Investigating the Impact of Perceived Ease of Use and Perceived Usefulness towards Phubbing Behavior among University Students: Unveiling the Mediating Role of Smartphone Addiction

Kiran Ali[*] , Muhammad Mehmood Aslam[†], Anam Saif [‡]

Abstract

The present study intends to investigate the effects of perceived ease of use (PEOU) and perceived usefulness (PU) toward phubbing behavior. It also examines the mediating role of smartphone addiction between perceived ease of use and phubbing behavior as well as perceived usefulness and phubbing behavior. By drawing on the Technology Acceptance Model (TAM) as a theoretical lens, this study seeks to examine the direct impact of perceived ease of use and perceived usefulness towards phubbing behavior and see how these relationships are explained in the presence of smartphone addiction among students. The final sample comprised 210 students from twelve universities located in the twin cities of Pakistan. Structural equation modelling (SEM) was used in Smart-PLS 4 to test the hypothesized relationship. The findings indicated that perceived ease of use has a direct association with the students' phubbing behavior, and also this relationship is mediated through smartphone addiction. On the other hand, the perceived usefulness does not directly relate to the phubbing behavior. The study has meaningful implications for educators, future researchers, and policy makers regarding use of smartphone devices.

Keywords*:* Phubbing behavior, smartphone addiction, technology acceptance model, perceived ease of use, perceived usefulness

Introduction

In recent years, advances in communication technology have significantly reduced the stress traditionally associated with communication (Gummesson, 2004). In parallel, it has adverse effects with people concentrating more on devices such as smartphones. In today's world people are using smartphones and other appliances for

[*]Department of Leadership and Management Studies (LMS), National Defense University, Islamabad, Pakistan, Email: **ali.pariisrar@gmail.com**

[†] Lecturer, Department of Leadership and Management Studies (LMS), National Defense University, Islamabad, Pakistan, Email: mehmoodaslam@ndu.edu.pk

[‡]Lecturer - Department of Leadership and Management Studies (LMS), National Defense University, Islamabad, Pakistan, Email: anamsaifmalik@ndu.edu.pk

several purposes which include communication, entertainment, information dissemination and the facilitation of daily activities such as banking, shopping and navigation processes.

However, as stated by Karadag et al. (2015) that smartphones even with many features have led many to experience various problems such as phubbing. Furthermore, Chotpitayasunondh and Douglas (2016) emphasis that the past research has overlook on what causes phubbing behavior. In previous studies, authors have explored various causes that potentially lead individuals to get involved in phubbing behavior. For instance, Younas et al. (2022) investigated direct impact of fear of missing out towards phubbing behavior and how this relationship can be explained in the presence of social media addiction. Another study by Khilji and Ambreen (2025) have emphasized the increasing number of registered mobile users in Pakistan and estimated how boredom proneness as well as FOMO can predict phubbing behavior. Whereas Rehman et al. (2025) explained supervisor related phubbing behavior and how does it translate into employee engagement through the underlying mechanism of self-leadership role.

The concept of "Phubbing" has been described by Karadag et al. (2015) "An individual looking at his or her mobile phone during a conversation with other individuals, dealing with the mobile phone and escaping from interpersonal communication". Several scholars have emphasized that it is risky to underrate phubbing as it can endanger fundamental social life. For instance, continuous negligence of others may smash their honor and initiate loss of belonging (Karim et al., 2017). In addition to it, Tom et al. (2018) discusses the significance of emotions in conversations taking place in social setups, noting that digital devices have become central to emotional engagement and create a stage for phubbing behavior.

Phubbing initiates as an outcome of various factors or antecedents and an understanding of those antecedents is essential to address phubbing behavior and coming up with solutions to tackle phubbing can be diligent for future times (Roberts & David, 2016). The understanding of the factors behind phubbing will lead ways towards the establishment of suitable strategies by encouraging socio-societal relations and academic performances (Davey et al., 2018). With the identification of the diverse antecedents that contribute to phubbing, it is significant to undergo for a detailed understanding as the reasons and outcomes of phubbing may vary for different populations and different contexts. Keeping this in view in Pakistan, where the number of university students owning smartphones is promptly rising and has its consequences for the university students in various aspects.

To address this problem, the present study intends to inquire how phubbing behavior is promoting within the students at universities in Rawalpindi and Islamabad, Pakistan through the impact of antecedents derived from the TAM model namely perceived ease of use (PEOU) and perceived usefulness (PU). The research also contemplates for investigation of the mediation function of smart phone addiction upon the two antecedents.

In today's world phubbing has taken prevalence and affected people in several ways, especially university students, as it is influencing the personal, educational, social, economic and psychological life of the people. Since phubbing is a growing concern in the modern world, there is a need to explore the underlying factors which contribute to it and awareness of those reasons may foster acknowledgement of the issue and addressing it properly. The goal of the current study is to predict whether perceived ease of use (PEOU), perceived usefulness (PU) and smartphone addiction contribute to phubbing among university students. A thorough exploration of these factors within the specific demographic may highlight potential measures to deter phubbing among the university students in Pakistan.

This concept pinpoints that people ignore others in their environments, be it personal, social, economic or educational because of their deep focus on mobile devices which in turn has resulted as a rising concern. Several academicians have studied phubbing, from its effects on romantic relationships (Roberts and David, 2016) to its causes and consequences (Chotpitayasunondh & Douglas, 2016) to the intensity of the increase in phubbing behaviour among people regardless of contextual barriers and spreading fast to the antecedents and consequences with the outcomes.

Further, Talan et al. (2024) indicated in his research about the need to explore the main causes of phubbing behaviour. The negative repercussions of smartphone addiction and phubbing, as well as how these behaviors are influenced by perceived usefulness and perceived ease of use, are still underexplored. Thus, keeping in view of the previous studies, this research has a potential contribution to make by filling the significant theoretical gap by implying the variables (perceived usefulness and perceived ease of use) derived from Technology Acceptance Model (TAM) being mediated by smartphones contribute to phubbing behaviour among university students. Specifically, this present study intends to examine the direct effects of perceived ease of use (PEOU) and perceived usefulness (PU) towards phubbing behavior. It also aims to unveil the mediating role of smartphone addiction between perceived ease of use and phubbing behavior and perceived usefulness and phubbing behavior too.

Literature Review

Perceived Ease of Use (PEOU) and Phubbing Behavior

Perceived ease of use is one of the main determinants of the TAM which is entitled with user's acceptance of any novel technology and their beliefs that the use of the specific technology will be comfortable and easy. From the point of view of Lepp et al. (2015) the difference between computers and cell phones has got very low, since both devices have same features i.e., cell phones have all the specifications of a computer and as they are handy also, so the students find it simple to use their smartphones. Smartphones are made with an easy-to-use interface, and their access is smooth for large selection of application in mind. The ease of use enhances protract and frequent use, which might result in phubbing behavior. Like other industrialized nations, Pakistan is one of the countries which has seen a rise in the use of technology, specifically among students.

