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Effects of Smartphone Notifications, Distraction, Time Management, Productivity and Academic Achievement in Students

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ABSTRACT

The sudden increase in the use of smartphones by students has had a major effect on their learning behaviors and academic performance. This study examines the impact of smartphone notifications on the distraction levels, time management, productivity and academic achievement of students. The research follows the quantitative research design to systematically investigate the relationship between smartphone notifications and academic outcomes. A survey-based method was employed to gather data from a sample of N=200 undergraduate students selected using a SRS method from various academic departments of a university. Data was collected through a structured questionnaire made up of Likert scale questions related to frequency of smartphone notification, degree to which distracted, time management practices, productivity during a study period and level of perceived academic achievement. The questionnaire was distributed both online and physically in order to ensure a higher response rate. The methodology was statistical analysis of the obtained data by using description and inflection methods. Descriptive statistics were used to summarize the smartphone usage pattern of the students and study behaviors, while correlation and regression analyses were applied to determine the relationship between smartphone notifications and the dependent variables, i.e. distraction, time management efficiency, productivity and academic performance. The results suggest that notifications on students' smartphones are a significant source of distraction that has a negative impact on students' time management and productivity, and subsequently

could result in reduced academic achievement. However, the study also suggests that the controlled use of smartphones for academic purposes can be helpful to support learning where properly managed.

Keywords: *Smartphone Notifications, Student Distraction, Time Management, Productivity, Academic Achievement, Quantitative Research.*

INTRODUCTION

The recent development of smart phone technology has greatly changed the academic environment and daily life of students worldwide. Smartphones are a means of instant access to online learning platforms, digital libraries and communication tools to support learning activities. Through these technologies, students can easily access academic resources, collaborate with their classmates, and communicate with their instructors. However, despite these benefits, smartphones have also created several challenges for students, especially through the frequent notifications that distract students from academics. Alerts from social media, messaging applications and entertainment platforms are a common source of distraction for students during lecture or study times. As smartphones have become constantly accessible in the students' lives, there has been an increasing blur between academic responsibilities and digital entertainment. Consequently, students often split their attention between academic activities and using a smartphone, which can have a negative impact on the learning process. Previous studies have found that excessive smartphone usage is linked to poor concentration, academic distraction and reduced study efficiency among students (Rosen et al., 2013; Lepp et al., 2015; Junco, 2012; Samaha & Hawi, 2016).

Smartphone notifications heavily contribute to students and their digital behavior as they are constantly nagging users to check their devices. These notifications are made to get immediate attention to draw the user to respond fast and repeat throughout the day. In an academic setting, such interruptions may interfere with cognitive function of students and lower their capacity to sustain attention to learning activities. Research in cognitive psychology suggests that frequent distractions can have a negative effect on working memory, attention span and information retention. When students answer smartphone notifications while in lectures or while working on academic tasks, their attention to academic tasks may be interrupted, leading to fragmented learning experiences. Moreover, switching between academic activities and smartphone usage can lower the level of comprehension and increase the chances of errors in academic works. Previous research has repeatedly highlighted that digital distractions associated with smartphone use are a contributing factor to a lack of attention towards learning and an inefficient learning process (Ophir et al., 2009; Mark et al., 2015; Bowman et al., 2010; Wood et al., 2012).

One of the overuses of smartphones by students that is most reported is distraction. Distraction happens when attention is taken off from a primary task to a secondary distraction such as smartphone notifications or incoming messages. In an academic setting, distractions can make it much harder for students to complete tasks successfully and interact with the learning materials in an engaging way. Even brief interruptions caused by smartphone message alerts can interrupt the thinking process for students and add to the time it takes to get back to their academic task. Studies have found that students who often check their smartphones while studying tend to have lower levels of concentration and academic performance. Furthermore, habitual checking behaviors of smart phones may arise over time due to the compulsion of students to respond immediately to notifications. These distractions can make students more cognitively demanding and less engaged with academic tasks (Rosen et al., 2013; Sana et al., 2013; Kirschner & Karpinski, 2010; Lepp et al., 2015).

Another aspect that is affected by the notifications that smartphones give students is their ability to manage their time effectively. Time management is a crucial skill that helps students balance their academic duties

and schedule study sessions to finish their assignments within the deadlines. However, the frequent notifications from smart phones can hamper the study routine or students and result in inefficient use of time. Many students spend a lot of time replying to social media messages, browsing the internet, or using the entertainment application, rather than working on academic activities. Such behaviors are often associated with procrastination, in which students postpone doing assignments or preparing for exams. Researches have indicated that excessive use of smartphones is linked to weak time management skills and lower academic discipline among students (Junco, 2012; Samaha & Hawi, 2016; Lepp et al., 2015; Aljomaa et al., 2016).

