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Impact of Mobile Phone Use on School-Level Students' Mental Health

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Abstract: This study investigates the relationship between students' mental health (MH) and mobile phone addiction (MPA), addressing growing concerns about the impact of excessive phone use on school-age children. Using a quantitative research approach, data was collected through a standardized questionnaire and analyzed using Cronbach's Alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and factor loadings to ensure construct validity and reliability. Structural equation modeling (SEM) was employed to examine the impact of MPA on MH. The findings reveal that mobile phone addiction significantly explains 61.5% of the variance in mental health (R^2 = 0.615), with a strong positive association between MPA and mental health issues (β = 0.784, p = 0.000). This indicates that excessive mobile phone use negatively affects students' mental health, potentially leading to stress, anxiety, and poor academic performance. The study highlights the need for digital wellness initiatives and interventions to promote responsible phone use and reduce screen time. Focusing specifically on school-level teenagers contributes to understanding the psychological and academic consequences of MPA, offering valuable insights for policymakers, parents, and educational institutions. The results underscore the importance of fostering mindful phone usage to safeguard students' mental well-being. Future research should explore long-term effects and develop targeted strategies to mitigate the adverse impacts of mobile phone addiction. This study emphasizes the urgency of addressing MPA to support healthier mental and academic outcomes for students.

Keywords: Mobile Phone Addiction, Mental Health, School-Level students

JEL Classification Codes: 118, 112, 121

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Introduction

In every area of research, business, physical activity, culture, and legislation, the cell phone is a highly useful tool. However, addiction can result from the overuse and abuse of this useful tool. The modern period is characterized by communication and information, and we can connect to the outside world more quickly than in the past, thanks to this sophisticated communication infrastructure. The most common type of technology is the mobile phone, whose use has increased significantly over the past several years due to societal effects. Clinicians, sociologists, and training experts are taking into account cell phone dependency as a psychological disorder brought on by modern innovation. Overuse may be considered a form of addiction to technology. The user has become so dependent on their phone

that they believe they cannot function without it, and studies have indicated that extended use of the device can negatively impact both mental and physical health (Igarashi et al., 2018).

Medical research suggests that those who use cell phones are unable to stay physically healthy. For example, the findings of several research show that cell phone radiation can cause headaches, memory loss, irritability, problems with vision and hearing, and the development of a brain tumor (Hansson et al., 2017). The results also show that delayed PDA usage contributes to cerebral tumors. Psychology claims that excessive mobile phone usage negatively impacts social interactions and an individual's well-being since it can lead to social anxiety, loneliness, and depression (Mahadevaswamy, 2023). Numerous studies have also found that addiction to mobile phones significantly affects one's physical and mental well-being. Aspects of mental health include being able to deal with social facts, accepting them, and acting in a way that is in harmony with the community (Canatar & Bilge, 2023). Mobile phones are a major tool used by young people to communicate with one another. Adolescent people's peer connections have also been found to suffer from some of the negative consequences of mobile phones, including bullying and isolation. In a similar vein, family dynamics have changed as a result of mobile phone use. From the perspective of parents, security and monitoring concerns lead to the structuring of children's changing flexibilities.

Since their mobile phone is such an integral part of their lives, they are always using them for calling, playing games, listening to music, conversing, or simply passing the time. The idea of being without their phone makes them nervous. In the first ten years of the new century, Pakistan's mobile cellular subscriber base increased from around 0.31 million to almost 100 million between 2000 and 2010. The number has steadily increased, reaching 193 million registered mobile consumers nationwide in 2022. With over 929.37 million mobile phone users as of 2023, India is the second-largest wireless-using developing country in the world. The India Telecom Regulatory Authority claims that the issue of mobile phone use might be a sign of depression. The primary markers of mobile addiction are the amount of time spent each week, the proportion of positive ways, and the percentage of social uses (Martynenko et al., 2024). "Emotional well-being" is defined by Hadfield as "the full and appropriate functioning of the entire personality." A psychologically stable person can have a contented and successful life. According to positive psychology, psychological resilience and the capacity to enjoy life and overcome obstacles are both components of emotional well-being. Our emotions are a reflection of our mental health. Mobile phone technology may affect students' lives in several ways (Takao et al., 2019).

