

The effect of using Smartphones on student achievement among Al Baha University Students, Saudi Arabia 2024

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Abstract

Background: Smartphones have become an integral part of our daily lives, revolutionizing the way we communicate and access information. Excessive use of smartphone cause social isolation, anxiety, and depression. **Research design** Descriptive cross sectional study, **aims:** To investigate the impact of smartphone usage on students' academic performance and achievement .The study involve 319 volunteer students, fulfilled the selection criteria's **Tools:** The research used a modified questionnaire designed from Smartphone Addiction Scale (SAS). **Results:** The data exhibited linear relationships between the independent variables and the dependent variable (GPA), and the residuals displayed homoscedasticity, indicating consistent variance across all levels of the predictors. The multiple regression model presented a correlation coefficient (R) of 0.329, indicating a moderate positive association between the combined predictors (mobile addiction, mobile usage patterns, and the impact of mobile use) and the dependent variable (GPA). The R Square value, or the coefficient of determination, stood at 0.109, signifying that the model explains 10.9% of the variance in GPA. **Conclusion:** It was proven by this study regarding the close and direct relationship between the high rate of students and the use of the mobile phone. **Recommendation:** In light of the study's findings, we recommend that students deal with the uses of smart tours with discipline and focus on educational programs that enhance students' abilities and academic achievement.

Keywords: Smartphone, students' achievement, addiction, and social media

Introduction:

Smartphone addiction encompasses a range of impulse-control problems, such as virtual relationships, information overload, cybersex addiction, and online compulsions like gambling. These issues can lead to negative consequences in various aspects of life, including learning problems, financial problems, strained relationships, and mental health issues. Heavy smartphone use is often indicative of underlying issues such as stress, anxiety, depression, or loneliness. While using a smartphone as a coping mechanism may provide temporary relief from these feelings initially, it ultimately worsens the situation by further isolating individuals from real human interactions that are essential for emotional growth and mental wellbeing.

Smartphones have become an integral part of our daily lives, revolutionizing the way we communicate and access information. To fully comprehend the motivations, behaviors, and impacts associated with their use, it is essential to understand their background. Since the release of

the first iPhone in 2007, the use of cell phones has become increasingly widespread. The statistics on smartphone addiction further support this fact **Ling, and Yttri (2002).**

The adoption and use of smartphones have been revolutionized by rapid technological evolution. Smartphones are now versatile devices with features such as internet connectivity, app ecosystems, and multimedia capabilities fact **Ling, and Yttri (2002).** These advancements have expanded the functionalities of smartphones, making them indispensable tools in various aspects of daily life. Excessive use of smartphones can lead to various health risks such as eyestrain, neck and back pain, therefore, it is essential to be mindful of our smartphone usage and take necessary steps to ensure our physical and mental well-being. According to a study conducted by researchers at Rutgers University, excessive smartphone use among students during class for non-academic purposes negatively affects academic achievement. The study suggests that students who frequently check their

phones during class tend to have lower grades as compared to those who do not engage in such behavior **Kuznekoff and Titsworth, (2013)**. High smartphone use is linked to lower academic achievement, weaker study habits, and reduced self-control, according to a study published in the *Journal of Behavioral Addictions* **Lepp, et al., (2014)**. As a student, it is crucial to be aware of the time spent on smartphones and prioritize academic responsibilities to ensure success in school. Excessive smartphone usage is associated with several psychological hazards, including addiction. According to recent research, it can lead to addiction symptoms such as tolerance, withdrawal, and cravings. Therefore, it is essential to maintain a balance and reduce the amount of time spent on smartphones to avoid these hazards **Billieux, et al., (2015)**. Excessive use of smartphones can have negative effects on mental health. This is because it can lead to social isolation, disrupted sleep patterns, and decreased physical activity. The constant notifications and alerts from smartphones can also create a sense of pressure and stress, as individuals feel the need to stay connected and respond to messages immediately. Therefore, it is important to limit smartphone usage and take breaks to promote better mental well-being **Panova, and Carbonell, (2018)**. Smartphone addiction can cause a feeling of being overwhelmed and make it difficult for people to disconnect, which can worsen mental health issues. It is important to be aware of the potential psychological dangers of excessive phone usage and take necessary steps to manage it, prioritizing mental well-being.

