Original Article

Mediating Effect of Academic Amotivation between Smartphone Addiction and Academic Procrastination among University Students

Aatif Iftikhar¹, Abdul Wahab Liaquat², Hina Shahid³

¹Assistant Professor, Department of Media & Communication Studies, National University of Modern Languages (NUML) Islamabad

²Assistant Professor, Department of Psychology, Government Gordon Graduate College, Rawalpindi ³Assistant Professor, Department of Arts and Media, Foundation University Islamabad Correspondence: <u>atiftikhar@numl.edu.pk</u>¹

ABSTRACT

Aim of the Study: Based on the Media System Dependency theory, the study aims to investigates the mediating effect of academic amotivation between smartphone addiction and academic procrastination. The literature shows that new media technologies, especially smartphones have both positive and negative effects on users.

Methodology: In this study researchers used cross-sectional research design and is quantitative study which employed survey method to collect data from students. The sample constituted (N=896) university students from undergraduate and graduate programs. Information was obtained on three rating scales i.e., Problematic Use of Mobile Phone Scale (Merlo et al., 20003), Academic Motivation Scale-College version (Vallerand et al., 1992), and Academic Procrastination Scale-short form (Chakraborty & Chechi, 2019).

Findings: The findings indicate significant positive correlation between smartphone addiction and academic procrastination (r = .56, p < .01), smartphone addiction and academic amotivation (r = .34, p < .01), and academic procrastination and academic amotivation (r = .41, p < .01). The regression model suggests that smartphone addiction positively predicted academic procrastination (model 1: $\beta = 0.57$, p < .05; model 2: $\beta = 0.48$, p < .05). Academic amotivation also positively predicted academic procrastination ($\beta = 0.26$, p < .05). As hypothesized, a partial mediation of academic amotivation was observed as the regression weights for the impact of smartphone addiction on academic procrastination were reduced in model 2 ($\beta = .48$) comparing to model 1 ($\beta = .57$). Significant gender differences were also observed in the study with male students getting comparatively higher scores on all three variables than female students.

Conclusion: The study concluded that smartphone addiction significantly affects academic performance of the students.

Keywords: Smartphone Addiction, Academic Procrastination, Academic Motivation, Media Systems Dependency Theory.

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Introduction

The use of smartphones is rapidly growing. According to an estimate (Park & Park, 2021) smartphones were used by 3.8 billion people in the world during 2021. Today a smartphone is the alternate of a computer held in hand and connected to the internet thus offering access to many computer software as mobile applications (apps). The enhanced facilitation offered by these devices made them an integral part of daily life (Park & Park, 2021). New media technology and especially smartphones have positive as well as negative effects on users. There are many features and facilities smartphones have offered. However excessive use of these gadgets has disturbed our life patterns. Smartphones bring negative consequences for the users who are unable to control their dependency on these gadgets and resultantly they have to face compromised daily routine (Busch & McCarthy, 2021).

Children have shifted their focus from traditional media like TV and radio to digital media like tablets, smartphones, laptops and similar interactive media. Definitely a smartphone is more attractive due to its interface and multiple applications. Today students' learning is contingent to the technology. The use of smartphones assist students' learning and cognitive abilities (Abbasi et al., 2021). Due to the continuous and increased mobile phone usage the school students are facing issues which are social, physical and psychological. Studies reported anxiety, depression, poor sleep quality, less social interactions and exposure to inappropriate content. All such factors affect their educational performance at school (Lee & Kim, 2021). Baig (2014, as cited in Fook et al., 2021) revealed the mobile phone usage interrupts academic focus of school and college students.

Study Objectives

This study aims at discerning to;

- Understand the relationship among smartphone addiction, academic amotivation and academic procrastination in students.
- Look for mediation of academic amotivation between smartphone addiction and academic procrastination.
- See gender differences in mean levels of smartphone addiction, academic amotivation and academic procrastination.

Hypotheses

Following hypotheses were tested for the present study

- 1. There is a positive relationship between smartphone addiction, academic amotivation and academic procrastination.
- 2. Academic amotivation mediates between smartphone addiction and academic procrastination.
- 3. Male students will show higher levels of smartphone addiction, academic amotivation, and academic procrastination.

