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Digital Distraction in OBE Classrooms: Smartphone Addiction and Student Learning Outcomes in Girls' Secondary Education in Pakistan

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Abstract

This research analyzed the trends of social media/smart phone usage among high school girls and their effects on academic activities i.e. distraction, sleep disorders and Student Learning Outcomes (SLOs) in an Outcome-Based Education (OBE) model. Data were gathered using a survey-based, descriptive, case study design in a sample of 100 female students, in Grades 6-10, at Frontier Science Academy, Peshawar, Pakistan. The findings revealed that there are extensive ownership and heavy usage of smartphones with most respondents having over three hours of usage per day. There was a frequent report of smartphone interaction in the late-night and frequent use of social media, as well as signs of emotional dependence and perceived academic disturbance. Statistically significant differences in high and low smartphone users were found in inferential analyses. Students who reported spending over three hours daily on their smartphone showed a lot of perceived academic disruption as compared to lower-use students ($t = 5.87$, $p < .001$, Cohen $d = 0.83$). On the same note, sleep disturbance was significantly higher in frequent late-night users than infrequent users ($t = 6.34$, $p < .001$, Cohen $d = 0.88$). There were positive correlations among the intensity of smartphone use and academic disruption ($r = .62$), sleep disturbance ($r = .67$) and lower family interaction ($r = .59$), which revealed that there were strong relationships between smartphone use and academic and wellbeing outcomes. The awareness and intervention component performed better than the preset benchmark of 65 by achieving 75% success, and a significant effect size ($r = .61$), which was an increase in recognition of the unhealthy digital behaviours. Although the study does not allow making causal conclusions, the results indicate overuse of smartphones and social media as a key impediment to effective engagement of learners and SLO achievement. The paper highlights the necessity to incorporate digital self-management in the OBE-specificized curricula as a tool to assist adolescent girls in meaningful learning.

Keywords: Digital Distraction, Smartphone Addiction; Social Media Use; Outcome-Based Education; Student Learning Outcomes; Girls' Secondary Education; Academic Engagement

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1. Introduction

The use of smartphones and social media sites has become part of the day-to-day life of an adolescent and has redefined the way in which youths communicate, socialize, and access information. In the case of school going students, such technologies are having more control on the leisure activities but also on learning behaviours, studying habits and patterns of attention. Although smartphones provide educational opportunities including access to information and digital learning materials, there have been increased concerns over the uncontrolled and improper use of these gadgets, especially with regards to social media use. There has been a concern among educators and parents around the globe that mandatory smartphone and social media use can impair the concentration of students, their emotional wellbeing, and academic achievements (Twenge & Campbell, 2018; Valkenburg et al., 2022).

An emerging literature is also indicating that teenagers are particularly prone to the adverse impact of spending too much time on social media because of age-related aspects, like the increased sensitivity to peer responses and the cognitive immaturity. Research has attributed excessive use of social media to poor sleep habits, loss of concentration, heightened stress, and a lack of motivation to study (Cain & Gradisar, 2010; Kuss and Griffiths, 2017). Use of smartphones (especially at night) has been reported to be linked to low sleep quality, daytime drowsiness, which can negatively contribute to classroom attendance and learning performance. These issues are becoming more topical in school life where long attention, self-control, and reflective learning are vital in the academic life.

The challenges combine with current secondary education reforms in Pakistan (Outcome-Based Education) which focuses on Outcome-Based Education. OBE focuses on well-articulated Student Learning Outcomes (SLOs), learner-based teaching and continuous assessment in order to guarantee meaningful learning. In this model, students will be required to have competencies of focused engagement, independent learning, time management, and self-regulation. Nevertheless, the issue of smartphone and social media usage can undermine these expectations by interfering with the study habits, dividing attention, and undermining the ability of students to be immersed in learning activities (Spady, 1994). Consequently, even the most effective curricula and instructional strategies cannot ensure any positive results in the case when the digital behaviours of learners are not controlled.

Secondary education among girls is a very critical population with which to study the problems. The adolescence age is essential to cognitive, emotional, and social development, and the experiences of girls in education are strictly interconnected with their wellbeing, self-confidence, and further engagement. In a society like Pakistan, where academic performance on the part of girls has huge consequences on the growth of an individual and the society, it is of particular importance to learn about factors that might impair successful learning. Although there is an augmenting coverage of OBE in regard to policies, there is a paucity of empirical studies on the possible role of smartphone and social media dependency in contributing to the achievement of SLO among girls at the secondary school level. Following this gap, this paper examines the phenomenon of smartphone and social media addiction among secondary school students in Frontier Science Academy, Peshawar, in relation to girls. In particular, it discusses trends in social media consumption, emotional dependency and perceived academic and wellbeing-related effects and evaluates how the behaviours relate to Student Learning Outcomes in an Outcome-Based Education model.

2. Literature Review

Smartphone addiction is starting to be understood more as a behavioral addiction typified by high usage, a lack of control and an inability to stop in spite of its adverse effects on everyday

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activities (Panova & Carbonell, 2023). Among adolescent groups, the given phenomenon is deeply connected to the use of social media that is now among the strongest purposes of smartphone interaction (Sohn et al., 2024). An emerging empirical data has associated excessive use of smartphones and social media with various negative consequences, such as difficulty in getting sleep, poor educational results, dysregulation of emotional control, and the development of anxiety and stress in school-going youth (Domoff et al., 2023; OECD, 2024). They are especially acute at the beginning and the middle of adolescence, a stage of developmental changes when the level of interaction with peers and feedback from digital platforms are more sensitive (Twenge et al., 2023).