Background

Research on university students in Australia found that they spend 1.5 to 5 hours a day on their phones. Their findings showed several characteristics associated with addictive behavior. They found impulsivity, stress, withdrawal symptoms, and a lack of control mechanisms before utilizing the system. The results also showed several factors connected to consumers engaging in obsessive or addictive behaviors. Situational factors that impact improper usage include unique experiences, substance abuse, and depressed conditions (Bullard, 2023). Devis et al. discovered that teenagers spend more time on their phones on the weekends than they do during the week and that men use mobile phones more often than women (García et al., 2023). Ali et al. (2021) Assert that phone-related behaviour is associated with individual personality and traits, including age and gender. Another study on gender differences in impulsion and problematic cellphone usage among youths found that males are more likely to use their phones in risky situations. At the same time, girls have become reliant on them. (Pérez de et al., 2021).

Studies have indicated a connection between problematic internet usage and psychological and behavioral characteristics. Social isolation, low self-esteem, fear, and a lack of social skills have all been linked to excessive internet use (Ezeh et al., 2021). This method takes into account potentially addictive behaviors; some research identifies novel addictions (such as screen addiction, television addiction, and political sect addiction) (Bickel et al., 2018). Several different shared components (salience, mood change, tolerance, withdrawal, conflict, and relapse), as well as additional characteristics that may constitute a common genesis of addictive behavior, are included in these additions, which raise the possibility that addiction is a unique condition (Islam et al., 2018). A small percentage of Spanish college students were shown to be at risk for Internet addiction or depression (Sahu et al., 2019).

It is important to note that, with a population of over 220 million and a median age of 23, Pakistan is the sixth most populous nation in the world.(Martynenko et al., 2024; Schulte-Körne, 2016). By 2020, 51% of the nation's population will have smartphones, up from 10% in 2014. Of those users, 77% are between the ages of 10 and 20 (Ejaz et al., 2023). As a result, the growing use of smartphones has encouraged researchers to look at how they affect wellbeing. The connection between smartphone usage and well-being in Pakistan, however, presents conflicting results, much like research conducted in other settings. According to Leung (2018), A study of teenagers discovered that teenage girls had a noticeably greater level of smartphone reliance and impact than teenage boys.

There hasn't been much research done in this area, despite data showing that 19 (cell phone) use is linked to emotional reliance demonstrated by the assumption that users could not operate without their phone, as well as behavioral patterns such as texting and waking up late. The results corroborate the detrimental impacts excessive usage has on students' physical and emotional well-being. Over 5.6 billion individuals, or over 70% of the world's population, now have a mobile phone subscription, up from 12.4 million in the previous 20 years. Numerous reports of hazards to the physical and emotional health of people of all ages have also made its usage a significant public health concern.

The data shows a steady incline in adolescents reporting persistent feelings of sadness or hopelessness since the year 2011. In 2021, 42 percent of high school students reported feeling sad or hopeless almost every day for two weeks, while 29 percent reported poor mental health in the last 30 days. Social media has been an area of concern for researchers aiming to find and analyze what affects adolescent mental well-being. A Pew Research Center study conducted in 2022 concluded that approximately 95% of teenagers aged between 13 and 17 years had access to a smartphone, and almost 90% had access to a desktop or laptop at home.5 Thus, for adolescents, social media use on the devices is ever-constant, with 97% of the adolescents claiming to use at least one of the seven leading online social media platforms.6 YouTube remained the preferred social media platform of adolescents in the 2023 study by the research center, whereby 93% of adolescents said that they had ever used the platform while 16% said they keep visiting or using the app or website regularly.7 Since its inception in 2018, TikTok has quickly emerged among the top social media platforms, where 63% of respondents reported using it, and 17% described it almost every day. Instagram, Snapchat, and Facebook are also other top social media sites preferred by most U.S. teens.