According to the Technology Acceptance Model (TAM) proposed by Davis in 1989 and further developed by Davis et al. (1989). The perceptions of perceived ease of use (PEOU) and perceived usefulness (PU) play a crucial role in deciding the adoption of Information Technology (IT). According to Moslehpour et al. (2018), perceived ease of use describes how well users comprehend to use specific technologies to access websites, internet operations and web displays.

Moreover, the use of ChatGPT is regarded as easy and tasks on it can be done with smooth transition because of its user friendliness. Hence, it is determined that the higher the level of Perceived Ease of Use of any device, the more likely the user will accept it and perform activities on ChatGPT (Wulandari et al., 2024).

Whereas perceived ease of use is that in which a person thinks of using the specific technology or system as easy and can be used without effort or striving. Moreover, when a person realizes that the system or technology is easy to use and understands the system both internally and externally, they use it smoothly. Researchers also pointed out the impact of perceived ease of use on e-learning system (Terzis & Economides, 2011). Prior research also indicated that as the antecedents of TAM perceived ease of use is determined by the system complexity. When the operation of a specific system is considered painless, the consumer intention will be enhanced to use it and adopt it as a behavior (Davis, 1989). According to Lee and Jun (2007), the major element for succession in terms of mobile satisfaction in mobile world is its perceived ease of use. Moreover, Amin et al. (2014) exclaimed about the relationship of online shopping and perceived ease of use. They formulated that the two have positive link with one another. As people consider online shopping hassle

free and manageable. It saves energy and time, so, people consider it comforting and perceive it easy to use.

Talking about the notion of "Phubbing" as a contraction derived from the words "phone and snubbing". This distraction activity specifically directs neglecting social connections by prioritizing phone applications or rather by becoming dependent on phones. With the authority of one of the researchers who simply defined phubbing as an action of distracting from real time conversations with companions or avoiding man to man exchange of ideas by using smart phones (Balta et al., 2020). It has become a commonplace behavior. According to Habuchi et al. (2005), increasing the smartphone addiction rate would decrease healthy interaction between people. Moreover, research revealed that presence of smartphone could decrease face to face communication between people and as a result the conversation lacks quality elements in it (Misra et al., 2016). Smartphone addiction is characterised by an individual's escapism from interpersonal communication in community or educational institutes because of the massive mobile use (Karadağ et al., 2015). He additionally stated that the Phubbing notion encompasses various addictions, including mobile phone loyalty, internet loyalty, social media loyalty and game commitment. The researchers have asserted that the prevalence of Phubbing is higher, and its potential consequences can be more detrimental. Research indicates that phubbing is prevalent among university students due to their high smartphone usage and reliance on digital communication. According to researchers it is significantly influenced by the amount of time disposed to mobile use and the nature of activities performed on them, such as social networking, playing games and sharing video and text messaging (Karandag et al., 2015).

Research indicates that phubbing has an adverse effect on relational outcomes, including the creation of impressions (Abeele et al., 2020). For instance, a recent study examined different antecedents of phubbing behavior. Among the various causes identified, smartphone addiction appeared as one of the major contributors to phubbing behavior (Al-Saggaf & O'Donnell, 2019). When partners perform phubbing in work scenarios, it negatively influences the work productivity. This interaction is particularly crucial due to the potential adverse consequences linked to excessive social media usage and the disregard for social meetings, leading to isolation and neglect. Phubbing is among the most frequent outcomes of problematic social media use (Franchina et al., 2018). Chotpitayasunondh & Douglas (2016) suggested that when authoritative person frequently doing phubbing it would branch off to the entire organization and become a standard practice for all of them. People who unintentionally answer their phones while listening to someone else's

problem may seem to be paying attention to the other person, but in reality, they were phubbing them since they were preoccupied with other tasks (Büyükgebi Koca, 2019).

Phubbing is a habit that has been linked to hazard and is common among millennials and generation Y (Verma et al., 2019). In addition, students that engage in phubbing often have a bad self-perception because of their excessive emphasis on cell phones rather than interacting with the speaker. Another study primarily focusses on the function of phubbing in promoting a sense of social exclusion which is done consequently through the involvement in social media. Koc and Caliskan (2023) declared forehand that supervisor's phubbing influences relationships between bosses and employees as well as intimate connections between partners. It also has an impact on relationships between supervisors and students. Several research have examined the occurrence of phubbing behaviour in educational settings, and the findings indicate a significant prevalence of phubbing among students. In the past, a mobile phone was a device that helped individuals communicate with family and friends through texts, emails, or social media platforms. Now, it has become the tool that people use for phubbing (Onn, 2024).

The researchers Nikel et al. (2024) argue that phubbing can have a harmful effect on one's overall well-being, prime to feelings of depression, partners having disrespect towards each other, causing a dissatisfaction within their relationships, and an increase reliance on their smart phone. Hence,

H1: Perceived ease of use is positively associated with phubbing behavior.

Perceived Usefulness and Phubbing Behavior

Perceived usefulness is one of the main elements of Technology Acceptance Model which specifies that when users encounter any new technological instrument, they use it, considering it useful. The consumers defend the use of any instrument by presenting the various positive outcomes of the use of the instrument. Thus, based on the perceived usefulness of devices like computers and mobile phones, social media surfing etc. people ignore others in family gatherings and social and academic circles.

According to Han et al. (2024), the perceived usefulness of smartphones for academic purposes, such as accessing the possessions of education and managing schedules, preparing presentations can contribute to increased phone usage and increased consumption of phones can result in phubbing behavior. According to Davis et al. (1989), who categorized PU as an extrinsic motivation type and enjoyment as an intrinsic

motivation type. They further said that extrinsic motivation ought to have a greater influence on IT adoption. The key metrics for assessing the PU of technology include its impact on task performance time, decrease in effort, cost savings and overall utility (Alsyouf et al., 2023; Renny et al., 2013).

PU also found a positive impact on acceptance of e-learning system and new technology by the students and teachers (Teo, 2011); (Seif et al.,2012). The teachers and students find the e-learning system more useful and energy saving so it is beneficial. The perceived usefulness also promoted online shopping behavior as well as playing a major role in the adoption of hotel service in the market (Morosan, 2012). Additionally, perceived usefulness is a significant variable in using the social networking web site (Braun, 2013). It has been demonstrated by many studies that PU majorly affects user's mindsets, which in turn affect user acceptance and experience (Hess et al., 2014).

Furthermore, it has been illustrated that there is a positive connection between the expected benefits of digital services for health and the successful usage of the services by the users (Saranto et al., 2018). Furthermore, perceived usefulness impacts the behaviour of users which are using the technology which makes them dependent on that technology and after addiction to that it will lead to a behavior. Therefore, according to Henderson and Divett (2003), the more positive the perceived usefulness the greater will be the actual use of that system. The goal of the current research is to identify the impact of perceived usefulness on phubbing behavior among university students. As mentioned, researchers have highlighted that students conduct phubbing behavior and divert their attention from educational sessions because of the antecedents like perceived ease of use and perceived usefulness. Thus,

H2: Perceived usefulness is positively associated with phubbing behavior.

