Determinants of Smartphone Addiction and its Influence on Students' Academic Performance

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Abstract

Smartphone is the most wanted gadget of this era and smartphone addiction is the association with its use. This research aims to find the role of craving, social relationships, and overuse of smartphone as determinants of smartphone addiction and its influence on students' academic performance. This study uses purposive sampling (non-probability) technique and survey method was adopted. The data was collected through online questionnaire via Google Forms from 300 students of Bachelor of Education (hons.) studying in the Department of Teacher Education, Shah Abdul Latif University, Khairpur Mirs'. For hypotheses testing, structural equation modeling was used. The findings indicated that social relationships and overusage of smartphone were positively affecting smartphone addiction whereas craving to use smartphone was proved insignificant in creating smartphone addiction, further it was found that the created smartphone addiction among students was positively and significantly affecting their academic performance. This study recommends that use of smartphone must be encouraged in teaching learning for students' effective academic performance.

Keywords: *Mobile learning, Social relationships, Smartphone addiction, Academic performance*

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Introduction

Smartphone is an electronic gadget mostly used for daily two-way communication (Nair, Vijay & Vinod, 2014). It is a device used as a communication tool (Khan, Khalid & Iqbal, 2019). In the past few years, it has become so common that individuals, especially youth cannot even think of their lives without using smartphones (Phillips & Bianchi, 2005). In the developed countries it is very common for young people to use smartphones. It has also developed rapidly in Pakistan as Pakistan Telecommunication Authority represented that its cellular yearly tele density is about 74% of its total population, ranking it on the 7th in the list of top smartphones using countries. Kamran (2010) stated that low-cost internet bundles, calls and instant messaging has attracted the youth of Pakistan. According to Crompton and Burke (2018) mostly students at university are the habitual smartphone users. It is believed that smartphone has been an important part of their lives (Shahzad, Shahzad Ahmed, Hussain & Riaz, 2015). Smith (2015) reported that 99% of the undergraduate students use their phones at least once in an hour during study time.

Smartphones are used by students for multiple purposes. Most of them use smartphones for social connectivity (Alosaimi et al. 2016) and for communication on social networking sites (Lee et al. 2013), others get attracted to use it for camera (Nishida, Sakakibara & Tamura, 2019) whereas some students use it with the intention of academic activities (Vandan, 2016) like sharing the notes and assignments (Garcia & Khalifa, 2013). Smartphone addiction refers to the dependency level of a person on a smartphone. Its usage is considered as an obsession in daily life (Hwang, Choi & son, 2011).

Most of the studies (Mendoza, Pody, Lee, Kim, McDonough, 2018; Giunchiglia, Zeni, Gobbi, Bignotti & Bison 2018; Duke & Montag 2017; Yang, Asbusy & Gri 2019, Nayak, 2018; Ali, Imran & Noori, 2019) have been conducted on addiction to smartphone and its influence on university going students' academic performance. Some studies (Domoff, Foley & Ferkel 2020; Hawi & Samaha, 2016) concluded that addiction to smartphone becomes a risk faction in decrease of students' academic performance. Other researches (Han & Yi, 2019; Kibona & Mgaya, 2015, Froese, Carpenter, Inman, , Schooley, Barnes, Brecht & Chacon, 2012; Masiath Mubassira & Amit Kumar Das, 2019; Jeongmin Lee, Boram Cho, Youngju Kim & Jiyae Noh, 2014) declared that highly addicted smartphone students' have negative impact on their academic performance (Boahene, Fang & Sampong, 2019; Qi, 2019; Viciana, Banque & Calafell, 2019; Hossain, Nurunnabi, Hussain, Saha & Wang, 2019; Shahibi & Aziz,