Theoretical Literature

Media System Dependency (MSD) Theory provides theoretical foundation for this study. Ball-Rokeach and Defleur (1976 as cited Alabi, 2014) maintains varying psychological effects of media usage on different people. These effects are cognitive, effective and psych-motive. Mobile dependency (MD) refers to a person overwhelming use of mobile phone, when absence of cellphone triggers unrest (Atadil et al., 2021). The level of smartphone addiction indicates difference in the educational performance and personality of the students (Wu, 2018). Dependence on smartphones reflects smartphone addiction in students and workers thus checking smartphone frequently (Atadil et al., 2021).

Mobile phone dependency effects cognitive capacity of users. Heavy mobile phone users experience

significantly compromised cognitive cost as compared to light mobile phone users. Studies suggest that regular reliance on smartphones for accessing information, social connectivity, entertainment, use of camera and different mobile applications may cost us our cognitive abilities (Ward et al., 2017).

Research studies indicate negative effects of smartphones addiction on the academic performance of students. While using cellphones excessively they neglect many things including their education, physical and emotional health (Sunday et al., 2021). The growing addiction and extensive negative effects of cellphones urge to initiate solution to the problem by increasing awareness, and devising policies by conducting relevant research in the field.

Studies indicate addiction of smartphone usage in students is increasing and they cannot state any compelling reason except their reliance linked with emotional stability. Every day they spend considerable time with mobile phone screens but rarely for academic purposes. Generally students spend six hours per day to 40 hours per week on their smartphones (Fook et al., 2021). Research study finds that 67% students face distraction due to the use of cellphones. Mobile ringing and similar kind of gadgets can have negative impact on student's learning in classrooms. Sometime they find it difficult to concentrate on learning due to the disturbed concentration caused by smartphones. Educational institutions should formulate some rules and regulations regarding mobile phone usage and teachers can demonstrate such behaviors which students may follow (Attia et al., 2017b). In a research study titled "The Use of Mobile Applications in Higher Education Classrooms: An Exploratory Measuring Approach in the University of Aveiro" by Oliveira et al., (2021) reported that students significantly use mobile phone in classrooms however teachers should ensure that they are using these gadgets to meet learning outcomes. Some of the students emphasized integrated usage of mobile phone both by teachers and students. Almost 40% students expressed this desire for teachers to enhance use of mobile phone applications and devices in classrooms.

Sumuer (2021) found that restricted use of mobile phone during class time increased students' scores in tests. Regulated mobile phone usage of college students reduces negative effects and they experience greater focus towards studies due to the absence of multitasking distractions and off-task activities. With the implementation of mobile phone restriction students showed more cognitive involvement in learning process during the class. Banning cell phones is necessary to enhance students focus in classrooms. However educational technologies can be used to assist technology based learning for students. The term digital media encompasses many kinds of gadgets some of them are essentially being used in educational institutions and others need to be regulated like controlling monitoring use of smartphones by teenagers especially by school students (Selwyn & Aagaard, 2020).

Researchers introduced a new term FoMO which means fear of missing out, for example; students cannot help using smartphone during the lecture because they desire to be cognizant about everything happening on social media. Instructors in classrooms need to follow some rules and regulations to limit negative effects of FoMO, particularly for students' attention during the lectures. Students reported many negative effects of FoMO like distractions, compromised attention and learning disengagements. They also suffered from poor grades, lack of concentration, remembering information and performing tasks effectively (Al-Furaih & Al-Awidi, 2021).

Though smartphones have some positive effects on students learning however there is issue of inequality in terms of having access to these latest gadgets. Students who are low socio-economic background or unaware of the different features of smartphones cannot get benefits of these technologies. An equal access to such technologies can be beneficial to the academic performance of all students (Han & Yi, 2019). Researchers and educationist are optimistic regarding the positive use of smartphones for learning in classrooms. The rapidly changing use of technology has enhanced personal use of gadgets which are considered now important for education. In developed countries schools are shifting from institutionally provided technologies to individually owned devices. In newly prevailed education system teachers and students are required to have their personal devices usually approved by schools being termed as

BYOD—i.e. 'bring your own device'. With embedding these technological innovations different transformations are being observed in contemporary schooling. The debate still goes on whether such technological changes are positive or negative as personal use of mobile phone by students involve many harmful uses like, bullying, cheating, sexting and some other anti-social activities (Selwyn et al., 2017).

A research study found that young Indian students have varying effects and usage patterns of smartphones. Female students spend more time while using smartphones as compared to male students. Interesting smartphone addictions brought more negative impact and poor academic performance to male students than the female students. Smartphones have introduced many positive aspects as connectivity, entertainment, access to information and online services. There are many negative effects where youth and students are particularly vulnerable, many of them remained unmindful thus meeting accidents, while taking using cellphones, taking selfies, engaged in viewing adult content (Nayak, 2018).