Mediating Effect of Smartphone Addiction

Smartphone addiction is defined as the impulsive use of a smartphone, leading to significant interference with daily activities, educational projections and social interactions. Smartphone addiction has a strong correlation with phubbing behavior (Talan et al., 2023). Additional research carried out by university students in South Korea has also demonstrated the connection between addiction of smartphone and mental health, campus life, interpersonal relationships, self-control, and stress in daily life (Kim et al., 2012).

Thomee et al. (2011) stated that more often depressed people use smartphones in order to overcome stress and by using smartphones they just temporality forget about their illness. Some other people engage in mobiles to gain assistance from worldly affairs causing solitude (Yi & Choi, 2012; Kim & Kim, 2016). Additionally, addiction to phones has also been associated with furthermore addiction such as dependence of social sites, gaming sites, internet surfing. Hence, this addiction of smart phone predicts phubbing behavior. Another research findings have also highlighted that it's not the device of the mobile phone which is problematic and causes addiction but the applications with numerous functions within it which make the users addicted and make them dependent on it.

Smartphones are used by individuals to entertain themselves and smartphones are even assembled for academic activities (Zhang et al., 2014). Smartphones are now a days is our close friends, logicians and give us direction about living (Roberts et al., 2017). Due to excessive phone use and loss of control over one's day, smartphone addiction, which is common in daily life, can lead to psychological issues and negatively impact social connections among users (Meral, 2017). Tamura et al. (2017) and other studies show that Pakistani higher education students; happiness with classroom connectivity is negatively impacted by smartphone addiction (SMA). In addition to that there are moments where the presence of smartphones can make work easy for people but at the same instances, they took those people apart from one another. Studies have found a connection between low agreeableness and addictions to smartphones, specifically Instagram as well as online addictions (Zhou et al., 2017). Davey et al. (2018) found that individuals with higher levels of smartphone addiction are more likely to exhibit phubbing behavior.

In recent times scholars have voiced their apprehension regarding the potential adverse effects of smartphones on the psychological and physical well-being of students, as well as the quality of their social connections, despite the evident advantages of these gadgets (Rocco et al., 2003). SMA is a behavioral addiction that has four components, according to various definitions: obsessive smartphone use, tolerance (which is the reduction in sensitivity to an addictive substance or stimulus because of repeated use), withdrawal, and functional impairment. According to Barbed-Castrejón et al. (2024), Phubbing is widely spared among adolescents. He also argued that as compared to lower educational level students, university students are more prevalent rate with smartphone addiction and phubbing behaviour. Social anxiety promotes self-control and smartphone addiction. Moreover, smartphone addiction is also caused by the mediation effect of procrastination (Zhao et al., 2024). Another

study by Coyne et al. (2011), argues that leader phubbing is negatively related to follower outcomes because of phubbing behavior the leader perception to support the worker, and the work engagement would decrease. Thus,

H3: *The relationship between perceived ease of use and phubbing behavior is mediated by smartphone addiction.*

H4: *The relationship between perceived usefulness and phubbing behavior is mediated by smart phone addiction.*

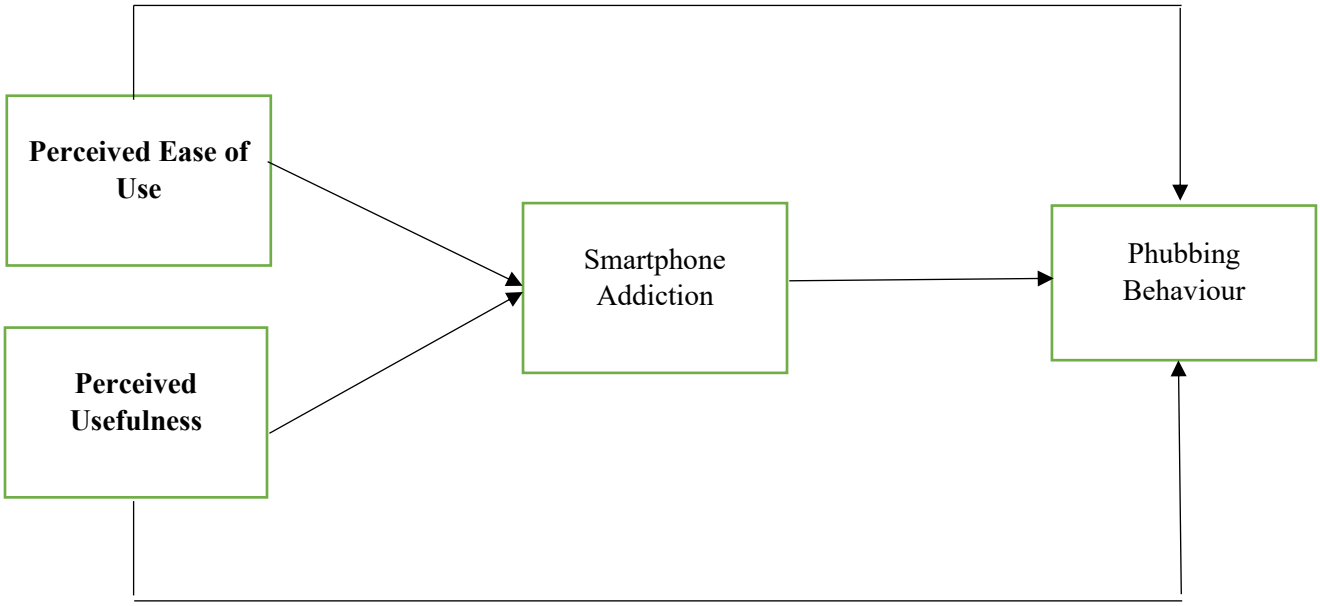

Figure 2.1: Conceptual Framework
Source: Own Study

Methodology

The current study's population includes all university students who are enrolled in higher education institutions. University students of Pakistan are at the forefront of learning new technology and now a day's smartphone is used for both their personal and academic purposes and are very easy to use.

Sample

The researcher chose purposive sampling, specifically targeting university students at the BS and Master's levels, who are most likely to engage in phubbing in an educational setting. All potential participants were informed about the objectives of the study, and their informed consent was obtained. They were also informed that participation in the study was voluntary and that they could withdraw at any time.

Sample Size

As the current study explores the antecedents of phubbing behavior among university students, the researcher delimited the population and selected a sample size which comprised respondents from 12 different higher educational universities of the twin cities (Rawalpindi & Islamabad) in the spring semester of the 2024-2025 academic year. The data collection process took about one month. In the data collection effort, a total of 241 students from different levels (BS and MS) were approached. 31 students who might have impacted the study, dependability was eliminated. Therefore, the original sample size would reduce from 214 to 210 responses which were analyzed. More than 75 percent (75%) of the students were female and of BS and rest of them were male.it is indicated that mostly students were at the age group of 18- 24.