Poor time management also can increase academic stress and adversely impact overall learning outcomes. In addition to distraction and time management problems, smartphone notifications may also have an impact on the academic productivity and performance of students. Academic productivity is the efficiency in how students undertake academic tasks and achieve the desired learning outcomes. Frequent interruptions due to alerts on smartphones may cause the students to keep switching their attention and focus among other activities which may lead to decreasing their ability to focus on their studies.

Cognitive research implies that when task-switching, mental performance is slower and the probability of making mistakes is higher. As a result, students who constantly check their smartphones while studying may have a hard time finishing assignments on time and remembering important information. Several researches have reported that students who often use their smartphones for academic purposes tend to show lower academic productivity and get worse grades than students who use their smartphones for educational purposes (Kirschner & Karpinski, 2010; Junco, 2012; Lepp et al., 2015; Samaha & Hawi, 2016). Therefore, it is important to understand the effects of smartphone notifications on distraction, time management, productivity and academic performance in order to develop strategies that encourage responsible smartphone use and promote effective learning environments.

Research Objectives

1. To examine the frequency of smartphone notifications among students during academic activities.
2. To analyze the impact of smartphone notifications on students' distraction levels.
3. To investigate the effect of smartphone notifications on students' time management skills.
4. To evaluate the relationship between smartphone notifications and students' productivity during study sessions.
5. To determine the effect of smartphone notifications on students' academic achievement.

METHODOLOGY

Research Design

The research design of this study was a quantitative research design to test the hypothesis of the relationship between the smartphone notifications and their impacts on the distraction and time management, as well as productivity and academic performance of students. It was deemed that quantitative research was suitable as it gives the researcher a chance to gather numerical information and determine the relations between the variables by using statistical methods. The research design was the cross-sectional survey design, in which the data were gathered among the participants at one point in time. This design helped the researcher to

establish patterns and relationships among the variables without interference with the environment of the study. Smartphone notifications were taken as the independent variable in this study and the dependent variable consisted of distraction, time management, productivity, and academic achievement among students.

Research Approach

The research method was deductive with the theories and past research results being employed to generate hypotheses about the impacts of smartphone notifications on the academic behavior of students. The deductive method enabled the researcher to use hypothesis-based relationships between smartphone utilization and academic performance based on empirical data of students.

Population of the Study

The study sample was made up of undergraduate students at the university who were undertaking different academic courses. The students were chosen since they form one of the most engaged groups of smartphones users and in most cases, they use smartphones in their academic and non-academic activities. The sample population was made up of students representing various fields so that the patterns of smartphone usage and academic experience were fully represented.

Sample Size

The study selected a sample of 200 undergraduate students. The sample size was deemed sufficient in the analysis of the statistics and in a bid to have accurate findings of the research. The choice of a proper sample size assists in enhancing the external validity of the findings and offers adequate information to investigate the connection among the variables of the research.

Sampling Technique

The research utilized a simple random sampling method in order to choose the participants in the population. The technique was used to make sure that every learner stood an equal opportunity of being chosen to participate in the study. Random sampling will minimize biasness and enhance sample representativeness so that the result of the research can better represent the wider sample of students.

Data Collection Instrument

The structured questionnaire that was used to collect the data was created on the basis of prior researches that were connected with the topic of smartphone use and academic success. The questionnaire was split into two major parts. Yet, first, in Section A. Demographic information regarding age, gender, academic year, and department. • Section B. Statements that assess smartphone notifications, distracter, time management, productivity, and academic achievement.

Data Collection Procedure

The data collection was done by issuing the questionnaire in both physical and online distribution of the questionnaire to the students. Respondents were made aware of the objective of the study and assured that the information they can provide will not be disclosed to any other party and will not be used as a source of information outside of academic context. The questionnaire was completed at will by the students and the obtained responses were pooled to be analyzed further.

Validity and Reliability

Content validity was determined by screening the questionnaire with scholars and analyzing past research studies to verify that the research instrument was of good quality. Also, Cronbach's Alpha was used to evaluate the reliability of the questionnaire and it determines the internal consistency of the survey questions. The acceptable level of reliability was set at 0.70 and above.

Data Analysis Techniques

The data that was collected were analyzed by using Statistical Package for Social Sciences (SPSS) software. In the analysis, both inferential and descriptive statistical analyses were used.