Academic Procrastination

Academic procrastination is deliberate delay of academic activities which leads to dissatisfaction and feeling of distress and anxiety. Most of the students face academic procrastination however it is a complex concept which consists of many issues including time and emotions management (Akınci, 2021; Zacks & Hen, 2018). Significant academic procrastination reported in the students having smartphone addiction like excessive use of social media (Li et al., 2020;Simbolon & Daulay, 2022). Spending a lot of time on using social media causes academic procrastination in individuals thus affects their academic performance negatively (TÜREL & DOKUMACI, 2022). There are different kinds of academic interventions which cause academic procrastination. Future studies need to probe different reasons of interventions and teachers should help students in reducing procrastinating tendencies (Zacks & Hen, 2018). Researchers found amotvation one of the important reasons for academic procrastination (Yurtseven & Doğan, 2019). Research studies indicate male students procrastinate more than the female students (Abdi Zarrin et al., 2020). The negative relation between academic procrastination, academic performance accompanied with academic life satisfaction reported higher in male students (Balkis & Duru, 2017).

Academic Amotivation

Amotivation refers to reduction in motivation, performing something without any intention or motivation (Wu-Ouyang, 2022). The lack of academic motivation brings boredom in students thus offering smartphone attraction as an easy escape (Amez & Baert, 2020). Individuals tend to face amotivation when they are unsure about the reward. They also remain confused about their efforts and the associated outcomes (Yurtseven & Doğan, 2019). Literature indicates that female students have more intrinsic and extrinsic motivation than their male counterparts (Gupta & Mili, 2016).

Smartphone Addiction

Research studies indicate smartphones addiction in young students. Excessive use of smartphones brings negative effects on educational performance including physical and mental health (Amez & Baert, 2020). Though smartphones offer many positive contribution to studies, like speedy communication, access to information and unlimited data however so far literature indicate unregulated problematic use of smartphones for you students (Wang et al., 2015). Female students faced less effects of smartphone addiction whereas male students reported to neglect academic tasks and showed poor mental and physical health (Nayak, 2018).

Method

Sample

The sample of 896 students from the universities situated in Islamabad was collected via online platforms. The mean age of the sample was ---- (M = , SD =), and it comprised of 460 male (51.3%) and 426 female (47.5%) students. Students from undergraduate (n = 473; 52.8%), graduate (n = 207; 23.1%), and

postgraduate programs (198; 22.1) were included for the study. Mainly students from four faculties were engaged i.e., faculty of Social Sciences (n = 507; 56.6%), faculty of Arts and Humanities (n = 153; 17.1%), faculty of Engineering and Information Technology (n = 82; 9.2%), and Faculty of Management Sciences (n = 136; 15.2%).

Instruments

1. Problematic Use of Mobile Phone Scale (PUMP Scale). The PUMP Scale is 20 items, 5-point Likert scale developed by Merlo et al., (2013). This scale had been developed based on 10 substance use criteria proposed by the Task Force on Substance-Related Disorders of the Diagnostic and Statistical Manual of Mental Disorder-5th Edition (DSM-5) del Barrio, (2017). The authors of the scale reported a very high Cronbach alpha reliability of $\alpha = .94$, while a principal component analysis yielded one-factor solution. The sale shows significant correlation with other similar measures thus providing good convergent and divergent validity evidence. The 10 substance abused criteria taken into consideration in the scale include: tolerance, withdrawal, longer time than intended, great deal of time spent, craving, activities given up or reduced, use despite physical or psychological problems, failure to fulfill role obligations, use in physical hazardous situations, use despite social or interpersonal problems. As the present study intends to measure smartphone addiction, we operationalized PUMP Scale as a suitable measure of that.

2. Academic Motivation Scale-College Version. In order to measure academic amotivation among students, we used Academic Amotivation Scale-College version developed by Vallerand, Pelletier, Blais, Brière, Senécal, and Vallières, (1992). It is 28-items, 7-point Likert scale ranging from 1 = does not correspond at all to 7 = corresponds exactly. The scales consist of seven subscales of four items each. As this study manly focused on academic amotivation of the students, so only Amotivation scale comprising items 5, 12, 19, and 26 was used. The authors of the scale reported a satisfactory level of Cronbach alpha reliability ($\alpha = .81$) and test-retest correlation of .81. Separate subscales are confirmed by use of confirmatory factor analysis (Vallerand et al., 1992).