2017; Han & Capraro, 2016; Schaal & Lude, 2015; Molina, Pertegal, Mora & Jimeno 2018) found that use of smartphone has positively effects on academic performance of students. Majority of the studies (Choi, 2019; Riley & Shields, 2019; Dzamesi, Akyina, Manu & Danso, 2019; Hassan, Mahmood, Abbas, Sarker & Palaniappan, 2019; Martinez, Batanero, Sanchiz & Rosa, 2019) have been conducted in foreign context, however very few have been done in Pakistani context (Nand, Pitafi, Kanwal & Rasheed, 2020; Aman, Shah, Hussain, Khan Asif & Qazi 2015; Ahmed, Salman, Malik, Streimikiene, Soomro & Pahi 2020; Khan, Khalid & Iqbal, 2019; Shahzad, Shahzad Ahmed, Hussain & Riaz 2019; Soomro, Zai, Nasrullah & Hina 2019) while there is not any research study so far done in the context of Shah Abdul Latif University(SALU), Khairpur, Pakistan. Thus, taking this gap as an opportunity, the current research intends to measure determinants of addictive use of smartphones and its relationship with academic performance of Bachelor of Education (B. Ed) Department of Teacher Education (DTE), SALU.

The foremost factor for any developed society is to produce such individuals having sufficient skills to engage in this global competition. In the era of the 21st century, men are nothing without the adoption of technology. We are surrounded with all forms of technology such as computers, laptops, the internet, and smartphones that have contributed a lot to our daily necessities. Likewise, the educational system is also benefited from technology and smartphones hold a center point for its access. Today's youth aged between 18 to 29 use smartphones frequently (Crompton & Bruke, 2018; Klimova, 2018) in their daily routine as well as to fulfil their academic needs (Vanden Abeele, 2016). It is observed that almost all the students of DTE, SALU average aged between 18 to 23 have at least one smartphone that they use for academic purposes also for non-academic purposes. It is therefore important to find the determinants of smartphone addiction and its influence on students' academic performance. This study intended to measure determinants of addictive use of smartphone and its influence on academic performance of students of B. Ed (hons.) from department of teacher education, Shah Abdul Latif University, Khairpur Mirs.

Literature Review

Yalcin, Ozkurt, Ozamaden & Yagmur (2020) worked on a hypothesis; smartphone addiction has positively affected academic achievement. To measure the smartphone addiction, a scale was used, and GPA (Grade Point Average) was considered as academic performance of students. The findings support the hypothesis and suggest that students should be given

a fixed amount of data/GB to reduce or limit their daily usage. Yalcin (2020) recommend that smartphones should be used as a teaching tool and the apps used by students should be supervised by teachers and monitored by parents.

Ahmed, Salman, Malik, Streimkiene, Soomro & Pahi (2020) piloted research intended to determine the association of students' academic performance in universities and smartphone use of university going students. Smartphones were used as an independent variable (SMS, MMS, entertainment, and warp-speed processing) with moderating effect of technology and addiction and mediating effect of attitude and eWOM (electronic word of mouth) and attitude. Data was collected through a survey and research found that attitude and eWOM (Mediators), technology and addiction (Moderators) both showed positive impact between students' smartphone usage and their academic performance.

Domoff, Foley & Ferkel (2020) conducted a research study intended to measure mobile phone addiction and its relationship with academic performance of students. Smartphone addiction was measured by an instrument named APU (Addictive Pattern of Use) and students' grades were considered as their academic achievement. This study finds that smartphone addiction in students can be a risk factor for decreasing the academic performance.

Nand, Pitafi, Kanwal & Rasheed (2019) piloted a research study by using the role of self-efficacy as moderator in between smartphone usage of students and their academic performance. They used a survey instrument. The results show that self-efficacy of students had moderation effect of intention in using the smartphone for learning purposes and suggested that there should be a free WIFI system in universities with a usage monitoring system. In addition to this, the scholars should arrange some workshops, conferences and trainings focusing on the benefits of using a smartphone for academic purposes.