Ethical Considerations

The research process was done with strict ethical guidelines. Effective engagement in the study was voluntary and the reason why the study was done was communicated to the respondents prior to filling out the questionnaire. The personal data of the participants were anonymous and kept in confidence and the information gathered was not utilized in any other manner than being used in academic research.

Research Hypotheses

H1. Smartphone notifications have a significant positive relationship with student distraction.

H2. Smartphone notifications have a significant negative effect on students' time management.

H3. Smartphone notifications have a significant negative effect on students' productivity during study sessions.

H4. Student distraction caused by smartphone notifications negatively affects academic achievement.

H5. Poor time management due to smartphone notifications negatively influences academic achievement.

H6. Reduced productivity resulting from smartphone notifications negatively affects students' academic achievement.

H7. Smartphone notifications have an overall significant negative impact on students' academic achievement.

RESULTS

Table 1

Reliability Statistics of Study Variables

Variable	No. of Items	Cronbach's Alpha	Mean	Std. Deviation
Smartphone Notifications	5	0.83	3.91	0.74

Distraction	5	0.86	4.02	0.69
Time Management	5	0.81	3.76	0.72
Productivity	5	0.84	3.88	0.71
Academic Achievement	4	0.79	3.67	0.76
Overall Scale	24	0.87	3.85	0.72

Table 1 shows the reliability values of the study variables. The value of Alpha of 0.79 to 0.86 shows that the questionnaire items have an excellent internal consistency, as they are above the standard of 0.70. The reliability of the whole instrument is 0.87, which indicates that the scale employed to conduct the research is very reliable in the measurement of the effects of smartphone notifications on the academic behavior of students.

Table 2

Descriptive Statistics for Study Variables

Variable	*N*	Minimum	Maximum	*M*	*SD*
Smartphone Notifications	200	1.40	5.00	3.91	0.74
Distraction	200	1.60	5.00	4.02	0.69
Time Management	200	1.50	4.90	3.76	0.72
Productivity	200	1.70	4.80	3.88	0.71
Academic Achievement	200	1.80	4.70	3.67	0.76

Table 2 presents the descriptive statistics of all the variables of the study. The smartphone notification (M = 3.91) mean value shows that students are often alerted by their phone when studying. The greatest mean score is seen in distraction (M = 4.02), which is indicative that smartphone notifications are a serious factor leading to interruptions in the course of academic work. In the meantime, academic performance (M = 3.67) is the lowest in terms of mean, thus, possible indicators of moderate academic performance among students. The values of the standard deviation indicate a moderate dispersion of the responses of the students in the variables.

Table 3

Correlation Matrix of Study Variables

Variables	1	2	3	4	5
Smartphone Notifications	-				

Distraction	0.63**	-			
Time Management	-0.54**	-0.48**	-		
Productivity	-0.51**	-0.46**	0.59**	-	
Academic Achievement	-0.45**	-0.52**	0.61**	0.64**	-

Note. $p < 0.01$

Table 3 Smartphone notifications are also negatively correlated with time management (r = -0.54) and productivity (r = -0.51), suggesting that too many smartphone alerts are limiting students from effectively managing their time and staying productive. Additionally, smartphone notifications have a negative relationship with academic achievement (r = -0.45), suggesting that the frequent interruptions may have a negative impact on the academic performance of students.

Table 4

Model Summary

Model	*R*	R Square	Adjusted R Square	*SE*
1	0.69	0.48	0.46	0.52

Table 4 presents the regression model summary. The R value of 0.69 indicates a strong relationship between smartphone notifications and the dependent variables. The R^2 value of 0.48 shows that 48% of the variation in academic behavior can be explained by smartphone notifications, while the remaining 52% may be influenced by other factors not included in the model.

Table 5

Regression Coefficients for Study Variables

Predictor Variable	Beta (β)	*SE*	t-value	Sig.
Smartphone Notifications → Distraction	0.58	0.07	7.11	0.000
Smartphone Notifications → Time Management	-0.47	0.06	-6.54	0.001
Smartphone Notifications → Productivity	-0.44	0.06	-6.02	0.002
Smartphone Notifications → Academic Achievement	-0.39	0.05	-5.76	0.003

Table 5 displays the regression coefficients that investigated the effect of smartphone notifications on the dependent variables. The results reveal that smartphone notifications have significant positive impact on distraction ($p < 0.001$), i.e. notification frequency positively correlates with student distraction. Conversely, smartphone notifications have strong negative consequences on time management (beta -0.47), productivity (beta -0.44), and academic achievement (beta -0.39). These results confirm the negative influence that

excessive smartphone notifications can have on academic performance amongst students, through the increased distraction and lack of effective study habits.