Some of these frequent adverse effects result in physical and mental illness, while others are potentially fatal, like cancer. On May 31, 2019, the World Health Organization said that using a cell phone poses a risk to one's health and that mobile phone radiation is a carcinogenic hazard that may cause cancer in people. Constant mobile phone use has negatively impacted people's physical and mental health, leading to aches and pains and, in some cases, incapacity, the loss of necessary sleep hours, frustration and arguments over little things, and more.

Objective of this Study
The study would plan to explore the relationship between school-level students' mobile phone addiction and mental health.

Purpose of the Study
The present purpose of this research is to explore the possible consequences of mobile phone usage on the mental health of Pakistani students, which include addiction, cyberbullying, social comparison, and sleep disturbances. This research aims to identify the gaps present in school regulations after examining the available research data and taking into consideration the irregular sociocultural situation in Pakistan. It aims to suggest some practicable solutions, taking into account the cultural factors toward minimizing these risks and creating a safe digital area for children.

Conceptual Framework

IV   DV

Mobile Phone Addiction → **Mental Health**

Methods

Participants and Procedure

Data collection is a key section of this study. The researcher should consider primary data categories while selecting a study-specific data-gathering strategy. The current study was out to determine the effects of social media addiction on adolescent school students. The researcher adopted a structured questionnaire for this study. The study's online cross-sectional purposeful sample survey was administered through Facebook, Gmail, Face-to-face, and WhatsApp, which were the sources of data utilized for analysis in this study. After the data was cleaned, 308 honest responses reported by members of the education sector were collected from the survey. It was separated into two sections; in section A, the researcher provides a list of personal data, including age, gender, level in school, school type, personal mobile phones, etc. Addiction to social media and mental health are the main topics. The second section, B, contains questionnaires on social media addiction, mental health, and, last, academic performance. Also, the researcher tried to make the questionnaire items simple, straightforward, and understandable according to this study.

Measures

Social Media Addiction

The Mobile Phone Addiction Index (Leung, 2018) was used to measure mobile phone addiction. "You find yourself engaged on your mobile phone for a longer period than intended" was one of the 17 components that made up the instrument. 1 was the least on the rating scale, indicating that it meant "never," and 7 was the highest rating, indicating that, in this case, it meant "always." Therefore, the average score of all items will give a composite score, where the better the score, the more dependent the children were on their mobile phones. The present study shows a Cronbach's alpha of 0.940 for the scale.

Mental Health

The 12-item Mental Health Questionnaire, created by Gelaye et al. (2015), was used to gauge mental health. This scale had a Cronbach's alpha of 0.982.

Data Analysis and Results

For descriptive statistics, the SPSS was utilized, while for inferential statistics, the Smart PLS 4 (Ringle, 2015) was employed. As a useful method for analyzing multivariate data and drawing conclusions, partial least squares structural equation modeling (PLS-SEM) was used (Sarstedt et al., 2021). The next parts address the results of the structural model analysis, control variables, testing for variance in common methods, measurement model analysis output, and descriptive statistics.

Descriptive Statistics

The mean scores and standard deviation of the variables, as well as descriptive data of the respondents' demographic profiles, were taken using SPSS (version 22). The study looked at a wide range of demographic and educational traits. The gender distribution of the participants revealed that 148 were men (48.1%) and 160 were women (51.9%). The age groups that made up the majority (53.9%) were those in the 5–10 age range (166 individuals), followed by those in the 11–13 age range (24.0%) and those in the 14–16 age range (22.1%). According to a grade-level split, 160 students (51.9%) were in grades 1–5, 83 students (26.7%) were in grades 6–8, and 65 students (21.1%) were in years 9–10. The distribution of the types of schools attended was similar, with 155 kids (50.3%) attending public schools and 153 students (49.7%) attending private schools. Lastly, 156 adolescents (50.6%) claimed not to have a mobile phone, whereas 152 students (49.5%) said they had a mobile phone.