 Mubassira & Das (2019) examine the association between academic performance of students and their smartphone usage. It also addresses the link between regular smartphone use by junior and senior students that the seniors are using smartphones more than juniors? Or juniors are the addict ones? This study had also shown the influence of smartphone usage on obtained CGPA of students. Data was collected through online surveys, interviews and an application installed on students' smartphone for collecting real-time data. It was a longitudinal study of two months to analyse the students' smartphone usage. Interviews were conducted to know about the time spent on studies as well as on using different apps.

Through interviews Mubassira & Das (2019) concluded that students' own ideas and mostly used apps influence students' study behaviour and CGPA. The study found that smartphones are mostly used for social networking, fun, and enjoyment purposes which hinder students' academic performance. Juniors show more negative effect on their study as compared to seniors. Overall, the results show negative association between both the variables. It suggests using a prototype app in students' phones which helps to reduce the overuse of apps and improve academic performance.

Khan, Khalid & Iqbal (2019) conducted a research to reveal the association of addictive use of smartphones with academic performance of students and worked on four hypotheses; H1: GPA (Grade point average) and smartphone usage have negative association, H2: There is a negative relation between smartphone use and time management, H3: there is a positive relation between social networking sites and GPA and H4: SNS (Social Networking Sites) and time management usage have negative association. A self-administered survey was used for data collection. Pearson correlation, descriptive statistics, multiple linear regression, and bivariate correlations were used for data analysis. From results H1, H2 and H4 were proven while H3 was not supported. The study suggested that students should have a proper time management schedule and they must be trained and monitored to use smartphones in a beneficial way.

Han & Yi (2018) conducted a study having a main objective to find out the impact of smartphone use of college students on their expected academic performance. This study found that social communication skills were being influenced by self-efficacy which affects student's behavioural intentions to use smartphones that shows positive impacts on the academic performance. This concluded that smartphones positively affect academic performance, and the teachers should be aware of this worth noting issue.

Felisoni & Godoi (2018) conducted research to test the actual average time of using a smartphone per day and academic performance. Questionnaire was used for measuring self-efficacy during learning and usage perception. The app tracker was installed in the phones of randomly selected students and a record of two weeks was obtained from them and their previous CGPA was used as their academic performance, but it was not revealed to them and their previous CGPA was collected from the office. Then, the actual and reported usage was compared. The study shows a significantly negative association of academic performance with overall spent time on using smartphone.

Anshari, Almunawar, Shahrill, Wicaksono & Huda (2017) intended to answer a question that Is smartphone acts as learning experience or learning interference? They collected the data through focus group discussion and to collect the material on advantages & disadvantages of using smartphone especially in academic learning purpose. Descriptive analysis was used for subject matter and correlation between variables. The results showed that students spend most of the time using smartphones, they use the smartphone to get help in studies inside and outside of class and it supports learning. Further this study proposed a conceptual model to embed the smartphone in learning context and consider this gadget as a teaching aid, and it should be included in curriculum and syllabus, and to be used by the teachers as an evaluation and assessment tool.

Alosaimi, Alyahya, Alshahwan, Mahyijari & Shaik (2016) investigated smartphone addiction in students at university at Saudi Arabia. A scale named PUMP acronym of problematic use of mobile phone and a self-administered survey was used to collect the data. Descriptive statistics, t-test, Karl Pearson correlation coefficient and Regression analysis was used to analyse the gathered data. The study found that smartphone addiction affects negatively on energy level, eating routine, sleeping schedule, weight, workout, and academic performance.

Anam, Shah, Hussin, Khan, Asif & Qazi (2015) study aimed to know the perspectives of students about the impacts of smartphone usage on their personal life, academic and psychosocial factors by using a structured self-administered questionnaire with some close ended questions was used to know about smartphone daily usage and found negative impacts on life.