The social consequences of smartphone addiction can be significant. Those who are addicted to their phones may spend too much time on them, causing a decline in face-to-face interactions. As a result, social isolation and a lack of social support can occur, which can hurt mental health **Lin, et al., (2016)**. Excessive use of smartphones can cause a phenomenon known as "phubbing" or phone snubbing, where people give more importance to their devices over real-life communication with people. This behavior can result in ruptures in relationships and a decline in overall satisfaction with social connections **Roberts et al., (2016)**. The continuous urge to check and respond to messages and notifications can cause pressure and distraction, which can make individuals feel

disconnected and disengaged in social situations. This can result in a lack of presence and attention during social interactions, ultimately harming relationships. Smartphone addiction can hurt social connections and relationships, highlighting the importance of managing device usage and prioritizing face-to-face interactions. However, smartphones can also be a valuable tool for students as they provide access to a wide range of educational resources and facilitate communication and collaboration **Przybylski, and Weinstein, (2017)**. One of the advantages of having a smartphone is the ability to access educational materials and resources on the go. By using educational apps and mobile-friendly websites, students can conveniently access course materials, study aids, and other resources from their smartphones **Chen, and Denoyelles, (2013)**. Smartphones facilitate communication and collaboration among students by enabling easy interaction with instructors and classmates through messaging apps and discussion forums. This allows for effective collaboration on assignments and real-time feedback **Chen, and Denoyelles, (2013)**. Smartphones can enhance student engagement by allowing interactive activities and quizzes, increasing the learning experience **West et al., (2015)**. Smartphones have become an important tool in education, providing students with increased access to educational resources, facilitating communication and collaboration, and enhancing engagement and participation in the classroom. However, along with their benefits, there are also a few disadvantages associated with their use. The most significant disadvantage is the potential for distraction. Social media, games, or other non-academic applications, which can hinder their focus on coursework, may easily distract students **Kirschner, and Karpinski, (2010)**. Smartphones make academic dishonesty easier by providing easy access to information and resources online, leading to increased cheating and plagiarism **Ellis, et al., (2015)**. Additionally, smartphones can negatively affect both sleep patterns and physical health. The blue light emitted by smartphones can disrupt sleep patterns, leading to decreased academic performance and overall well-being **Carter, et al., 2016**.

Frequent use of smartphones can adversely affect the eyes, leading to problems such as eyestrain, dry eyes, and blurred vision.

Additionally, the blue light emitted by electronic devices can cause sleep disturbances and other health problems. Eyestrain is a common issue among smartphone users, especially those who use their devices for long periods. Symptoms of eyestrain include headaches, blurred vision, and dry eyes **American Optometric Association (2021)**. It is important to note that prolonged staring at a small screen can cause your eyes to work harder, leading to fatigue and discomfort. Furthermore, the blue light emitted by smartphones can have negative effects on both your eyes and overall health. The blue light could interfere with the production of melatonin, a hormone that regulates sleep-wake cycles, leading to disrupted sleep patterns **Heo, et al., (2017)**. Extended exposure to blue light can cause retinal damage, potentially increasing the risk of age-related macular degeneration over time **Raman, et al., (2018)**. To minimize the negative effects of smartphone usage on the eyes, individuals can take several preventive measures. These include taking frequent breaks, adjusting the brightness and contrast of their screens, and using blue light filters or glasses. Furthermore, it is recommended to avoid smartphone usage in the dark or before bedtime to minimize disruption to sleep patterns. Although smartphones offer many benefits to students, individuals must be mindful of the potential drawbacks and manage their usage accordingly **American Optometric Association (2021)**.