3. Academic Procrastination Scale-Short Form. This 5-items short form is developed by Chakraborty & Chechi, (2019) based on a McCloskey's full length 25-itmes scale (McCloskey & Scielzo, 2015). The scale is in Likert format with a reported Cronbach alpha reliability of $\alpha = .61$. The confirmatory factor analysis for this scale showed* good fit indices for the items retained in the short form for the Indian population.

Research Design

This was a cross-sectional study conducted in a population of university students. Population segments included both male and female students studying in undergraduate, graduate, and postgraduate programs. An online survey was used for the purpose of data collection.

Procedure

The study instruments were converted into google forms and generated links were sent to students in personal contact with researchers. The links were also shared on various student groups on social media platforms. The forms also included demographic information and consent to participate in research. Instructions were added in which students were informed about their right to participate or withdraw from the study. They were also informed about the confidentiality of their information, that was not intended to be used for any commercial purposes. Nowhere student names or other personal identities were asked. Researchers' emails were also provided to facilitate participants for any kind of correspondence they wanted to make. The study intended no physical or psychological harm to participants and conducted within the acceptable ethical standards.

Results

Table 1: Descriptive statistics and Cronbach alpha coefficients for the instruments used in the study (N = 896)

						_	Range
Scales	Items	α	M	SD	Skewness	Kurtosis	Actual
PUMP	20	.88	61.8	12.4	36	.37	20-96
PS	05	.84	15.6	4.3	14	45	5-25
AAS	04	.84	10.7	3.8	.24	41	4-20

Note: PUMP = Problematic Use of Mobile Phones; <math>PS = Academic procrastination Scale; AAS = Academic Amotivation Scale

Table 1 shows that all three scales have high reliability coefficients. Skewness and Kurtosis values for the scales are less than one that indicate normal distribution of scores and subsequent suitability of the data for parametric statistics.

Table 2: Pearson Correlation coefficients between main study variables (N = 896)

		1	2	3
1	Smartphone Addiction	-	.56**	.34**
2	Academic procrastination		-	.41**
3	Academic Amotivation			-
** p<	<.01			

Table 2 shows the three variables have significant positive correlation among them.

Table	3:	Linear	regression	analysis	for	mediation	of	academic	amotivation	between	smartphone
addict	ion	and aca	demic procr	astination	(N)	= 792)					

Variable	В	95% CI	SE B	β	R ²	ΔR^2
Model 1					.32**	.32**
Constant	3.40**	[2.13, 4.67]	0.64			
SMA	0.19**	[.17, 0.22]	.01	.57**		
Model 2					.38**	.05**
Constant	2.22**	[0.97, 3.46]	0.64			
SMA	0.17**	[0.15, 0.19]	.01	.48**		
AA	0.28**	[0.26, 0.35]	.03	.26**		

***p*<.05

Note: SMA = Smartphone Addiction; AA = Academic Amotivation; Outcome variable = Academic procrastination

Table 3 shows effect of smartphone addiction on academic procrastination by the mediation of academic amotivation. In model 1, the R² value of .32 shows that smartphone addiction explains 32% variance in the academic procrastination with F(1, 791) = 376.6, p < .05. The findings reveal that smartphone addiction positively predicted academic procrastination ($\beta = 0.57$, p < .05). In model 2, the R² value of 0.38 indicates that smartphone addiction and academic amotivation explain 38% variance in academic procrastination with F(2, 790) = 238.1, p < .05. The findings show that smartphone addiction ($\beta = 0.48$, p < .05) and academic amotivation ($\beta = 0.26$, p < .05) positively predicted academic procrastination. The ΔR^2 value of .05 indicates 6% change in the variance of model 2 comparing with model 1. The Regression weights of smartphone addiction in the model 1 reduced from 0.57 to 0.48 in the model 2, showing partial mediation. Mediation was also observed as a significant indirect effect of smartphone addiction on academic procrastination (.08, CI = .02, .04).



Figure 1: Figure 1 shows standardized regression coefficients. Solid line represents total effect of smartphone addiction on academic procrastination including mediator (path c`), while dotted line shows direct effect of smartphone addiction on academic procrastination excluding mediator (path c).

