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THE IMPACT OF SMARTPHONE ADDICTION ON LEARNING OUTCOMES BETWEEN MALE AND FEMALE UNIVERSITY STUDENTS

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Abstract

This study analyzed the impact of smartphone addiction on learning outcomes between males and females on learning outcomes. Several studies have analyzed the effects of smartphone addiction on student learning effectiveness. However, there are a lot of gaps in these studies, such as the selected sample, in which all the respondents are assumed to belong to a gender group. In this work, we categorize each respondent, based on gender, into male and female. 500 students from public and private universities in Indonesia participated in this study. The independent-sample t-test, linear correlation, and regression analysis determined the result. It was found that smartphone addiction had a significant negative correlation with learning outcomes in male students and no significant correlation in female students. Male students' smartphone addiction had a higher effect on learning outcomes than females, with a percentage of 33.7%. This study contributes to improving the gender perspective on learning issues.

Keywords: Gender; Learning Outcomes; Smartphone Addiction; University Students.



A. Introduction

Learning outcomes indicate successful learning (Anis et al., 2020). Academic achievement, an indicator, must go through an optimal learning process rather than pseudo-achievement. To obtain these achievements, students must learn optimally and use opportunities. In addition, the development of the world today makes learning outcomes a vital requirement or capital in applying for a job (Mawaddah et al., 2022). Every student must have good study results to get a decent job later.

The academic achievement of students in Indonesia still needs to improve (Jufrida et al., 2019). The ability of Indonesian students based on the Program for International Student Assessment (PISA) scores from 2000 to 2018, Indonesia still ranks as the country with the ninth-lowest science quality out of 78 countries. The score obtained is below the average PISA mastery score.

Several factors can cause these students to have low abilities. Many factors can affect student learning outcomes. One of these factors is media use (Radhakrishnan et al., 2021). One type of media is a smartphone, a portable communication device that functions like a computer and has an operating system that supports the needs of its users (Chen et al., 2020). Has a variety of applications that offer fast access to the Internet and Social Media through applications such as Facebook, WhatsApp, Twitter and other features (Ansori & Juliansyahzen, 2022).

A smartphone is a communication tool that combines Internet and cell phone services. Smartphones offer qualitatively different services in addition to the Internet's benefits. Smartphones have become an integral part of society's lifestyle and culture. Nowadays, it is increasingly more work for someone to get away from their smartphone. Young people watch videos, express themselves, communicate with friends, and search for information using smartphones. In contrast, parents use smartphones to video call and play games with their children who live far away. The portability and accessibility of a smartphone allow it to be used anywhere, for any duration.

Smartphones also have a significant impact on the world of education. Smartphones can access e-learning and interactive learning

resources or media through Internet services. This aligns with the demands of the Industrial Revolution 4.0, where the world of education must follow technological developments that are developing rapidly and utilize information and communication technology as more sophisticated facilities to facilitate the learning process (Destiana, 2019). Smartphone technology, which continues to proliferate, can also support learning and improve academic performance. Smartphones allow students to get information, download documents, and interact with students and teachers online (Bull & McCormick, 2012; Tao & Yeh, 2013).

However, most students still view smartphones as mere recreational and entertainment devices, for example, for friendship, social networking, surfing the Internet, watching videos, and playing games. Research shows that students often use smartphones when attending lectures, even though rules prohibit them (Tindell & Bohlander, 2012). If students focus more on using smartphones for their leisure needs than on education, then in an academic context, smartphones are considered a “disruptor” in the learning process. Thus, the relationship between smartphone use and academic performance can be positive or negative, depending on how students use their smartphones.

The adverse effects of smartphone use include the emergence of cyberbullying or online bullying (Suryana et al., 2019). Smartphones can adversely affect interpersonal relationships, physical-psychological health and general functioning (Choi et al., 2015). Another adverse effect is smartphone addiction, which is considered rooted in internet addiction. This is due to the similarity of symptoms and adverse effects for users. Internet addiction is defined as the inability to control the timing of smartphone use with mood swings (Cash et al., 2012). Ginige (2017) defines smartphone and internet addiction as uncontrolled internet use over a long period. Smartphone addiction is a form of technology addiction, which is a type of behavioral addiction that involves human-machine interaction and is non-chemical.