Shazad, Ahmed, Hussain & Raiz (2015) investigated the mobile phone usage of university students in cities (twin) of Pakistan (Islamabad and Rawalpindi). The data was collected by using a self-structured survey instrument. Study found that smartphone usage kills time and creates loss in studies and its addiction negatively impacts on close relationships of students. The study recommends the teachers and parents to give the guidelines and clear instructions to use the smartphone properly and to have a vigilant eye on what their students or children that how they are using the smartphone? What is being surfed by them?

Lee, Cho, Kim & Noh (2014) aimed to answer the question: is there any difference in self-regulation or learning flow of students due to smartphone addiction? For these two questionnaires were used; questionnaire by national information society agency (NISA, 2011) to measure the addiction level of smartphone and questionnaire by Soo & Kim (2012) to measure the self-regulation and learning flow of students.

The results showed that smartphone addiction decreases self-regulated learning and effects on learning-flow with a constant interruption by highly used applications.

Development of hypotheses

Craving: Craving to use a smartphone refers to have the feeling of anxiety and impatience to use the smartphone or always having this gadget on mind (Ezoe et al., 2016). Smartphone's usage can be craved as it is a mood switch device that can control delight or relief while using it (Turel et al. 2011). Craving to use smartphones regarding the internet has been exhibited as problematic treatment (Caplan et al. 2009; Caplan 2010). Some users crave to use the smartphone to reduce tension, loneliness, stress, depression (Larose et al., 2003), thus this craving to use the smartphone in excess creates dependency on it (Khang et al. 2013). In this research, it is proposed that if any user experiences the craving to use smartphone this means that most probably, she/he is addicted to smartphone. The following hypothesis is provided.

H1: *Students' craving to use smartphones is positively associated with smartphone addiction*.

Social Relationships: Communications through smartphone are more interesting and friendly as compare to social relations of real life family and friends (Ezoe et al., 2016). Smartphone users have more online friends on social sites than non-users (Eun and Sangwon, 2015). When browsing the internet or using social network interruption exhausts a smartphone user and causes anxiety to reply than usual breaks like walking and face to face gossiping with friends (Rhee and Kim, 2016). According to Yoo (2011) interpersonal communication and activities of any society can be described by social motive. Xu (2012) believed that the social relationships through smartphone are long lasting. LaRose et al., (2003) conducted the research on cyber-relationship and found that the user who seeks to have more online relationships will have obsessive problems of smartphone usage. Social needs related positively with excessive use of smartphones examined by (lee, 2002; Khang et al., 2013). Nowadays smartphones are believed as the crucial tool for interpersonal communication. Therefore it is hypothesized that if a person is having the motive of social relationships via smartphone then he/she is expected to become addict to smartphone. Thus, the following hypothesis is proposed:

H2: *Social Relationships are positively associated with Smartphone Addiction*.

Overuse of Smartphone: A long and uncontrollable usage of phone for a long period of time even after trying to control one's usage of smartphone to get the same level of individual experience previously is referred to

overuse of smartphone (Ezoe et al., 2016). Earlier research (Griffiths & Hunt 1998) declared that the hobby to play video games is the key motive for young ones to use smartphones that leads to excessive play and in result they indulge in overuse of smartphone and it may cause different health disorders and problems like sleeping, stress and anxiety (Thomée et al., 2011). The same views were given by Toda (2013) that any people with the intension of having entertained by using smartphone may not control use of it. Lee (2002) declared that Boredom also significantly influences overuse of smartphone and that leads towards addicted behaviour of users (Chiu et al. 2004). Stewart & Devine, 2000 stated that sometimes an individual unconsciously uses a smartphone for a long span of time. Some studies (Thomas & Martin, 2010; Anand & Nalwa, 2003) declared that students are smartphone addicted due to overuse of it. A research piloted by (Khang, 2013) acknowledged that individuals gain self-satisfaction through overuse of smartphones and one who overuses it is smartphone addicted. Therefore, for this study it is hypothesized that if a person overuse smartphone, then it is likely that s/he will become addicted.

H3: *Overuse of Smartphone is positively associated with smartphone addiction*.