In Saudi Arabia, the use of smartphones is widespread, with a high percentage of the population owning and using them. According to a report by the **Communications and Information Technology Commission (CITC), in 2020**, smartphone penetration in Saudi Arabia reached 75.8% and the majority of users accessed the internet through their mobile devices **Al-Tawil, (2018)**. Smartphones are widely used in Saudi Arabia for social media and communication purposes. Popular social media platforms among Saudis include WhatsApp, Snapchat, and Instagram, which are frequently utilized to stay connected with friends and family. Smartphones are widely used in Saudi Arabia for e-commerce and online shopping, with popular online marketplaces such as Souq.com and Noon.com allowing many Saudis to make purchases and conduct financial transactions via their smartphones **Alharthi, (2019)**. Although

smartphones offer numerous benefits, there are growing concerns about their negative impact on mental and physical health. The excessive use of smartphones has been linked to issues such as addiction, eyestrain, and disrupted sleep patterns **Raman et al., (2018)**. Overall, while smartphone use has become an integral part of daily life in Saudi Arabia, it is important for individuals to be aware of the potential risks and take necessary steps to manage their usage.

Previous studies

1. **Jiahui Zhang and Youlai Zeng, 2024** investigate the Effect of College Students' Smartphone Addiction on Academic Achievement: The Mediating Role of Academic Anxiety and Moderating Role of Sense of Academic Control which published on National Library of Medicine on March 2024 ,found significant negative correlation between smartphone addiction and academic achievement;
2. **Bukhori, et al (2019)** studied the Effect of Smartphone Addiction, Achievement Motivation, and Textbook Reading Intensity on Students' Academic Achievement. September they found that smartphone addiction and achievement motivation directly affect the intensity of reading academic textbooks, and smartphones addiction, achievement motivation

Methodology:

Study Design: Descriptive cross sectional study employed, to investigate the impact of smartphone usage on the academic performance and achievement of students from Al Baha University.

Research Question: Does the use of smartphones among Al Baha University have a significant effect on their academic achievement?

Study tools: The study used a modified questionnaire designed from Smartphone Addiction Scale (SAS), developed by Kwon et al. in 2013. The modified scale (questionnaire) consists of three sections; distributed to respondents through WhatsApp and e-mails.

Section one

Socio-demographic characteristics:

The modified questionnaire divided into three sections. The first section includes eight questions about respondents' sex, level of education, monthly expenses, and their mobile phone usage habits, such as the number of hours they use their phone during the day and when they use it the most. The second section consists of 13 questions that assess respondents' attitudes. They will be asked to rate their level of agreement or disagreement with various statements on a scale of 1 to 5, where 1 represents "slightly disagree" and 6 represents "slightly agree". The third section includes eight questions that assess smartphone addiction. Respondents will be asked to rate their level of agreement or disagreement with various statements on a scale of 1 to 5, where 1 represents "slightly disagree" and 6 represents "slightly agree".

The data analyzed by SPSS version 22 The SAS-SV scores were analyzed the relationship between variables was tested using a t-test and ANOVA for each item to determine the difference. Multiple Linear regression model, Cronbach's alpha correlation coefficient used to confirm the reliability of each item on a scale of 13 questions. Pearson's correlation analysis was conducted to determine the degree of smartphone addiction based on the SAS, SAPS. The SAS-SV scores were analyzed using a t-test and ANOVA for each item to determine the difference. Cronbach's alpha correlation coefficient was used to confirm the reliability of each item on a scale of 13 questions. Pearson's correlation analysis was conducted to determine the degree of smartphone addiction based on the SAS, SAPS, and KS scales. An additional analysis was conducted in each gender group for eight questions. The AUC score was used to measure the accuracy of the predictive model, with a score of 1.0 being perfect and a score of 0.5 or lower being similar to random guessing. An AUC score of 0.7-0.8 is considered acceptable, 0.8-0.9 is excellent, and 0.9 or greater is outstanding. The optimal cut-off value for predicting smartphone addiction was chosen based on the point on the ROC curve nearest to the top left-hand corner, which maximizes both sensitivity and specificity.