There have been many studies related to smartphone addiction. Several studies have found a correlation between smartphone addiction and



self-disclosure, anxiety, depression and academic performance (Arslan & Kiper, 2018; Gligor & Mozoş, 2019; Turgeman et al., 2020). Research has also investigated the effects of smartphone addiction on student behavior, health, psychology and social life (Buctot, Kim, & Kim; 2020; Shahrestanaki et al., 2020; Wacks & Weinstein, 2021). Previous research has shown that the driving factors for the dependence of university students on smartphones include internal factors (primary needs, interaction needs, and increased self-confidence) and external factors (lifestyle, affordable smartphone prices, the surrounding environment, and smartphone sophistication). There has been a shift in the interaction of university students with their peers. This can be seen from the shift in the tradition of speaking, which is related to direct face-to-face interactions, shifting to indirect interactions (through intermediaries) (Saputri & Lestari, 2017; Novriana et al., 2021). However, this study has many limitations, such as the fall of the selected sample in which all respondents are assumed to have a coherent gender/ type. In this work, we categorize each respondent, based on their gender, into male and female.

Males and females use smartphones differently (Paska & Yan, 2011). This is influenced by psychological differences between males and females (Hyde et al., 2019). Males and females use the Internet in different ways; for example, males are more often addicted to online games, porn sites, and online gambling, while females are more often addicted to chatting and online shopping (Mulyati & Frieda, 2019; Ideham, 2022). Therefore, this study aimed to see how much influence smartphone addiction had on student learning outcomes based on gender. This study hypothesizes that smartphone addiction's influence on learning outcomes in males is higher than in females.

B. Method

This study uses a quantitative approach, which is the most appropriate approach to the objectives of this study. The research population is students who use smartphones at public and private universities in Indonesia. At the

same time, the sample was selected by convenience sampling as many as 500 people, including males and females.

The data collection technique used is an online survey, which is composed of two separate sections. Section 1 covers demographic information (initial name, university, primary, gender, and Grade Point Average (GPA). Section 2 covers a smartphone addiction questionnaire that Kwon et al. (2013) developed with a Cronbach's alpha value of 0.967. The questionnaire was composed of 33 questions with a six-point Likert-type scale, ranging from "strongly disagree", coded 1, to "strongly agree", coded 6.

Data analysis was carried out through the application of IBM SPSS Statistics 23.0. The tests used are independent-samples t-test, linear correlation and regression test. An independent-sample t-test was used to examine differences in smartphone addiction levels and learning outcomes of male and female students. A p-value below 0.05 indicates statistical significance, leading to the rejection of the null hypothesis. Conversely, a P-value above 0.05 does not indicate statistical significance, so the null hypothesis should be retained. A linear correlation test determined the relationship between the two variables. Using a Pearson product-moment correlation coefficient, we examined the relationship between smartphone addiction and learning outcomes. Before this analysis, we conducted preliminary assessments to confirm that the assumptions of normality, linearity, and homoscedasticity were not violated. Meanwhile, the linear regression test determines how much influence the independent variable has on the dependent variable. In this test, the coefficient of determination (R-squared) is used to assess how well the independent variable influences or explains the variation in the dependent variable.

The independent variable in this study is smartphone addiction, and the dependent variable is learning outcomes. Smartphone addiction is a behavioral addiction characterized by a strong and uncontrollable urge to use a smartphone, even when it is not necessary or when its use may have negative consequences. There are six factors of smartphone addiction based



on analysis by Kwon et al. (2013), namely daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationships, overuse and tolerance. The six factors have been applied in the questionnaire, which is the instrument of this research.

C. Result and Discussion

1. Result

The demographic information of the respondents is shown in Table 1.

Table 1. Demographic information

Variable	Frequency	Percentage
Male	200	40%
Female	300	60%

The level of smartphone addiction by gender is shown in Figure 1. It can be seen in Figure 1 that the male is experiencing smartphone addiction at a higher rate than the female. An independent-sample t-test was conducted to compare the level of smartphone addiction in males and females. There was a significant difference in the level of smartphone addiction for males ($M = 4.1350$, $SD = 1.19167$) and females ($M = 3.6687$, $SD = 0.99270$); $p = 0.036$.

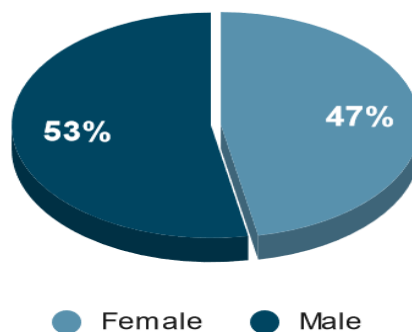


Figure 1. Smartphone addiction result

The learning outcomes obtained in the survey are shown in Figure 2. It can be seen in Figure 2 that the female has a better learning outcome than the male. An independent-sample t-test was conducted to compare

the GPA in males and females. There was a significant difference in the GPA for males ($M = 3.3683$, $SD = 0.31117$) and females ($M = 3.5283$, $SD = 0.23607$); $p = 0.004$.