Smartphone addiction influencing academic performance: Along with internet accessibility and social interaction, smartphones provide an opportunity to share documents, produce new material, and provide many more academic helps (Gökçearslan et al., 2016). Previous research (Yoo 2011) posits that smartphones are used by the individuals to share the information for academic purposes. It is easier to download or get any sort of information from millions of websites related to any field just by a single click or by typing a single word (Tella, 2007). Different studies (Chen et al., 2001; Chen, 2006) examined that majority of the smartphone users meet an addiction level where they use their smartphone for emailing to seek information hence smartphone addiction immediately reinforced as per required information of the users. It was supported by (Song et al., 2004) that reinforcement is a helpful factor in academic activities that effects from the pleasure of information seeking and causes maladaptive dependency of users on smartphones. Smartphones in reference to academic activities enhance academic performance of students Jonas (2002). Yoo, (2002) supported the same that the use of smartphones in academic activities enhance CGPA of students. Students can easily download specific subject related information, do communication, complete assignments and other resources for learning purposes by using smartphones (Tella 2007). Smartphones have many benefits, the excessive use of it is always at risk and that all depends on how users utilize this

device for academic purposes (Young & Rodgers 1998). Hence this study proposes a hypothesis:

H4: *Smartphone Addiction is positively associated with Academic performance*.

Conceptual Framework

The conceptual model of current research is constructed on the basis of following theories; Theory of Reasoned Action and Theory of Planned Behaviour and widespread literature review addressing smartphone addiction and its influence on students' academic performance and detects three main determinants taken from above mentioned theories. The behaviour intention is considered as the addicted behaviour towards smartphone and its first antecedent is 'craving' as attitude to create smartphone addiction, seconds is 'social relationships' as subjective norms to create smartphone addiction, and the third is 'overuse' considered as perceive behaviour to create smartphone addiction, and this addicted behaviour influence in students' academic performance (behaviour) as per the model of theory of planned action by Ajzen (1985). Theory of Reasoned Action (Ajzen & Fishbein, 1975; Ajzen & Fishbein, 1980) is vastly used as a predictor behavioural model or as an analyst of one's intended behaviours. The research study of Hartwich, Sheppard and Warshaw (1988) noticed that model of theory of reasoned action best predicts the behaviour and behavioural intentions. The theory posits that attitude and subjective norms shapes the behaviour intentions which influence the behaviour. A slight change in above model of theory of reasoned action proposed by Ajzen (1985) named as theory of planned action. The change was an addition of an element in shaping the behavioural intentions as perceived behavioural control. Attitude refers to beliefs, values, feelings and disposition towards any action. It is the mental state of one's belief to perform certain action. Subjective norms refer to one's' perceptions of societal belief about any behaviour. It is actually the social influence which shapes individuals' behaviour. Perceived behaviour refers to shaping one's behaviour by giving more opportunity and resources they possess, the greater the opportunities and resources the more they will perceive certain behaviour. This attitude, subjective norms and perceive behaviour creates the behavioural intention which shapes individual behavior.
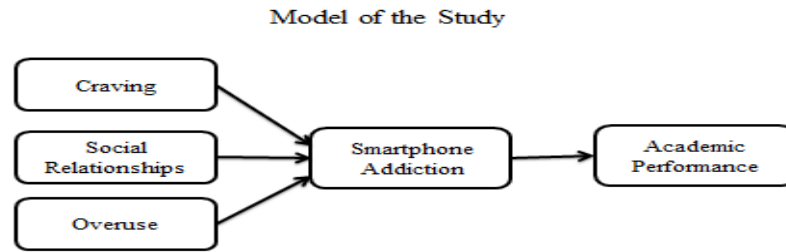
Model of the Study

Figure 01. Conceptual model of the study

Objectives of the Study
Research Design
The objectives of the study were:
1. To identify the determinants for smartphone addiction.
2. To evaluate the influence of smartphone addiction on students' academic performance.