Table 1

Demographic Characteristics of the Participants (n= 308)

Category	Sub-categories	Frequency	Percentage
Gender	Male	148	48.1 %
	Female	160	51.90 %

Category	Sub-categories	Frequency	Percentage
Age	5-10 year	166	53.9 %
	11-13 year	74	24.0 %
	14-16 year	68	22.1 %
Grade in school	1-5 grade	160	51.9 %
	6-8 grade	83	26.9 %
	9-10 grade	65	21.1 %
Type of school	Public	155	50.3 %
	Private	153	49.7 %
Do you have your mobile phone?	No	156	50.6 %
	Yes	152	49.4

Measurement Model Analysis

The results from the measurement model study included reliability (internal consistency) and validity (convergent and discriminant) assessments. The following measurement model values treat the formative and reflective measuring models separately.

Internal Consistency and Convergent Validity

According to Hair Jr, Sarstedt, Hopkins, and Kuppelwieser (2014), another measure of the validity is convergent, which implies that, for instance, item loadings must be greater than 0.708, and the average variance extracted should be equal to or greater than 0.5; internal consistency is assumed when measurements satisfy, for example, Cronbach alpha index greater than 0.70 and composite reliability greater than or equal to 0.70. Measurement models for the constructs for reflection in PLS are expected to meet these properties. In this paper, the analysis of the reflective construct showed that all Cronbach alpha, CR, and AVE measures exceed those stipulated by PLS standards, thus satisfying the reliability and convergent validity of all reflective factors in the study. The items were then investigated for test validity and reliability for two principal constructs, mental health (MH) and mobile phone addiction (MPA).

For the 17 items (MPA 1-17) constituting the scale for measuring mobile phone addiction (MPA), factor loadings ranged between 0.701 and 0.828. A Cronbach's Alpha value of 0.940, signifying high internal consistency, further endorsed the construct's reliability. In addition, good convergent validity was provided by Composite Reliability (CR) of 0.953 and Average Variance Extracted (AVE) of 0.543. Loadings assigned to the twelve items (MH 1-MH 12) that were analyzed ranged from 0.737 to 0.853 along the Mental Health (MH) factor. A Cronbach's Alpha of 0.982 further ensured a very high degree of reliability of the construct. The Construct validity was supported by Composite Reliability (CR) of 0.943 and Average Variance Extracted (AVE) of 0.606. In summary, both domains showed excellent psychometric properties, making them suitable for the evaluation of mobile phone addiction and mental health.

Table 2

Measurement Model Analysis

Constructs	Items	Loadings	Cronbach Alpha	CR	AVE
	MPA 1	0.701	0.940	.953	0.543
	MPA 2	0.768			
	MPA 3	0.742			
	MPA 4	0.810			
	MPA 5	0.809			
	MPA 6	0.828			
	MPA 7	0.820			
	MPA 8	0.762			
Mobile Phone Addiction	MPA 9	0.769			
	MPA 10	0.780			
	MPA 11	0.789			
	MPA 12	0.714			
	MPA 13	0.719			
	MPA 14	0.744			
	MPA 15	0.792			
	MPA 16	0.716			
	MPA 17	0.760			

Constructs	Items	Loadings	Cronbach Alpha	CR	AVE
	MH 1	0.739	0.982	0.943	0.606
	MH 2	0.775			
	MH 3	0.749			
	MH 4	0.840			
	MH 5	0.810			
	MH 6	0.737			
Mental Health	MH 7	0.853			
	MH 8	0.767			
	MH 9	0.844			
	MH 10	0.791			
	MH 11	0.782			
	MH 12	0.743			

Note: CR is composite reliability, and AVE is the average variance extracted.