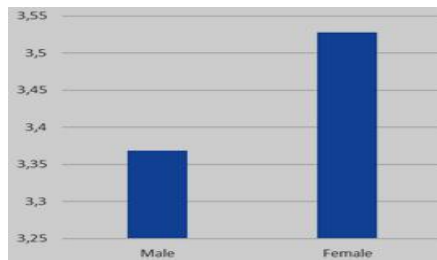


Figure 2. Learning outcomes result

The correlation between smartphone addiction and learning outcomes was investigated using a Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of normality, linearity, and homoscedasticity assumptions. It has a significant considerable negative correlation between smartphone addiction and learning outcomes ($R = -0.291$, $p = 0.003$). That is, the higher the smartphone addiction level, the lower the learning outcomes. Smartphone addiction has a significant effect on learning outcomes, which is 8.5% ($R^2 = 0.085$; $p = 0.003$).

a. The impact of smartphone addiction on learning outcomes in male students

The analysis conducted for male students is shown in Table 2. It shows that smartphone addiction has a significant negative correlation with learning outcomes in male students ($R = -0.580$, $p = 0.000$). The probability value for smartphone addiction is 0.000, more diminutive than 0.05. This means that smartphone addiction affects learning outcomes significantly, with a percentage of 33.7% ($R^2 = 0.337$).

Table 2. Correlation and regression analysis for male

Variable	Coefficient Regression	p-value
Constant	459.497	0.000
Smartphone addiction	-0.770	0.000
R = -0.580		0.000
R Square = 0.337		

b. The impact of smartphone addiction on learning outcomes in female students

The analysis conducted for female students is shown in Table 3. There was no significant negative correlation between smartphone addiction and learning outcomes in female students ($R = -0.186$, $p = 0.155$). The probability value for smartphone addiction is 0.155, higher than 0.05. This means that smartphone addiction does not affect learning outcomes significantly, with a percentage of 3.5% ($R^2 = 0.035$).

Table 3. Correlation and regression analysis for female

Variable	Coefficient Regression	p-value
Constant	359.450	0.000
Smartphone addiction	-0.279	0.155
$R = -0.186$		0.155
$R \text{ Square} = 0.035$		

c. The comparison of the impact of smartphone addiction on learning outcomes in male and female students

There are differences in the effect of smartphone addiction on learning outcomes in terms of gender. The influence of smartphone addiction on male students' learning outcomes is much more significant than that of female students. The effect on males has a percentage of 33.7%, while in females, it is only 3.5%, as shown in Table 3. Smartphone addiction and learning outcomes are significantly correlated in males but not in females. This confirms our hypothesis.

2. Discussion

Smartphones have become an essential part of everyone's life. Smartphones offer various features and applications to users. Teenagers use this technology to improve social relationships and expand communication networks. However, this state sometimes brings addiction and a lot of negative emotions. Along with the increasing use of smartphones, the number of people who are addicted is increasing, and people are starting to experience problems, including students. Nowadays, along with the increasing sophistication of smartphones and all their functions, young

people use smartphones not only for access and communication but also for other functions such as entertainment and multimedia. Thus, they become increasingly dependent on their smartphone, which can sometimes be a decision-maker and sometimes a guide for them.

The results of this study indicate differences in the level of smartphone addiction between males and females. The findings of this study are similar to those in the literature. This study established that smartphone addiction is higher in males than females. Similar studies also show that gender affects smartphone addiction, where smartphone addiction is higher in males than females (Alhazmi et al., 2018; Arnani & Husna, 2021). On the other hand, previous studies reported that smartphone addiction rates were higher in females (Mulyati & Frieda, 2019; Elserty, Helmy, & Mounir, 2020; Saleh et al., 2020), while other studies reported that gender did not affect smartphone addiction rates (Yoon, Jeong, & Cho, 2021; Sönmez, Kısacık, & Eraydın, 2021). However, smartphone addiction can be influenced by a variety of factors, including social, psychological, and environmental factors. Some studies have suggested that there may be gender differences in how individuals use smartphones and the types of activities or apps they are more likely to engage with. Some research has suggested that males may be more prone to excessive gaming or gambling-related smartphone apps. At the same time, the female may engage in using social media platforms and e-commerce apps, which can be associated with addictive behaviours (James, O'Malley, & Tunney, 2019; Okiyi et al., 2020; Derevensky et al., 2022; Nurjanah & Nur, 2022).