Inclusion Criteria:

1. Al Baha University students: Participants should be currently enrolled students at Al Baha University during the academic year 2023.
2. Age range: Participants should fall within a specific age range, for example, 18 to 25 years old, to ensure they are representative of the university student population.
3. Regular smartphone users: Participants should be regular users of smartphones, meaning they use smartphones for various purposes such as communication, internet browsing, and accessing educational resources.
4. Consent: Participants should provide informed consent to participate in the study, ensuring they understand the purpose, procedures, and potential risks of the research.
5. Students who has the desire to participate in the study voluntarily

Research tools:

The research used a modified questionnaire designed from various; scales including self-report scales and diagnostic criteria. One commonly used self-report scale is the Smartphone Addiction Scale (SAS), developed by Kwon et al. in 2013. The SAS has 33 items that evaluate addiction-related behaviors and attitudes, such as withdrawal symptoms, tolerance, and craving. Individuals rate the frequency of these behaviors using a 5-point Likert scale, where higher scores indicate a higher level of smartphone addiction. The modified scale (questionnaire) consists of three sections; distributed to respondents through WhatsApp and e-mails; Socio-demographic characteristics: includes eight questions about respondents' sex, level of education, monthly expenses, and their mobile phone usage habits, such as the number of hours they use their phone during the day and when they use it the most. The second section consists of 13 questions that assess respondents' attitudes. They will be asked to rate their level of agreement or disagreement with various statements on a scale of 1 to 5, where 1 represents "slightly disagree" and 5 represents "slightly agree". The third section contains eight questions that assess smartphone addiction. Respondents will be asked to rate their level of agreement or disagreement with various statements on a scale

of 1 to 5, where 1 represents "slightly disagree" and 5 represents "slightly agree"

Results:

Table (1) the age distribution of student participants in the survey shows that the largest group consists of those aged 21-23 years, making up 44.5% of the total. The next largest group is those 23 years and older, representing 35.7%, while the youngest group, aged 18-20 years, accounts for 19.7%.

Table (2) the analysis of monthly expenses among the 319 survey participants shows a distinct distribution across three income ranges. The majority, representing 66.8% of the total (213 participants), reported spending less than 2000 SAR monthly. A smaller portion, at 13.8% (44 participants), indicated a monthly expenditure between 2000 and 5000 SAR. The remaining 19.4% (62 participants) reported spending more than 5000 SAR per month.

Table (3) the analysis of daily mobile phone usage hours among the 319 participants reveals a clear pattern. The majority, 47.3% (151 participants), report using their mobile phones for more than 7 hours a day. Following this, 37% (118 participants) spend between 5 and 7 hours daily on their phones. A smaller segment, 11.6% (37 participants), use their phones for 2 to 4 hours

per day, while only 4.1% (13 participants) use their devices for less than 2 hours a day.

Table (4) the survey data on the preferred time of day for mobile phone use reveals a notable pattern. Of the 319 participants, 60.8% (194 individuals) primarily use their phones during the day. Meanwhile, the remaining 39.2% (125 participants) prefer using their mobile devices during the night.

Table (5) most Popular Mobile Applications by Usage among the 319 participants highlight clear preferences. TikTok and Snapchat are the most popular, each being the primary application for 31.7% of participants (n=101). Instagram follows, with 22.9% of the participants (n=73) citing it as their most-used app. Twitter is less popular, with 13.5% of respondents (n=43) primarily using it. One participant, representing just 0.3% of the total, noted Instagram.

Table (6) the results showed significant relation between variables regarding students hard time concentrating in class, while doing assignments, or while working, due to smartphone use and constantly checking their smartphone so as not to miss conversations between other people on Twitter, Facebook, Snapchat, Instagram, TikTok, or other social media P value 0.0000 and 0.003. In addition, other questions revealed no significant relation between variables.

