifice the quality of social interactions in everyday life.

5. anxiety and depression levels

Social media, as a sharing platform, allows people to show happy moments in their lives, from holiday photos, culinary experiences, to other positive news. Even though the main purpose of this sharing is to connect and share happiness, the impact can be different for the people who see it. Sometimes, constant exposure to other people's happiness on social media can increase levels of anxiety and depression, especially for those who feel they have not had similar opportunities or experiences.

Observing other people's happy lives online can trigger feelings of inadequacy or feeling left behind by other people's seemingly more perfect lives. This can be a source of significant psychological distress, especially when comparisons are constant. People need to realize that what is seen on social media is only a selection of lives and moments chosen to be shared, not a comprehensive picture of someone's life.

In this context, it is important to raise awareness of the psychological impact of social media exposure and promote the message that each person has their own life journey. Empowering yourself to focus on internal happiness, rather than comparing yourself to standards that appear on social media, can help reduce psychological distress and improve mental well-being.

6. Mobile phone misuse

Easy internet access via mobile phone carries certain risks, especially if it is misused by students to access sites they should not access. One example that often occurs is the use of mobile phones to access pornographic content. In some cases, addiction to pornography can arise as a result of the easy access afforded by mobile phones, and this can lead to harmful inappropriate behavior.

The importance of being aware of the negative impacts of uncontrolled mobile phone use in this case is very crucial. Easy access to pornographic content can result in detrimental behavioral changes, especially at the student level. Awareness of these risks must be increased among students, parents, and educators to take necessary preventive measures, including monitoring mobile phone use and open conversations about the risks and consequences of accessing inappropriate content. Education focused on digital awareness and safe internet use can help protect students from these negative impacts.

7. Reduces brain memory

Excessive use of mobile phones in the learning process can potentially result in a decrease in students' brain power and memory. This phenomenon can occur because of their tendency to rely on mobile phones as their main tool, such as recording conversations or relying on search engines to find answers to questions that arise.

Brain comprehension and memory are critical aspects in the learning process, and excessive use of mobile phones can cause the brain to become less trained to think independently. Relying too much on technology, without making an active effort to cognitively process information, can lead to a decline in the brain's ability to understand and retain information.

Therefore, awareness and a balanced approach are needed in the use of mobile phones during the learning process. The habit of continuing to involve the brain in critical thinking, analysis and reflection, without relying too much on technology, can help maintain and improve students' comprehension and memory. Education regarding the wise and effective use of mobile phones in learning contexts is also important to maximize the benefits of technology without sacrificing fundamental brain abilities.

8. Avoiding Fraud

Ease of access and use of mobile phones opens up opportunities for students to engage in cheating during exams. In this context, mobile phones can be a tool used to cheat by accessing the internet or sharing answers with friends via communication media. This kind of cheating often arises from lazy learning behavior, which can be caused by excessive

dependence on mobile phones. Students who are too engrossed in their devices may tend to neglect exam preparation and focus less on understanding the lesson material. This can lead to efforts to find instant methods, such as cheating, as an alternative to overcome their lack of understanding of the material.

Addressing the issue of cheating during exams requires a holistic approach. Educators, parents, and schools need to work together to provide an understanding of the consequences of cheating, motivate students to study diligently, and monitor the use of mobile phones during exams. In addition, it is important to encourage a positive learning culture and prioritize the values of academic integrity so that students understand the importance of serious effort in achieving academic success.

E. CONCLUSION

Mobile phone use has a complex impact on various aspects of life, including social, academic and mental well-being. Positively, mobile phones provide easy access to information, support the teaching and learning process, and increase efficiency in various daily activities. However, unwise use can cause various problems, including addiction, decreased quality of social relationships, and negative impacts on academic performance. In the context of mobile phone addiction, many studies have shown a link between excessive use and mental well-being problems, such as emotional instability, attention deficit, and depression. In addition, uncontrolled use of mobile phones can disrupt social relationships with other people and have a negative impact on productivity. Apart from that, excessive use of mobile phones can also affect academic performance, especially in terms of concentration and brain comprehension. Regarding security and ethics, mobile phones carry risks such as easy access to inappropriate content, especially for students who are vulnerable to negative influences. Apart from that, the sophistication of technology in mobile phones also opens up opportunities for cheating during exams. Thus, it is important to develop awareness and a balanced approach to mobile phone use. Education regarding digital ethics, awareness of the impact on mental well-being, as well as the promotion of policies and norms that support wise use need to be a focus in facing the challenges that arise due to the development of mobile phone technology.

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