Table 4: Mean, Standard Deviation and t-values for male and female students on smartphone addiction, academic amotivation, and academic procrastination (N = 831)

	Males $(n = 4)$	Males (<i>n</i> = 432)		Females (<i>n</i> = 399)					
Variable	M	SD	M	SD	t	P	LL	UL	Cohen's d
SMA	62.8	12.5	60.8	12.3	2.38	.02	0.36	3.75	0.16
AA	11.2	3.8	10.2	3.6	3.94	.00	0.51	1.52	0.27
Academic procrastination	16.3	4.2	14.8	4.3	5.27	.00	0.97	2.13	0.35
n - 05									

p = .05

Note: SMA = *Smartphone Addiction; AA* = *Academic Amotivation*

Table 4 shows results of independent samples t-test. The results indicate that male students scored significantly higher on all three variables in comparison to females. Small effect sizes ranging between 0.16 to 0.35 were noted (Cohen, 1992).

Discussion

The psychometric analysis of the scales indicated high reliability coefficients and subsequent suitability of use in the study. Findings show that smartphone addiction, academic amotivation and academic procrastination have significant positive correlation with each other. Regression analyses depict smartphone addiction has a statistically positive impact on academic amotivation as well as academic procrastination. Academic amotivation also has a significant positive impact on academic amotivation is found between smartphone addiction and academic procrastination. Academic procrastination. These findings contain support in already existing literature discussing negative impacts of excessive use of smartphone on students' academic performance. Studies like Sumuer (2021), show that restrictive use of smartphones leads to increased cognitive involvement of students in academic procrastination (Li et al., 2020; Simbolon & Daulay, 2022), and negatively effects academic performance (Turel & Dokumaci, 2022). The mediation of academic amotivation of academic amotivation evidently leads us to believe that excessive engagement with smartphones consumes students' psychological (and might be physical) resources. It brings down their interest in studies and they keep on pending their academic tasks. This might subsequently result in frustration and mental health

issues linked with poor academic performance and achievement (Navak, 2018). This also suggests that smartphone addiction becomes a vicious cycle in students. As indicated by Amez & Baert (2020), excessive smartphone usage leads to low academic motivation and boredom with studies, and students might find more smartphone usage as an escape route to enhance their mood, consequently finding themselves in an endless loop. Interestingly, we found this phenomenon more prominent in male students when compared to females. Results of the present study show that mean scores on all three variables i.e., smartphone addiction, academic amotivation, and academic procrastination are higher among males than females. These findings are not unique and find support in number of other studies in various other countries (Abdi Zarrin, et al., 2020; Gupta & Mili, 2016, Nayak, 2018). Culturally considering, males especially in Pakistan enjoy more freedom in academic as well as social settings. They have larger social circle, more freedom to engage with friends, can go outside more frequently, and spend time in activities other than studies. Females in comparison do not enjoy that much liberty in social settings. More social freedom though beneficial in many other ways might have some drawbacks of its own. Generally, in Pakistan, males are not better academic achievers when compared to females. The findings in the present study also confirm that females are better in academic motivation and are academically better organized than males. Overall, the results are well embedded in the existing literature and find support in studies conducted globally. This is a basic study that is descriptive in nature and does not identify causes of smartphone addiction. This study provides a way forward to look into nature of smartphone addiction as it appears to be a central theme impacting students academically. In the modern time and age, the human dependency on smartphones cannot be ignored when everything from ordinary communication to large scale businesses is linked with these devices and internet. There is a need to understand and endorse the balanced use of such devices that contribute positively to human wellbeing. Behavioral Interventions are needed when such balance is disturbed. The present study though not directly discussing interventions, implicitly emphasizes the need for them and future studies that can systematically determine the impact of such interventions.

Conclusion & Recommendations

The findings indicate smartphone addiction significantly affect academic performance of the students. Teachers should also implement some classroom rules to minimize distraction caused by these gadgets. Research suggests that classroom restrictions imposed by teachers on their students are beneficial and improve classroom learning environment (Attia et al, 2017a).

Cross-sectional studies based on surveys have consistently established a link between excessive use of smartphones and academic problems among students. There is a need for more diverse research designs especially experimental studies to establish causal relationships among variables.

Preventive approaches need to be discovered and considerable research should be done on the devising psychological and behavioral management strategies to reduce the excessive usage of smartphones especially in academic settings (Sunday et al, 2011).

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Conflict of Interest

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ORCID iDs

Aatif Iftikhar ¹ https://orcid.org/0000-0003-3132-369X Abdul Wahab Liaquat ² https://orcid.org/0000-0002-3291-8356 Hina Shahid ³ https://orcid.org/0000-0002-7334-992X

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