Table (1): Age Distribution of Target Individuals

Age	Frequency	Percent
18-20 years	63	19.7
21-23 years	142	44.5
≥ 23years	114	35.7
Total	319	100.0

Table (2): Students Monthly expenses

Expenses SAR*	Frequency	Percent
<2000 SAR	213	66.8
2000-5000SAR	44	13.8
>5000 SAR	62	19.4
Total	319	100.0

*SAR Saudi Arabia Riyal

Table (3): Daily Mobile Phone Usage Time

Times	Frequency	Percent
< 2 Hours	13	4.1
2-4 hours	37	11.6
5-7 hours	118	37.0
> 7 hours	151	47.3
Total	319	100.0

Table (4): Most Common Mobile Phone Usage Intervals

Times	Frequency	Percent
During the day	194	60.8
During the night	125	39.2
Total	319	100.0

Table (5): Most Popular Mobile Applications by Usage

Application	Frequency	Percent
Instagram	73	22.9
Facebook	1	0.3
X (Twitter)	43	13.5
TIKTOK	101	31.7
Snapchat	101	31.7
Total	319	100.0

Table (6): Smartphone addiction status analysis (n=318)

		Sum of Squares	df	Mean Square	F	p.value
I have a hard time concentrating in class, while doing assignments, or while working, due to smartphone use	Between Groups	50.259	4	12.565	13.035	0.000*
	Within Groups	302.669	314	.964		
	Total	352.928	318			
I wouldn't be able to stand not having a smartphone	Between Groups	12.739	4	3.185	2.038	0.089
	Within Groups	490.596	314	1.562		
	Total	503.335	318			
I feel impatient and fretful when I am not holding my smartphone	Between Groups	7.131	4	1.783	1.188	0.316
	Within Groups	471.170	314	1.501		
	Total	478.301	318			
I have my smartphone on my mind even when I am not using it	Between Groups	10.495	4	2.624	1.676	0.155
	Within Groups	491.668	314	1.566		
	Total	502.163	318			
I would never give up using my smartphone even if my daily life were greatly affected by it	Between Groups	11.434	4	2.858	1.893	0.111
	Within Groups	474.184	314	1.510		
	Total	485.618	318			
I constantly check my smartphone so as not to miss conversations between other people on Twitter, Facebook, Snapchat, Instagram, TikTok, or other social media	Between Groups	15.880	4	3.970	2.665	0.033*
	Within Groups	467.807	314	1.490		
	Total	483.687	318			
I use my smartphone longer than I intend	Between Groups	10.674	4	2.669	1.723	0.145
	Within Groups	486.323	314	1.549		
	Total	496.997	318			
People around me tell me that I use my smartphone too much	Between Groups	12.319	4	3.080	1.814	0.126
	Within Groups	533.016	314	1.698		
	Total	545.335	318			

* Significant

df =Degrees of freedom**F**= Variance of inflation factor (VIF)

Discussion:

The present study was conducted to explore the impact of smartphone usage on the academic performance of Al Baha University students in Saudi Arabia in the year 2024. With the increasing prevalence of mobile devices worldwide, there has been a growing concern regarding the effects of smartphone use on educational achievements.

Previous research in this area has produced conflicting results, indicating that moderate smartphone use could enhance learning, while excessive use might lead to distractions, reduced concentration, and lower academic success. Nevertheless, the influence of smartphone usage on academic outcomes may differ depending on cultural and educational settings.

The study reveals that the age distribution of student participants in the survey shows that the largest group consists of those aged 21-23 years, making up 44.5% of the total. The next largest group is those 23 years and older, representing 35.7%, while the youngest group, aged 18-20 years, accounts for 19.7%.

The survey data indicates that the largest portion of student participants are in the 21-23 years age group, comprising 44.5% of the total. The next biggest segment is those aged 23 and above, representing 35.7% of the respondents. The youngest group, consisting of 18-20 year olds, makes up the remaining 19.7% of the student participants.