Methodology

The study designed and uses a self-administered questionnaire used as a survey instrument for data collection. This study uses purposive sampling (non-probability) technique and survey method was adopted. The data was collected through online questionnaire via Google Forms from 300 students of Bachelor of Education (hons.) studying in the Department of Teacher Education, Shah Abdul Latif University, Khairpur Mirs'. Respondent's perceptions were recorded by using five-point Likert scale ranging from 1 to 5; 1 as Strongly Disagree, 2 as Disagree, 3 as Neutral, 4 as Agree and 5 as Strongly Agree. Instrument contains five constructs; craving, social relation, overuse, smartphone addiction and academic achievement. During the progress to develop the questionnaire each item was adopted from previous researchers, items, their source and measurement (factor loading) are given below.

The first construct of the study was craving adopted from Ezoa et al. (2016) having five items; I feel anxious when I forget to take my smartphone with me, I feel anxious when I am not able to use my smartphone, I feel impatient and restless when my smartphone is unavailable, I feel anxious when I have not prepared my charging pack or battery for my smartphone, It would be difficult if I was not allowed to use

a smartphone, with factor loading of 0.695, 0.694, 0.567, 0.634 and 0.687, respectively.

The second construct of the study was social relationships adopted from Ezoa et al. (2016) having four items; My social communications via smartphone are more frequent than in real life, My social communications via smartphone are more enjoyable than in real life, My social relationships with smartphone friends are more intimate than with my real-life friends, I express my true feelings better while communicating through smartphone rather than talking face-to-face with factor loading of 0.635, 0.642, 0.538 and 0.623, respectively.

The third construct of the study was social relationships adopted from Ezoa et al. (2016) having six items; I have missed planned work due to smartphone use, I use my smartphone for longer periods than I had intended, I have tried to shorten my smartphone use time, but always fail, Spending a lot of time on my smartphone has become a habit, I need to spend an increasing amount of time using my smartphone to achieve the same satisfaction as before, I involuntarily touch my smartphone with factor loading of 0.903, 0.584, 0.690, 0.523, 0.621 and 0.421, respectively. The fourth construct of the study was smartphone addiction adopted from Know et al. (2016) having four items; I feel pain in the wrists or at the back of the neck while using a smartphone, I have my smartphone in my mind even when I am not using it, the people around me tell me that I use my smartphone too much, I don't really want to go to places where smartphone signals are weak with factor loading of 0.902, 0.899, 0.901 and 0.821, respectively.

The fifth construct of the study was smartphone addiction adopted from Fox et al. (2016) having five items; I work consistently throughout the term and review regularly when the exams are close, I do all of my assignments as soon as possible after they have been set, While studying, I often think of real life situations to which the material that I am learning would be useful, I usually become increasingly absorbed in my work the more I do, I find that at times studying gives me a feeling of deep personal satisfaction with factor loading of 0.725, 0.715, 0.485, 0.687, and 0.676 respectively.

Findings
The rotated component matrix is presented below in table 1 that illustrates the highly correlated observed variables that are grouped together to form a latent variable based on value of factor loadings. According to the results, twenty-three observed variables are grouped together into five latent variables.

Table 01
Correlated observed variables

ITEMS	C	SR	O	SA	A
C1	0.776				
C2	0.749				
C3	0.678				
C4	0.751				
C5	0.558				
SR1		0.680			
SR2		0.688			
SR3		0.750			
SR4		0.727			
O1			0.562		
O2			0.671		
O3			0.688		
O4			0.771		
O5			0.739		
SA1				0.728	
SA2				0.777	
SA3				0. 809	
SA4				0.615	
AP1					0.565
AP2					0.706
AP3					0. 696
AP4					0.654
AP5					0.703