Discriminant validity

In this study, discriminant validity concerning mental health and mobile phone addiction was examined to enhance the unique properties of the variables in question in the research and ensure proper surveying of the constructs interrogated. Discriminant validity was established by employing the HTMT ratio of correlations (Henseler et al., 2015) and the Fornell-Larcker criterion (Fornell & Larcker, 1981). Fornell-Larcker represents a more traditional method for determining discriminant validity, while the HTMT method is a more recent one advocated in PLS-SEM path analysis. According to the Fornell-Larcker criterion, the designated variables should have the square root of the AVE greater than their intercorrelations. In addition, all HTMT values fell well below the stringent HTMT 0.85 requirement, as illustrated in Table, confirming that the constructs are indeed separate. Discriminant validity for this study has thus been established, permitting further investigation along the path between mobile phone addiction and mental health.

Table 3

Discriminant Validity Based on Fornell-Larcker Criteria

	Mental health	Mobile phone addiction
Mental health	0.778	
Mobile phone addiction	0.784	0.737

Note: Square Roots of the Average Variance Extracted (SQRT-AVE) are shown in bold on the diagonal line. Other entries in the table stand for intercorrelations between the variables. MH is mental health, and MPA is mobile phone addiction.

Table 4

Discriminant Validity Based on HTMT Criteria

	Mental health	Mobile phone addiction
Mental health	-	
Mobile phone addiction	0.811	-

Note: HTMT ratios of correlations between the study variables (Cutoff HTMT value is 0.85).

Common Method Variances

Cross-sectional study designs are commonly used in organizational research, however they may be susceptible to typical technique variation. (Podsakoff, MacKenzie, Lee, & Podsakoff, 2013). This study utilized Harman's single-factor test to assess possible method bias since it is a popular technique for detecting frequent method variance (Fuller et al., 2016; Sarstedt et al., 2017). The straightforward yet effective Harman's test approach aims to identify factors with eigenvalues greater than one and ascertain if the first component explains more than 50% of the total variance (Fuller et al., 2016). Common technique bias was not an issue in this study because the first component accounted for less than 50% of the overall variation.

Common Variables

The study has looked at gender, age, school grades, education, school type, and having a mobile phone in current education sectors; these factors were included in the baseline path model as categorical control variables. Only the baseline path model was retained for the structural path model analysis which looked at the effect of mobile phone addiction on the mental health of adolescents.

Structural Model Analysis and Results

The investigation evaluated the hypothesis (H1) regarding the relationship between mobile phone addiction (MPA) and mental health (MH). The results did indicate a substantial positive correlation between MPA and MH, with a β value of 0.784. At p = 0.000, with a t-value of 15.963 and an SD of 0.049, it is indeed statistically significant. The confidence interval shows the reliability of the estimate, ranging from 2.5% (0.687) to 97.5% (0.877). With this result, the hypothesis was accepted. Also, the model is an excellent fit with predictive power, as shown by the R2 value of 0.615, whereby 61.5% of the changes in mental health (MH) are accounted for by mobile phone addiction (MPA).

Table 5

Structural Model Analysis Result

Paths	Hypotheses	β value	SD	t- value	p-value	2.5%	97.5%	Decision	R^2
MPA-MH	H1	0.784	0.049	15.963	0.000	0.687	0.877	Accepted	0.615

Note: Note: Results are the output of 2-Tailed Bias Corrected and Accelerated (BCa) Complete Bootstrapping with 1000 subsamples at the 0.05 significance level

Discussion

Cell phone abuse may disturb a student's life in various ways. The purpose of the study was to determine the relationship between the use of cell phones among secondary school pupils and mental health problems. Another factor proposed for consideration in mental health problems among high school students is the excessive use of mobile phones. Previous research on the mental health issues associated with cell phone use found a direct relationship whereby an increase in phone use among high school students correlates with a greater risk for mental health issues (Ali et al., 2021).