This study found that the average female's learning outcome is higher than the male's. Previous studies have also obtained similar results (Sigit et al., 2019; Fahrudin & Pukan, 2020; Grebener et al., 2021). This is because there are differences in the learning process between male and female students; the ability to remember is higher in women than in men, and there are psychological differences, such as students' interest in the material (Sigit et al., 2019). Another thing is the differences in the structure of the brains of men and women (Hill et al., 2010; Harahap, 2020). The effect of differences in brain structure is



differences in mindset, so many studies say that girls' achievement has a more positive relationship to learning achievement than boys' (Xin et al., 2019). Male students tend to be more active in learning, but their liveliness is used to make noise in class, while female students tend to be more motivated to do assignments.

Smartphone addiction is generally negatively correlated with learning outcomes (Hawi & Samaha, 2016; Chaudhury & Tripathy, 2018; Abbasi et al., 2021). This study reveals that the influence of smartphone addiction on learning outcomes in male students is higher than in female students. However, there is no significant relationship between the level of smartphone addiction and learning outcomes in female students. Research shows differences in the motives for using smartphones between males and females (Fischer-Grote et al., 2019). The difference is that females spend more time on social media or text messaging, while males are more interested in video games, sharing media and searching the web. Arthy et al. (2019) showed that female students use smartphones to play social media, while male students use smartphones as entertainment (listening to music, watching movies, and playing online games). The type and amount of time spent on smartphone activities, such as gaming or social media, can vary between males and females. These differences may contribute to variations in their learning outcomes (Saleh et al., 2021; Nasih et al., 2023).

Smartphone addiction hurts student academic achievement. Therefore, students should make efforts to avoid or reduce their smartphone addiction. There are several things they can do to achieve this goal. Students can limit the use of smartphones, especially at bedtime. Studies have revealed that displays on most electronic devices or gadgets suppress melatonin, which disrupts the body's natural clock (Okika & Blessing, 2017). Students can also learn to balance and manage time (Qi, 2019; Basri et al., 2022). It is essential to balance activities such as time spent with friends and family, recreational outdoor pursuits, and academics. In the learning process in class, students can turn off mobile data (Okai-Ugbaje, Ardzejewska, & Imran, 2020). This is the easiest way that can be done anytime and anywhere. Especially if

students are during school hours or work hours so that the mind can be calmer and focus on lectures.

Besides the negative impact of smartphones, the benefits of smartphones as academic support have also been studied. Smartphones can be used wisely to achieve goals in education and work. Tips for using smartphones include (1) of the many applications offered, students must be good at choosing which applications are needed; (2) too many applications can result in smartphone performance being reduced, delete applications that are not too important; (3) instead of just updating something that is not important on social media, students can use smartphones to read material and update the latest news; and (4) when they find interesting information, students can share it with friends through social media applications on smartphones.

Smartphone addiction can have a significant impact on various aspects of an individual's life. The consequences of smartphone addiction can be both physical and psychological. Excessive smartphone use, including checking social media, playing games, or texting during class or work, can lead to reduced productivity, lower grades, and impaired concentration (Durak, 2019). Prolonged smartphone use, especially for extended periods, can lead to physical health problems such as eye strain, headaches, neck, and disrupted sleep patterns due to excessive screen time before bedtime (Mustafaoglu et al., 2021). Smartphone addiction is associated with an increased risk of mental health issues such as anxiety, depression, and stress. Excessive use can lead to feelings of isolation, loneliness, and negative self-esteem, particularly when comparing oneself to others on social media (Pereira et al., 2020; Maksum et al., 2022). It is essential to recognize the signs of smartphone addiction and take steps to manage smartphone use, set boundaries, and seek support if necessary.

This study did not examine the factors that cause the magnitude of the influence of smartphone addiction on learning outcomes. Thus, this is a limitation of this study. Future researchers must be able to expand research on other variables so that this research can be an essential source of theory.



D. Conclusion

The research conducted has significant results. Smartphone addiction in males and females has a different effect on learning outcomes. The influence of smartphone addiction on male students' learning outcomes is much more significant than that of female students. Smartphone addiction can be a negative factor in learning outcomes for male students, with a percentage of influence of 33.7%. However, in females, smartphone addiction cannot be used as a benchmark for learning outcomes because it does not have a significant relationship with the percentage effect of 3.5%.

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