Confirmation and modification of the model is done with analysis of model fitness for validation of dataset used for study. AMOS was used for CFA (confirmatory factor analysis). All factor loading values were greater than 0.5 and considered as significant, indicating strong convergent validity. Three types of fit measure were used to verify the model's fitness; absolute fit measure that included χ^2, RMSEA (Root Mean Square Error of Approximation), GFI (Goodness if index); incremental fit measures included AGFI (Adjusted goodness-of-fit index), TLI (Tucker Lewis Index), NFI (Normal fir index), CFI (Comparative fit index), and IFI (incremental fit index) and parsimony fit measures that included PNFI (Parsimony normed fit index) and PCFI (Parsimony comparative fit index) (Bollen, 1989; Hair et al., 2010). Structural model is used to get empirical

evidence to verify the relationship of variable hypothesized in the study. Indices of model-fit show the adequacy and acceptance of current model $\chi 2/df = 1.66$ (<3), GFI = 0.942 (>0.9), RMSEA = 0.047 (<0.08), AGFI = 0.915 (>0.80), TLI = 0.947 (>0.90), NFI = 0.905 (>.090), CFI = 0.959 (>0.90), IFI = 0.9960 (>0.90), PNFI = 0.702 (>0.50) and PCFI = 0.743 (>0.50). As these indices have less effect of sampling size that is why used frequently (Hair, 2010). Table 2 shows paths and variables with their beta value, standard estimates, critical ratio, and significance value. The significance value of craving on smartphone addiction is 0.168 which doesn't meet the threshold (i.e., < 0.05) so hypothesis one (H1: Students' craving to use smartphones is positively associated with smartphone addiction) is not supported. The significance value of social relationships on smartphone addiction is 0.000 which meet the threshold (i.e., < 0.05) so hypothesis two is supported. The significance value of overuse on smartphone addiction is 0.032 which meet the threshold (i.e., < 0.05) so hypothesis three is supported. The significance value of smartphone addiction on academic performance is 0.000 which also meet the threshold (i.e., < 0.05) so hypothesis four is also supported. Only first (H1: Students' craving to use smartphones is positively associated with smartphone addiction) proposed hypothesis was rejected whereas remaining three hypotheses (H2: Social Relationships are positively associated with Smartphone Addiction, H3: Overuse of Smartphone is positively associated with smartphone addiction and H4: Smartphone Addiction is positively associated with Academic performance) are supported showing that social relationships and overuse of smartphone creates its addiction which positively influence on academic performance. Further, Adjusted R square value is 0.350, showing that 35% of the change in academic performance can be predicted from smartphone addiction, craving, social relationships, and overuse. The value of F-stats is 41.239 and is significant indicating that the combination of the predictors significantly predicts academic performance.

Table 02
Confirmation and modification of the model

Path	B	Standard Estimates	Critical Ratio	p-value	Results
C→SA	0.084	0.060	1.380	.168	Not Supported
SR→SA	0.361	0.059	6.322	.000	Supported
O→SA	0.122	0.059	2.144	.032	Supported

SA➔A	0.304	0.050	5.514	.000	Supported
Adj. R²		0.350			
F-stats		41.239			
(Prob.)		(0.000)			

Table 2 shows paths and variables with their beta value, standard estimates, critical ratio, and significance value. The significance value of craving on smartphone addiction is 0.168 which doesn't meet the threshold (i.e., < 0.05) so hypothesis one (H1: Students' craving to use smartphones is positively associated with smartphone addiction)is not supported. The significance value of social relationships on smartphone addiction is 0.000 which meet the threshold (i.e., < 0.05) so hypothesis two is supported. The significance value of the overuse on smartphone addiction is 0.032 which meet the threshold (i.e., < 0.05) so hypothesis three is supported. The significance value of smartphone addiction on academic performance is 0.000 which also meet the threshold (i.e., < 0.05) so hypothesis four is also supported. Only first proposed hypothesis was rejected whereas remaining three hypotheses (H2: Social Relationships are positively associated with Smartphone Addiction, H3: Overuse of Smartphone is positively associated with smartphone addiction and H4: Smartphone Addiction is positively associated with Academic performance) are supported showing that social relationships and overuse of smartphone creates it addiction which positively influence on academic performance. Further, Adjusted R square value is 0.350, showing that 35% of the change in academic performance can be predicted from smartphone addiction, craving, social relationships, and overuse. The value of F-stats is 41.239 and is significant indicating that the combination of the predictors significantly predicts academic performance