The analysis of daily mobile phone usage hours among the 319 participants reveals a clear pattern. The nearly half of students report using their mobile phones for more than 7 hours a day. Following this, 37% (118 participants) spend between 5 and 7 hours daily on their phones. A smaller segment, 11.6% (37 participants), use their phones for 2 to 4 hours per day, while only 4.1% (13 participants) use their devices for less than 2 hours a day. The use of mobile phones is now considered an essential factor in the educational process for students, in addition to using it to benefit from other applications. The data regarding the most frequently used applications among the 319 participants highlight clear preferences. TikTok and Snapchat are the most popular, each being the primary application for 31.7% of participants (101 respondents for

each). Instagram follows, with 22.9% of the participants (73 respondents) citing it as their most-used app. Twitter is less popular, with 13.5%. This indicates that the majority of students use mobile phones for social interaction applications compared to educational programs, and this may negatively affect students' academic achievement.

Multicollinearity, which can distort the accuracy of coefficient estimates, was also evaluated. Both the Variance Inflation Factor (VIF) and Tolerance values remained within acceptable ranges, confirming no serious multicollinearity issues among the independent variables. The absence of significant outliers or influential data points further strengthened the reliability of the analysis.

The multiple regression model presented a correlation coefficient (R) of 0.329, indicating a moderate positive association between the combined predictors (mobile addiction, mobile usage patterns, and the impact of mobile use) and the dependent variable (GPA). The R Square value, or the coefficient of determination, stood at 0.109, signifying that the model explains 10.9% of the variance in GPA. Although this indicates that the model has some predictive capability, a significant portion of variance remains unexplained, suggesting the influence of other factors on academic performance.

The results of the multiple regression analysis examined the effects of three independent variables (mobile usage patterns, impact of mobile use, and mobile addiction) on the dependent variable, GPA. The findings are as follows:

Mobile Usage Patterns

The unstandardized coefficient (B) is -0.356, and the standardized coefficient (Beta) is -0.298. This relationship is statistically significant with a p-value of 0.000. These values indicate that a higher prevalence of mobile usage patterns, particularly non-productive usage, correlates with a significant decrease in GPA. The negative Beta coefficient reflects a substantial inverse relationship between this factor and academic performance.

Impact of Mobile Use

The unstandardized coefficient (B) is 0.169, and the standardized coefficient (Beta) is 0.214. This relationship is statistically significant with a p-value of 0.009. It shows a positive relationship between the impact of mobile usage and GPA. Moderate but positive improvements in academic performance are associated with beneficial or constructive mobile usage.

Mobile Addiction

The unstandardized coefficient (B) is 0.001, and the standardized coefficient (Beta) is 0.002. The relationship is not statistically significant with a p-value of 0.984. This suggests that mobile addiction, in this dataset, has no significant direct impact on GPA. This finding was consistent with the two previous studies conducted by **Jiahui and Youlai (2024)**. Investigate the Effect of College Students' Smartphone Addiction on Academic Achievement: The Mediating Role of Academic Anxiety and Moderating Role of Sense of Academic Control which published on National Library of Medicine on March found significant negative correlation between smartphone addiction and academic achievement; and **Bukhori, et al., (2019)** studied the Effect of Smartphone Addiction, Achievement Motivation, and Textbook Reading Intensity on Students' Academic Achievement. September they found that smartphone addiction and achievement motivation directly affect the intensity of reading academic textbooks, and smartphones addiction, achievement motivation

Conclusion:

Based on the study findings, it can be concluded that the use of smartphones among university students not only impacts their mental health and learning attitude, but also significantly influences their future academic achievement, academic emotion, and academic participation. However, the correlation between academic achievement and excessive phone usage, as well as the underlying mechanisms and limitations, has received limited attention. This study has provided evidence of a strong and direct relationship between the high rate of students and their mobile phone usage. This suggests that students utilize their mobile phones to enhance their educational process by following lectures,

studying, and browsing educational websites, thereby replacing traditional learning methods.

Recommendations:

1. In light of the study's findings, we recommend that students deal with the uses of smart tours with discipline and focus on educational programs that enhance students' abilities and academic achievement.
2. Controlling the use of mobile phones during lectures to enhance the educational process only, and monitoring not to browse social media applications during lectures and educational activities.

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