Additionally, prior studies have connected mobile phone usage to an increased risk of mental health conditions such as stress, anxiety, addiction, depression, and sleeplessness (Kundi & Hutter, 2019). Excessive mobile phone usage has been connected to several behavioral and psychological difficulties, such as sleep disturbances and depression symptoms, according to another study by Thomée (2018). The results revealed a non-significant difference in mobile phone use and a substantial difference in mental health issues. However, there were notable distinctions between the male and female individuals' mental health issues. Compared to male participants, female individuals had higher signs of mental health issues. According to the study's findings, women in Pakistan, like those in many other nations, often have more mental health issues than males. Women are also more likely than males to suffer from anxiety and depression. Male and female participants' cell phone usage, however, did not differ significantly. Compared to men, female participants use their phones more frequently (Economides & Grousopoulou, 2018).

Conclusion

Researchers, academics, and psychologists are made aware by the study that excessive mobile phone use might lead to a rise in mental health issues among students. For this reason, it is advised that school administrators inform children about the harmful effects of cell phones. Additionally, schools should offer counselling centres and other services to kids to detect early signs of anxiety, sadness, and sleep issues linked to mobile phone use.

Future Recommendations

Since the data was gathered from a variety of Okara City schools, the conclusions drawn from the study cannot be applied to the whole Pakistani population. Future research should use a larger sample size from more cities nationwide for improved generalizability. To further comprehend this framework, descriptive and experimental

research are needed. A longitudinal dataset might provide greater insight into causative mechanisms than the cross-sectional nature of this study. Therefore, to better determine the conditions in which mobile phone use results in mental health issues, future research might incorporate several additional significant variables. For additional validation, more research may be done on other populations and in connection with other potential factors.

Implications

This study will help educators, parents, and mental health professionals better understand how excessive mobile phone use might affect people's mental health and, in turn, increase awareness of the risks connected with excessive phone use. Given that students now use their phones more frequently and spend the majority of their time on them, the current study has consequences for academics and educational psychologists. To gain a deeper understanding of these variables, the current study offers empirical data. The study sheds light on excessive mobile phone use, which should be taken into account for intervention initiatives such as school-level promotion of awareness.

Public Policy Relevance

Pakistani secondary schools must create rules for the safe use of mobile phones in light of the growing impact of mobile phone use on mental health. The increasing usage of mobile phones by secondary school pupils in Pakistan poses major issues for their overall and mental well-being. This topic is particularly important to national public policy because of its impact on social justice, public health, education, and economic growth.

Policy recommendations

Policy proposal for addressing mobile phones' impact on the mental health of secondary school students:

1. Put Limits on Cell Phone Use in Schools: It is proposed that the government mandates every educational sector either government or private to establish a committee to cut down on distractions and screen time, and enforce rules prohibiting phone usage during school hours, except emergencies or instructional needs.
2. Promote Mental Health Services in Schools: To address problems with the overuse of mobile phones and mental health difficulties, set up counselling programs, employ qualified mental health specialists, and offer workshops.
3. Encourage community and parental involvement: Create programs through local governments to teach parents how to control their kids' use of cell phones. Give helpful advice on how to create areas free of screens, encourage offline activities, and see the warning indications of mental health problems.
4. Promote extra-curricular activities: It is recommended that the government should more invest in sports programs, cultural events, and public leisure centers to provide kids with interesting alternatives to excessive cell phone use. To advance equity, give implementation in underprivileged regions top priority.
5. Use Newspapers and Television to Promote Awareness: It is also related to the government to mandate all television channels and newspapers to launch awareness programs for the public about the dangers of unnecessary mobile phone use attitudes to one's mental health, emphasizing practical advice for parents and students to encourage moderation in use.

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