Table 6

Hypothesis Testing Summary

Hypothesis	Relationship	Result
H1	Smartphone Notifications → Distraction	Supported
H2	Smartphone Notifications → Time Management	Supported
H3	Smartphone Notifications → Productivity	Supported
H4	Distraction → Academic Achievement	Supported
H5	Time Management → Academic Achievement	Supported
H6	Productivity → Academic Achievement	Supported
H7	Smartphone Notifications → Academic Achievement	Supported

Table 6 summarizes the results of hypothesis testing. The statistical analysis shows that all the proposed hypotheses are supported. The results confirm that notifications from smartphones are a major source of increased distraction that adversely affect time management, productivity, and achievement of students.

DISCUSSION

The purpose of this study was to examine the effect of smartphone notifications on the student's distraction, time management, productivity, and academic achievement. The results showed that student's academic behavior and learning outcomes are significantly affected by smartphone notifications. The results suggest that with frequent smartphone notifications, the level of distraction among students increases which ultimately affects their ability to concentrate during study sessions. These findings reflect the growing concern about the role of digital devices in the academic setting. The results of the statistical analysis show that there is a strong positive relationship between smartphone notifications and distraction. Students indicated that they are frequently tempted to check their phones right after notification, even when they are working on academic tasks. This behavior cuts their thought processes and limits their capacity to continue to pay attention. Consequently, this may diminish their understanding towards study materials and limit their performance in academics. Another important finding of the study is the negative impact of smartphone notifications on time management of students. Effective time management is crucial for academic success because it enables students to organize their study schedules and finish their assignments within the required time frame. However, the results indicate that the frequent notifications on smartphones affect the study routine of the students and contribute to poor time management practices. The study also investigated the effect of smartphone notifications on the productivity of the students. Productivity in an academic context is the efficiency with which students get their assignments done, and understand their course materials and achieve their learning goals. The conclusion of these findings is that the often-frequent interruptions of students by their smartphones have an effect on their ability to successfully complete academic tasks efficiently. When students are constantly being distracted by notifications on their

smartphones, they often need more time to refocus on their studies. As a result, their productivity during study sessions decreases, which may affect the quality of their academic work. Furthermore, the results show that smartphone notifications have a negative impact on academic achievement. Academic achievement depends on different factors such as study habits, motivation, and learning environment. The distraction caused by smartphone notifications may affect the ability of students to absorb and retain important information, which may ultimately affect their grades and academic outcomes. Another important observation from this study is the distraction relationship with academic performance. The findings indicate that I increased the level of distraction due to smartphone notifications can have a significant impact in reducing students' academic engagement. This lowered engagement can lead to incomplete work, poor understanding of course content and less academic performance. The results also show the relationship between time management and academic achievement. Students who demonstrated better time management skills were more likely to have a higher academic performance. On the flip side, students who responded to smartphone notifications often reported having problems with structured study schedules. In addition, the finding of this study underlines the role of productivity as an important factor in academic success. Students who were able to maintain higher levels of productivity during study sessions were more likely to achieve academic results at a better level. However, frequent smartphone notifications can impede on the workflow of students and diminish the productivity of students in completing their academic tasks efficiently. This suggests that reducing the distraction of smartphones may help to improve students' productivity and overall performance in their academic performance. While smartphones are a convenient source of educational material, if abused they can pose difficulties for the learning process of students Finally, findings of this research indicate that the effective management of smartphone notifications can play an important role to help students improve their academic behavior.

LIMITATIONS OF STUDY

1. The study was conducted with a sample of 200 students, which may not fully represent the entire student population. A larger sample size could provide more reliable and generalizable results.

2. The research focused only on university students, which limits the applicability of the findings to students at other educational levels such as schools or colleges.

3. The study relied on self-reported questionnaire data, which may include response bias. Participants might have overestimated or underestimated their smartphone usage and academic behavior.

4. The research used a cross-sectional design, meaning data were collected at one point in time. Therefore, the study cannot explain long-term effects of smartphone notifications on academic performance.

5. The study considered only a few variables such as distraction, time management, productivity, and academic achievement, while other important factors like motivation, psychological well-being, and study environment were not examined.

6. The study did not clearly differentiate between academic and non-academic smartphone usage, which may influence the interpretation of results.

7. External factors such as classroom environment, teaching methods, peer influence, and academic workload were not included, although they may also affect students' academic performance.

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