Discussion

The study intended to examine students' smartphone addiction and its influence on their academic performance. Craving, social relationships and overuse of smartphone were used to measure smartphone addiction and students' academic performance was examined by taking smartphone addiction as influencing construct. It was found that social relationships and overuse of smartphone significantly affects smartphone addiction while craving was found insignificant whereas smartphone addiction positively affected students' academic performance. The results shows that social relationships create smartphone addiction which means

students would prefer using smartphone to be in touch with their social circle.

Park and Lee (2012) also found the similar results that social relationships and social influence significantly affect smartphone usage. Additionally, the study of Arif, Aslam and Ali (2016) also found positive association among social influence and dependency of students on smartphone. Similarly, research founds a positive significant association among overuse and students' addiction to smartphone. Consistent results were found by Li, Lepp and Barkley (2015) that students' overuse their smartphone as it is their enjoyment device and after some time, they become addicted to it. Some other studies (Al-Qosairi & Abo-Arrab, 2014; Philips & Alasdair, 2011; Campbell, 2005) also found similar results that extreme usage of smartphone leads to its addiction. Further investigation during research revealed that addiction to smartphone has a positive association with academic performance of students which shows that their addiction to smartphone has a positive influence and seems like a helpful effect for their performance academically. This outcome has consistency with some of the early research in which influence of smartphone addiction on students' academic performance was studied (Boahene, Fang & Sampong, 2019; Qi, 2019; Viciana, Banque & Calafell, 2019; Hossain, Nurunnabi, Hussain, Saha, & Wang, 2019; Shahib & Aziz , 2017; Han & Capraro, 2016; Schaal & Lude, 2015; Molina, Pertegal, Mora & Jimeno 2018).

Conclusion

The major objectives of the study were to identify the determinants for smartphone addiction and to evaluate the influence of smartphone addiction on students' academic performance. Three hundred (300) B.Ed (hons.) students of Shah Abdul Latif University Khairpur were the participants of study. It was concluded that social relations and overuse of smartphone creates its addiction. It was also found that smartphone addition positively influence students' academic performance.

The study recommended the teachers to incorporate the technology in pedagogy and use smartphone as a teaching aid, embed the smartphone in learning context, design the activities/assignment which needs to be completed via using smartphone (as designing an assignment on Google form) and use smartphone as an assessment and evaluation tool (Design some quizzes or games as a formative assessment and evaluate students' learning by earned points). Further, it suggest school management to make the proper rules and regulation regarding the usage of smartphone for students as well as for the teachers either in the classroom or outside the

classroom and ensure that provided guidelines are being followed with consistency, provide the facility of free WIFI system in universities as it is an important aspect for using a smartphone in learning purpose or arrange a half hour session focusing on awareness about the benefits of using a smartphone for academic purpose and present an image of smartphone as a powerful channel for learning on the very first day of their entry to the university i.e. on the orientation day of newly admitted students.

In addition, policy makers are recommended to integrate the use of smartphones in curriculum of different subjects and design and plan such activities which incorporate the usage of smartphone. Moreover, future researchers can replicate this study with different populations to explore the addictive potential of smartphone usage, attempt a study with different constructs or determinants for smartphone addiction, change the population and context of the research as this study collected data from single university future researchers can collect data from more than one university and can compare the addictive pattern of students among different universities or add any mediator or moderator in the research model used in this study to have different insights. As this study has tested the direct relationships between dependent and independent variables.

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