Units of Analysis

In the view of the present research the units for analysis imply to the students pursuing higher education from the prestigious educational institutes in the jurisdiction of Rawalpindi and Islamabad, Pakistan. All the students have mobile phones to be used for personal and academic purposes. It was useful to approach students as they frequently use mobile phone than others and have a higher chance to engage into phubbing behavior (see Khilji & Ambreen, 2025).

Google Survey Forms is an online tool for creating and distributing surveys. We utilized google survey forms for data collection. The responses have been collected through the Likert scale which range from (1-5) low to high. Using the Likert scale which ranges from 1 to 5 the instrument can identify respondents, thoughts and attitudes regarding the variables selected for investigation. Likert scale that ranges from 1 to 5 (strongly disagree =1), (disagree=2), (neutral = 3), (agree=4) and (strongly agree=5).

Measurement Scales

The study used scales from previous research, and their relevance was checked. All study constructs were measured on a 5-point Likert scale, and all scales were reliable, with Cronbach's alpha values above 0.7.

Phubbing Scale

The phubbing behaviour was assessed using a 10 item-scale developed by Karadag et al. (2015) known as the phubbing scale. The Cronbach alpha coefficient for Phubbing Behaviour was reported as 0.826. Sample item was ""

Smartphone Addiction Scale

The smartphone addiction scale which was adopted from Noyan et al. (2015) and was utilised to examine the level of phone addiction among the students. This scale used is a 5-point Likert scale, with ten items. Cronbach's alpha reliability coefficient for this scale was observed as α=.840.

Perceived ease of use and perceived usefulness Scale

To determine the perceived ease of use and usefulness, the study used the scale of Davis (1989) was used. This scale was measured on a 5-point Likert. The Cronbach alpha of the scales of perceived ease of use and perceived usefulness is (α=0.776) and (α=0.826) respectively.

Firstly, the researcher went to different universities in twin cities and explained the whole procedure of the survey to the interested participants. After that, the research gave the participants pertinent information about the current study's overview and then assured them that their responses will remain confidential. The investigator recognised the importance of establishing a sense of ease with the informant to guarantee a high level of involvement from participants. Hence the researcher collected initial data from 241 students and before the analysis, through data cleansing procedure removed 31 responses which might affect the data because the students attempted the survey without considering the criteria of the survey. Therefore, 210 responses from 12 different universities were finalized and were included in the current study.

Analytical Strategy

We employed the Smart PLS 4 software for the purpose of this investigation. Essentially, this software employed the Partial Least Square (PLS) methodology. PLS-SEM version 4.0 is a statistical procedure mostly used for modeling the difficult relationship between the observed variables and the new (latent) variables.

Sampling Characteristics

Demographics	Frequency	Percentage
Gender		
Male	44	21.0%
Female	164	78.1 %
Prefer not to say	02	1.0 %
Age		
18-24	178	84.8%
25-30	28	13.3%
30-35	4	1.4%
35-above	0	-

The above table 4.1 displays the overview of the demographic features of the research. A total of 210 participants recorded their responses. The sample comprises gender, age and university educational qualification. The table displays that there are 21% males, 78.1% females and 1.0 % others, 84. 8 % of respondents fall under the age category 18-24, 13. 3% fall under the age category of 25-30, only1.3 %fall under the age category of 30-35. The highest level belongs to the age category 18-24.

Assessment of Measurement Model

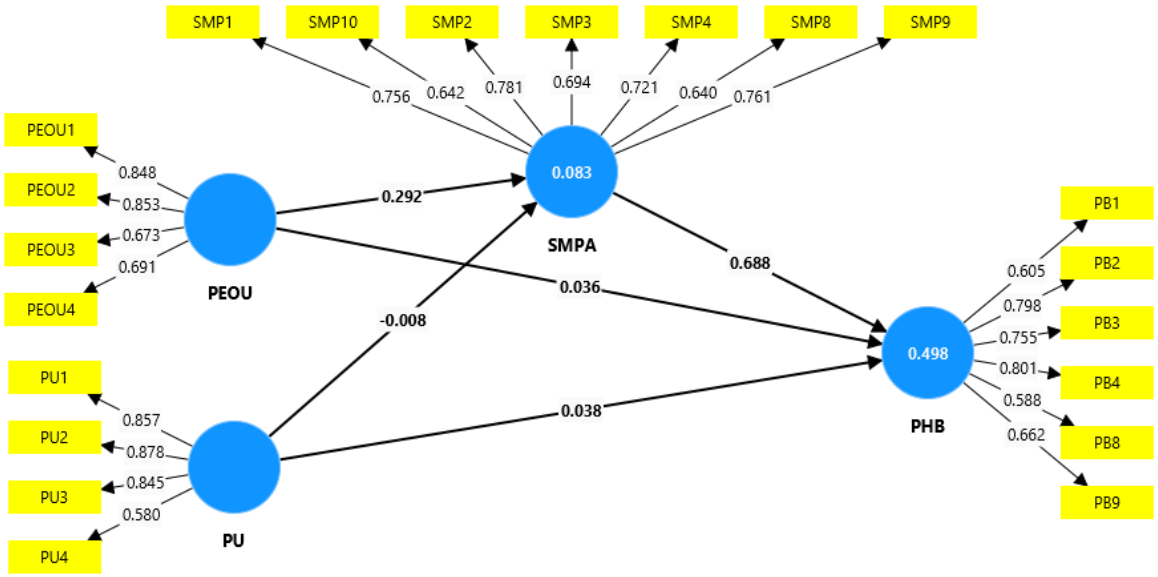

Figure 4.1: Measurement Model

First, the reliability of the created model functional in the current study for understanding the linkage between the variables (Perceived Ease of Use, Perceived Usefulness, Smartphone Addiction (SMPA) and phubbing (PHB) among university students is measured. The figure displays that reliability has been measured through three major points which are the Cronbach's Alpha value, the composite reliability and the average variance extraction. With reference to Hair et al. (2014), the values in Smart-PLS are arranged based on the unique dependability of each indicator. Accordingly, for reliability level the values mostly range from 0 to 1 and the best suited Cronbach Alpha value should be greater than 0.70, the values between 0.60 - 0.70 are considered acceptable. However, the value which exceeds from 0.90 to 0.95 are considered undesirable (Nunnally & Bernstein, 1994). Moreover, the researcher addressed convergent validity of each construct measure. Convergent validity explains the variance of the particular items as well as the AVE metric (Hair et al., 2019). Moreover, Fornell and Larcker (1981), declared the accepted values for AVE to be (≥ 0.5) and the acceptable value for composite reliability is 0.70 or higher than it (Hair et al., 2019). The Reliability results of the data through Smart PLS are displayed in the form of tables. The tables are as follows:

Table 4.2: Validity and Reliability

	Cronbach's Alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
PEOU	0.776	0.829	0.853	0.594
PHB	0.795	0.803	0.855	0.500
PU	0.826	0.876	0.874	0.639
SMPA	0.840	0.843	0.880	0.512

Table 4.2 displays the Cronbach Alpha values for different variables. The PEOU has a Cronbach Alpha of 0.77, which is highly appropriate. The perceived usefulness also has a Cronbach Alpha of 0.8, which is suitable. The Cronbach Alpha value for Phubbing behaviour (PHB) is 0.79, which falls within the suitable range. Lastly, the Cronbach Alpha value for smartphone addiction (SMPA) is 0.8, which is also suitable (Hair et al., 2014). Systematically, the value of Cronbach's alpha ranges between 0 to 1, with value more than 0.7 being well-thought- out and stable. The higher will be the correlation between the items (Lavraskas,2008)

Additionally, the table also presents the composite reliability (rho-a) of the different variables which range from 0.82 to 0.87, which according to Hair et al. (2019) are treated as suited values. The table also highlights the values of Average Variance Extraction of the variables which range between 0.50 - 0.63 for the variables of the current study. The composite reliability coefficients and the average variance extracted are indicators of a measure's quality. According to Fornell and Larcker (1981), stated that AVE measure of the variance absorbed by a construct relative to the variance caused by measurement error. Moreover, a greater AVE value indicates a higher level of reliability. The values of AVE and CR range from 0 to 1. The convergence validity is confirmed when AVE is greater than or equal to 0.5. All the three points in the table meet the standard construct reliability showing that the variables are reliable.

From all the above, it is confirmed that the study constructs hold convergent validity, as the AVEs for all constructs are above the benchmark of 0.500, except for one construct, phubbing behavior, which is exactly 0.500. However, since its composite reliability is fairly high at 0.855, we still accept the AVE value of 0.500.

4.3.2 Discriminant Validity*:* The measure of the values for discriminant validity can be done through Heterotrait-monatrait values. The (HTMT) is generally defined as the mean value of the specific items correlation across constructs compared to the average correlation for the particular items measuring the same construct. HTMT values determine the distinctiveness of the model. According to Henseler et al. (2015) the standard value for it should be less than 1. The discriminant validity may be missing if the values of HTMT are close to 1. Kline (2023) stated that for HTMT there is threshold of 0.85 on the other end. The discriminant validity results of the current study are tabulated in table 4.3 below.

Table 4.3: Discriminant Validity (HTMT)

	PEOU	PHB	PU	SMPA
PEOU				
PHB	0.308			
PU	0.625	0.170		
SMPA	0.348	0.849	0.171	

Table 4.3 shows that all HTMT values are below 1. This indicates that the study meets the HTMT criteria, suggesting that the constructs demonstrate discriminant validity and are suitable for further analysis of the study hypotheses.

Collinearity (Variance Inflation Factor)

Assessment of Structural Model

After confirming the reliability and validity of the variables through measurement model, the study steps forward for the further evaluation of the variables by applying the structure model. This model is used to describe and analyze the association of the specific variables with one another within research. The structure model presents how some variables of the study impact the other variables in the study. So, it is related to the relationship and impact of variables upon one another. Structural Model Assessment through the Smart PLS illustrates the coefficient of determination (R^2) and the statistical significance of path coefficient for all the variables. According to Chin (1988), the standard values considered for coefficient of determination (R^2) are 0.19 as weak, 0.33 as moderate and 0.67as strong respectively. The figure given below displays the results.

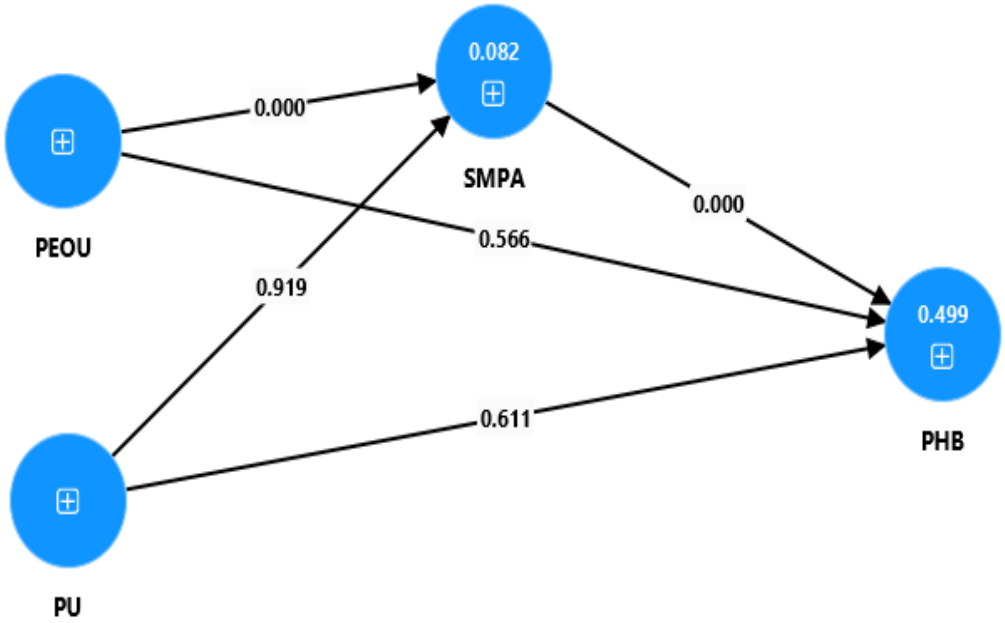

Figure 4.2: Structural Model

Figure 4.2 displays the coefficient of determination (R2) value for smartphone addiction, which is 0.082. This indicates that 8.2% of the perceived ease of use and perceived usefulness are associated with smartphone addiction. The coefficient of determination (R2) value for phubbing behaviour is 0.499, as shown in Figure 4.2. This shows that 49.9% of the variance in phubbing can be explained by the perceived ease of use (PEOU) and perceived usefulness (PU).

Path Analysis; Direct and Indirect Effect

According to Kline (2023), path analysis is the subcategory of the structure equation model (SEM) which measures the casual relationship among variables within research. Hence, it is a technique used for statistical examination to assess causal models, and it is essentially a form of multiple regression analysis. For this analysis, bootstrapping is formed. This examines the variables that is regressed containing varying number of independent variables. In direct path analysis one variable, specifically the independent variable directly impacts the dependent variable without any intervening variables. In indirect path analysis one variable impacts another variable within a study with the mediating effect of one or more variables. In case of the current study the independent variable perceived ease of use both directly and indirectly impacts the dependent variable,

which in this case is the phubbing behavior of students. The perceived ease of use alone as well as through the mediating effect of smartphone impacts the phubbing of students. Figure 2.1 shows that the current study has a single dependent variable and two independent variables.

Table 4.5: Path Analysis

	Original Sample(O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
PEOU->PHB	0.035	0.035	0.061	0.575	0.556
PEOU->SMPA	0.291	0.294	0.080	3.625	0.000
PU ->PHB	0.039	0.039	0.077	0.508	0.611
PU ->SMPA	-0.010	0.012	0.098	0.102	0.919
SMPA ->PHB	0.689	0.693	0.040	17.404	0.000

Table 4.5 indicates that the t statistics for PEOU->SMPA and SMPA ->PHB is greater than 1.96 which means these two are accepted and as their significance level is equal to 0.000 which means the meet the standards. Additionally, the standard deviation value should be less than or equal to 2.5, here the results show that all the values are less than 2.5.

Table 4.6: Direct Effect of X on Y

	Original sample (O)	Sample mean(M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
PEOU->PHB	0.200	0.203	0.056	3.551	0.000
PU ->PHB	-0.007	0.008	0.068	0.101	0.919

Table 4.6 highlights the independent variables(X) impact upon variables which are regressed (Y). According to the current study the significance level of perceived ease of use with phubbing behavior is 0.000 which demonstrates that PEOU directly manipulates phubbing behaviour, while table 4.6 indicates that phubbing and perceived usefulness has a significance value of 0.919 which is higher than 0.5. Thus, Perceived

usefulness has no direct effect on Phubbing behavior because the significance level is above the standard (>0.5).

Table 4.7: Specific Indirect Effect of X on Y Through Mediator

	Original Sample(O)	Sample Mean(M)	Standard Deviation (STDEV)	T Statistics (O/STDEV	P Values	Results
PEOU-> SMPA-> PHB	0.200	0.203	0.056	3.551	0.000	Accepted
PU-> SMPA-> PHB	-0.007	0.008	0.068	0.101	0.919	Rejected

Table 4.7 interprets the indirect effect of independent variables such as PEOU and PU on phubbing behaviour with the mediating role of smartphone addiction. The results hence show that perceived ease of use (PEOU) promote phubbing behavior with the mediation effect of smartphone addiction because the significance level is 0.000 respectively which is less than 0.5.

Discussion

The main objective of the present study was to analyze the relationship of perceived ease of use (PEOU) and perceived usefulness (PU) towards phubbing behavior. Especially, this study uncovered the underlying mechanism of smartphone addiction between these variables. Since it is known that communication in today's time is a necessity and people throughout the world access one another through various means, mobile equipment is at the top category regarding communication. These advanced modes of communication tools have webbed the world together and people can communicate within a blink of an eye. Individuals can perceive awareness of incidents happening in the opposite pole of the planet within seconds. With innovation and improvement, mobile phones have also wedged the world differently (Castells et al.,2007). Individuals are influenced by its misuse. Individuals, specifically students, are influenced a lot by the misuse of mobile phones in their social, societal and educational setups. The current study states that the use of smartphones is very high among university students. It is easy to use and easily accessible for them. Smartphones have become a life necessity, but their excessive use can destroy the behavior of the students. Excessive use of smartphones causes addiction and would lead to phubbing behavior

among university students. The current study shows that university students display phubbing behavior because of perceived ease of use of mobile phones. Chotpitayasunondh and Douglas (2016) highlighted that the concept of perceived ease of use is a determinant of the Technology Acceptance Model, when humans encounter any novel technology, they accept it by believing to use it effortlessly so, they start using it frequently with comfort and become used to of the technology which may result in the misuse of the technology. Thus, such ease can also cause rising concerns. The results of the present research also highlight that the university students of the Twin Cities in Pakistan also display phubbing behavior because of the perceived ease of use of mobile phones. The students at university level in the Twin Cities of Pakistan are fond of mobile gadgets and use them regularly. The results (see table 4.5) through the Path Analysis clearly show that perceived ease of use (PEOU) has a direct impact on smart phone addition (SMPA) with a significance value of 0.000 which is less than 0.5 and indicates that it has a direct impact on the mediator. The results (see table no 4.7) show that perceived ease of use (PEOU) has an impact on phubbing behavior (PHB) among university students with the use of smart phones as mediators. The given results thus show the expected results for hypothesis 1 and hypothesis 3.

The term "perceived usefulness" describes how technological tools are applied with the expectations that they would be widely beneficial for social and educational enhancement. This term also has been derived from the TAM model and implies that smart phones are highly assessed by humans believing that their usage is beneficial and can improve their productivity in every field otherwise if users don't see any benefit of using gadgets, they won't go for it despite of it being easy to use (Lee et al., 2014). The present research also shows that the Phubbing behavior among university students in the Twin cities in Pakistan is not affected by perceived usefulness of mobile phones. The results (see table no 4.5 and table no 4.7) measured through path analysis display that perceived usefulness has 0.611 significance value with phubbing behavior among university students. Additionally, the indirect relationship of perceived usefulness by mediating smart phone has a significant value of 0.919 which should be less than 0.05. Thus, it indicates that hypothesis 2 and hypothesis 4 do not get the expected results. The exploration of the data highlights that university students do not impact phubbing behavior directly and indirectly.

Smartphone addiction causes phubbing behavior, and it is a greater influence towards phubbing than internet addiction. Moreover, Vorderer et al. (2017) also argue that multitasking is also a factor which causes phubbing. The present research has also explored the data and

presents that smart phone addiction has high impact on phubbing behavior among university students in the Twin cities in Pakistan. The results (see table 4.5) show that the t statistics of smart phone addiction and phubbing is 17.4 and the t Statistics of perceived ease of use with smart phone addiction is 3.625, which are both suitable keeping the standard t statistics as 2 or above 2 and the remaining were less than two, which means the current research is fulfilling the standard in the case of smartphone addiction, perceived ease of use towards phubbing behavior.

The research developed four hypotheses for the study to explore the impact of the variables on one another. The results obtained from different analysis show that there is a significant association build up between perceived ease of use and perceived usefulness of smartphone addiction within university students. Moreover, it also shows that perceived ease of use, smartphone addiction and phubbing behaviour are all related to one another while perceived usefulness is not directly or indirectly related to phubbing behavior. Perceived ease of use and perceived usefulness with phubbing behaviour were also analyzed through regression. A key hypothesis was to check the impact of perceived ease of use and perceived usefulness of smartphone addiction on phubbing behavior. Results informed that the perceived ease of use of smartphone significantly and positively promote phubbing behavior among university students while perceived usefulness of smartphone does not affect phubbing behavior among university students in Pakistan. The specific research states the full exploration of the factors which enhance the phubbing behavior of students with special focus on the perceived ease of and usefulness of smartphone addiction within university student's context.

Research Contribution

The term phubbing coined by McCann group in 2012 introduced a new vocabulary by combining the terms phone with snubbing. Recently Talan et al. (2024) identified that phubbing behavior is influenced by smart phone addiction and social media addiction. He further recommended exploring more antecedents contributing to phubbing behavior. Keeping this gap in view the present research explored two antecedents of phubbing behaviour among university students of Rawalpindi and Islamabad, Pakistan. The two antecedents are PEOU and PU and these two have been derived from Technology Acceptance Model (TAM). Keeping the mediation impact of smart phones on phubbing behaviour, the results of the research reveal that students perform phubbing positively with mobile phone usage. The students' phubbing behaviour is not impacted by the perceived usefulness of mobile phones, so it has an indirect impact on phubbing behaviour. Thus, the results can be kept in mind for implicating

in university setups where educators can develop principles and strategies to reduce the use of phones by promoting fruitful learning. Hence, the present research has significantly contributed to the concept of phubbing behavior especially with the reference of university students. Furthermore, to the best of our knowledge the present study is the only study which has uncovered the relationship between perceived ease of use and usefulness towards phubbing behaviour but also has used smartphone addiction as a mediator between the given relationships. Therefore, this mediating effect also notably contributes to the phubbing behaviour literature.

Research implications

Implications of the research means the core consequences and applications of the outcomes of this research may have in coming time. The implications can be practical, theoretical, educational, environmental, economic and technological, socio-cultural and managerial. On the grounds of the results achieved, the following can be the implications made for it:

Conclusion

The study explored whether the antecedents which are perceived ease of use and perceived usefulness significantly contribute to severe phubbing behavior among university students of Rawalpindi and Islamabad. The data collected from 210 university students in the form of questionaries were analyzed through SEM PLS 4.0 to formulate the results. The findings indicated that students perceived the use of mobile phones very simple and effortless, so they engage in mobile phones. It promotes phubbing among students pursuing higher education at the universities of the twin cities of Pakistan. The current study also highlights the importance of addressing these technological perceptions in the educational settings in order to reduce phubbing among students because of its negative and retarding impact on the students' educational performance. Universities should consider implementing programs that help students balance the benefits of smartphone use with the need for meaningful interpersonal interactions. The study concludes that students do engage in phubbing behavior because of the perceived ease of use of smart phones and smartphone addiction. Interestingly, perceived usefulness hasn't had any impact on the phubbing behavior among university students in Rawalpindi and Islamabad. Future research should explore strategies to mitigate the adverse effects of phubbing by focusing on both technological and psychological dimensions. By understanding and addressing the antecedents of phubbing, the study highlights a

healthier digital environment that supports both academic success and personal well-being among university students of Rawalpindi and Islamabad.

References

Abeele, M. M. V., Antheunis, M. L., & Schouten, A. P. (2016). The effect of mobile messaging during a conversation on impression formation and interaction quality. *Computers in Human Behavior*, *62*, 562-569.

Al-Saggaf, Y., & O'Donnell, S. B. (2019). Phubbing: Perceptions, reasons behind, predictors, and impacts. *Human Behavior and Emerging Technologies*, 1(2), 132-140.

Alsyouf, A., Lutfi, A., Alsubahi, N., Alhazmi, F. N., Al-Mugheed, K., Anshasi, R. J., & Albugami, M. (2023). The use of a technology acceptance model (TAM) to predict patients' usage of a personal health record system: the role of security, privacy, and usability. *International Journal of Environmental Research and Public Health*, *20*(2), 1347.

Amin, M., Rezaei, S., & Abolghasemi, M. (2014). User satisfaction with mobile websites: the impact of perceived usefulness (PU), perceived ease of use (PEOU) and trust. *Nankai Business Review International*, *5*(3), 258-274

Balta, S., Emirtekin, E., Kircaburun, K., & Griffiths, M. D. (2020). Neuroticism, trait fear of missing out, and phubbing: The mediating role of state fear of missing out and problematic Instagram use. *International Journal of Mental Health and Addiction*, *18*, 628-639. techniques. *Management Mathematics for European Schools*, *1*(1), 1-18.

Barbed-Castrejón, N., Navaridas-Nalda, F., Mason, O., & Ortuño-Sierra, J. (2024). Prevalence of phubbing behaviour in school and university students in Spain. *Frontiers in Psychology*, *15*, 1396863.

Braun, M. T. (2013). Obstacles to social networking website use among older adults. *Computers in Human Behavior*, *29*(3), 673-680.

Büyükgebiz Koca, E. (2019). A literature review on smartphone addiction and phubbing. *Eurasian Journal of Researches in Social and Economics (EJRSE)*, *6*(6), 399-411.

Castells, M., Fernández-Ardèvol, M., Qiu, J. L., & Sey, A. (2007). *Mobile Communication and Society: A Global Perspective*. MIT Press.

Chotpitayasunondh, V., & Douglas, K. M. (2016). How "phubbing" becomes the norm: The antecedents and consequences of

snubbing via smartphone. Computers in human behavior, 63, 9-18.

Coyne, L. W., McHugh, L., & Martinez, E. R. (2011). Acceptance and commitment therapy (ACT): Advances and applications with children, adolescents, and families. *Child and Adolescent Psychiatric clinics*, *20*(2), 379-399.

Davey, S., Davey, A., Raghav, S. K., Singh, J. V., Singh, N., Blachnio, A., & Przepiórkaa, A. (2018). Predictors and consequences of "Phubbing" among adolescents and youth in India: An impact evaluation study. *Journal of Family and Community Medicine*, *25*(1), 35-42.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982-1003.

Fornell, C., and Larcker, D.F., "Evaluating structural equation models with unobservable variables and measurement error," Journal of Marketing Research, 18(1), 39-50. 1981.

Franchina, V., Vanden Abeele, M., Van Rooij, A. J., Lo Coco, G., & De Marez, L. (2018). Fear of missing out as a predictor of problematic social media use and phubbing behavior among Flemish adolescents. *International Journal of Environmental Research and Public Health*, *15*(10), 2319.

Gummesson, E. (2004). From one-to-one to many-to-many marketing. In *Service Excellence in Management: Interdisciplinary Contributions, Proceedings from the QUIS 9 Symposium, Karlstad University Karlstad, Sweden*, 16-25

Habuchi, I., Dobashi, S., Tsuji, I., & Iwata, K. (2005). Ordinary usage of new media: Internet usage via mobile phone in Japan. *International Journal of Japanese Sociology*, 14(1), 94-108

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2-24.

Han, J. H., Park, S. J., & Kim, Y. (2022). Phubbing as a millennials' new addiction and relating factors among nursing students. *Psychiatry Investigation*, *19*(2), 135.

Henderson, R., & Divett, M. J. (2003). Perceived usefulness, ease of use and electronic supermarket use. *International journal of human-computer studies*, *59*(3), 383-395.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*, 115-135.

Hess, T. J., McNab, A. L., & Basoglu, K. A. (2014). Reliability generalization of perceived ease of use, perceived usefulness, and behavioral intentions. *MIS quarterly*, *38*(1), 1-28.

Karadağ, E., Tosuntaş, Ş. B., Erzen, E., Duru, P., Bostan, N., Şahin, B. M., ... & Babadağ, B. (2015). Determinants of phubbing, which is the sum of many virtual addictions: A structural equation model. *Journal of Behavioral Addictions*, *4*(2), 60-74.

Karim, F., Majumdar, S., Darabi, H., & Chen, S. (2017). LSTM fully convolutional networks for time series classification. *IEEE access*, *6*, 1662-1669.

Khilji, B. K., & Ambreen, S. (2025). Disengaged in the Digital Age: Unraveling the Influence of Boredom Proneness and FoMO on Phubbing Behavior. *Journal of Asian Development Studies*, 14(2), 62-70

Kim, N. S., & Lee, K. E. (2012). Effects of self-control and life stress on smart phone addiction of university students. *Journal of the Korea Society of Health Informatics and Statistics*, *37*(2), 72-83.

Kline, R. B. (2023). *Principles and practice of structural equation modeling*. Guilford publications.

Koc, T., & Caliskan, K. (2023). Phubbing phenomenon in educational environments: examining the impact of supervisor phubbing on student outcomes. *Journal of Further and Higher Education*, *47*(1), 15-30.

Lee, T., & Jun, J. (2007). Contextual perceived value? Investigating the role of contextual marketing for customer relationship management in a mobile commerce context. *Business Process Management Journal*, *13*(6), 798-814.

Lepp, A., Li, J., Barkley, J. E., & Salehi-Esfahani, S. (2015). Exploring the relationships Between college students' cell phone use, personality and leisure. *Computers in Human Behavior*, *43*, 210-219.

Martinsson, P., & Thomée, S. (2025). Co-worker phubbing: A qualitative exploration of smartphone uses during work breaks. *Scandinavian Journal of Psychology*, *66*(1), 158-173.

Meral, D. (2017). An examination on smart phone addiction of high school students in respect to loneliness, life satisfaction and some personal characteristics [Master Thesis]. Erzincan University.

Misra, S., Cheng, L., Genevie, J., & Yuan, M. (2016). The iPhone effect: The quality of in-person social interactions in the presence of mobile devices. *Environment and Behavior*, 48(2), 275-298.

Morosan, C. (2012). Theoretical and empirical considerations of guests' perceptions of biometric systems in hotels: Extending the

technology acceptance model. *Journal of Hospitality & Tourism Research*, *36*(1), 52-84.

Moslehpour, M., Pham, V. K., Wong, W. K., & Bilgiçli, İ. (2018). E-purchase intention of Taiwanese consumers: Sustainable mediation of perceived usefulness and perceived ease of use. *Sustainability*, *10*(1), 234.

Nikel, Ł., Kolańska-Stronka, M., & Krasa, P. (2025). Personality traits, internet addiction, and phubbing among teens: A mediation analysis. *Behaviour & Information Technology*, *44*(3), 463-476.

Nunnally, J. C., & Bernstein, I. H. (1994). Psychological Theory, MacGraw-Hill, New York, NY. *Nyer, PU (1997),"A study of the relationships between cognitive appraisals and consumption*.

Onn, Y. T. (2024).Are you a phubber or a phubee? An analysis of phubbing behavior in the era of smartphone. In 6th international research conference on humanities, social sciences and technology 2024 (6th irchst 2024) (Vol.2024, no.6th, p.234) Oulasvirta, A.,

Rehman, K., Ullah, M. A., Ameeq, M., & Hassan, M. M. (2025). From Phubbed to Fatigued: How Supervisory Phubbing Undermines Work Engagement in Healthcare, With Self-Leadership as a Coping Mechanism. *Nursing & Health Sciences*, 27(2), e70150.

Roberts & David, 2016). Twenge, J. (2017). Steve Jobs, Apple and social anxiety: the iPhone's birthday is nothing to celebrate. Newsweek.

Roberts, J. A., & David, M. E. (2017). Put down your phone and listen to me: How boss phubbing undermines the psychological conditions necessary for employee engagement. *Computers in Human Behavior, 75*, 206-217. https://doi.org/10.1016/j.chb.2017.05.021

Rocco, T. S. R. T. S., Bliss, L. A. B. L. A., Gallagher, S. G. S., Pérez, A. P. A., & Prado, P. (2003). Taking the next step: Mixed methods taking the next step: Mixed methods research in organizational systems research in organizational systems. *Information Technology, Learning, and Performance Journal*, *21*(1), 19.

Saranto, K., Kivekäs, E., Kuosmanen, P., & Kinnunen, U. M. (2018). Electronic health services in the patients' daily activities-willingness to use health village services. *Building continents of knowledge in oceans of data: the future of co-created eHealth*.

Seif, M. H., Sarmadi, M. R., Ebrahimzadeh, I., & Zare, H. (2012). A model for predicting intention to use e-learning based on epistemological beliefs. *Life Science Journal*, *9*(2), 926-929.

Talan, T., Doğan, Y., & Kalinkara, Y. (2024). Effects of smartphone addiction, social media addiction and fear of missing out on

university students' phubbing: A structural equation model. *Deviant Behavior*, *45*(1), 1-14.

Tamura, H., Nishida, T., Tsuji, A., & Sakakibara, H. (2017). Association between excessive use of mobile phone and insomnia and depression among Japanese adolescents. *International Journal of Environmental Research and Public Health*, *14*(7), 701.

Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, *57*(4), 2432-2440.

Terzis, V., & Economides, A. A. (2011). The acceptance and use of computer-based assessment. *Computers & Education*, *56*(4), 1032-1044.

Verma, S., Kumar, R., & Yadav, S. K. (2019). The determinants of phubbing behaviour: a millenials perspective. *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, *8*(125), 806-812.

Vorderer, P., Hefner, D., Reinecke, L., & Klimmt, C. (Eds.). (2017). *Permanently online, permanently connected*. London: Routledge, Taylor & Francis Group.

Wulandari, A. A., Ohorella, N. R., & Nurhaipah, T. (2024). Perceived Ease Of Use and User Experience Using Chat GPT. *JIKA (Jurnal Ilmu Komunikasi Andalan)*, *7*(2), 52-75.

Yi, S., & Choi, J. (2012). The organization of scientific knowledge: the structural characteristics of keyword networks. *Scientometrics*, *90*(3), 1015-1026.

Younas, F., Amjad, S., & Qayyum, S. (2022). Fear of Missing Out and Phubbing in Young Adults: The Mediating Role of Social Media Addiction. *Pakistan Journal of Social Sciences* (PJSS), 42(4).

Zhang, K. Z., Chen, C., & Lee, M. K. (2014). Understanding the role of motives in smartphone addiction.

Zhao, M., Li, Y., Fang, Y., Yang, Y., Li, B., Dong, Y., & Xia, L. X. (2024). The relationship between self-control and college student smartphone addiction: a two-wave multiple mediation model. *Current Psychology*, 1-15.