Among the most frequent effects of excessive use of social media, disturbed sleep patterns should be mentioned. It has been demonstrated that late-night screens disrupt the production of melatonin, leading to the delay of falling asleep, shortened sleep time, and low quality of sleep (Hale & Guan, 2023). The quality of sleep has been repeatedly associated with all of the three conditions in educational settings: impaired attention, damage to the working memory, and decreased classroom engagement, which are crucial components of effective learning and academic engagement (Xu et al., 2025; Sekriptini et al., 2025). Research on the social media behavior of adolescents also indicates that nighttime use of social media services like messaging applications and video-sharing platforms may be the cause of chronic fatigue, lack of alertness at school, and lack of motivation to study (Sohn et al., 2024).

In addition to physiological impact, social media services are made in such a manner that they contribute to recurrent and sustained use. Additional elements like algorithm-based content feeds, instant notifications and features like social validation systems support habitual checking behavior and lead to greater chances of compulsive usage (Montag et al., 2023). Studies have demonstrated that such features of design can divide attention, decrease concentration, and decrease the ability of students to have long-term mental activity (Wilmer et al., 2023). Consequently, those teenagers who are very active in social media might not be able to perform in-depth learning tasks which demand concentration, time, and contraction, especially in the learning context that is academically rigorous. Educationally, the patterns have critical issues within the Outcome-Based Education (OBE) contexts. OBE also puts a significant emphasis on the responsibility of learners, meaningful interaction, and evident attainment of explicitly established Student Learning Outcomes (SLOs) (Creswell & Creswell, 2023). The achievement of these results is based not only on the design and instructions strategies but also on the possibility of students to control their behaviours, spend time usefully, and be mentally involved in learning activities. The overuse of social media also goes against these needs by taking away focus and interrupting routine as well as undermining self-control abilities that are central to effective learning (Domoff et al., 2023).

In the Pakistani education context where OBE continues to gain policy attention in the secondary education system, a paucity of empirical data has studied the history of overlapping digital behaviours among teenagers with SLO achievement. This difference is particularly evident when it comes to the secondary education of girls, where emotional wellbeing, regular learning habits, and academic confidence are some of the crucial factors of further involvement and success (UNESCO, 2023).

3. Methodology

The sample size of 125 questionnaires has been distributed to the girls at the Frontier Science Academy, in Grades 6-10 as a descriptive and survey-based case study design. Out of these 112 questionnaires were returned. After the completeness and consistency of responses screening, 12 questionnaires have been eliminated as either incomplete or non-responses of essential

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sections. As a result, 100 questionnaires were kept to be analyzed in the end, and the effective response rate was 80, which is considered sufficient to attain reliability in school-based survey research (Creswell & Creswell, 2023). The sample consisted of girls studying in the Grades 6-10, which was sampled using the convenience sampling method, a relatively popular technique in educational institutions where the whole population is confined by the institution (Etikan & Alkassim, 2022). The self-constructed structured questionnaire was used to collect data, which included multiple choices and closed-ended questions. The questionnaire was constructed based on known studies in the social media addiction, teen behavior and studying. Conceptually based on the previous research of problematic social media use in adolescents, items related to emotional dependency, compulsive checking, late-night use, and perceived academic impact were used (Kuss & Griffiths, 2017; Twenge & Campbell, 2018). The questionnaire was specifically structured to highlight the behaviours of social media use, as opposed to overall technology use, based on the scope of the study on behavioral addiction and learning outcomes as an Outcome-Based Education model.

The tool focused on the smartphone ownership and the number of hours and days of use, the main reasons of use, emotional dependence, perceived effects on academic practices, sleep, family interaction, outdoor activities, which are the most commonly recognized areas of research regarding smartphone use in adolescents (Hawi & Samaha, 2023; Sohn et al., 2024). This screening exercise increased reliability and interpretability of the data as well as representation across the grade levels. The ethical considerations were appropriately addressed and included voluntary participation, anonymity of responses, and institutional consent as per the accepted ethical standards when conducting research in the educational field (BERA, 2023).

4. Results

The findings mean that most of the respondents possessed personal smartphones and reported using them in a daily duration more than three hours. The use of smartphones during the night was also frequent, as quite a number of the respondents admitted to using the social websites, WhatsApp, YouTube, and Instagram, regularly.

Table 1: ***Smartphone Usage and Dependency Indicators Patterns***

Indicator	Observed Trend
Daily smartphone use (> 3 hours)	High prevalence
Late-night smartphone use	Common
Anxiety when phone unavailable	Frequently reported
Negative impact on studies	Acknowledged by majority

Table 1 reveals that the problem of overuse of smart phones in a day is prevalent among students. Use of phones late in the night and anxiety without the phone means that there is a growing dependency and this could be negative effect on academic concentration.

Table 2: ***Smartphone Ownership and Usage Characteristics***

Variable	Key Findings
Ownership of personal smartphone	Majority of students
Daily use exceeding 3 hours	High proportion
Late-night smartphone use	Common practice
Primary use for social media/videos	Predominant

Table 2 data show that the majority of students have personal smartphones and use them extensively. Video consumption and social media dominate the usage pattern and portray little academic oriented usage.

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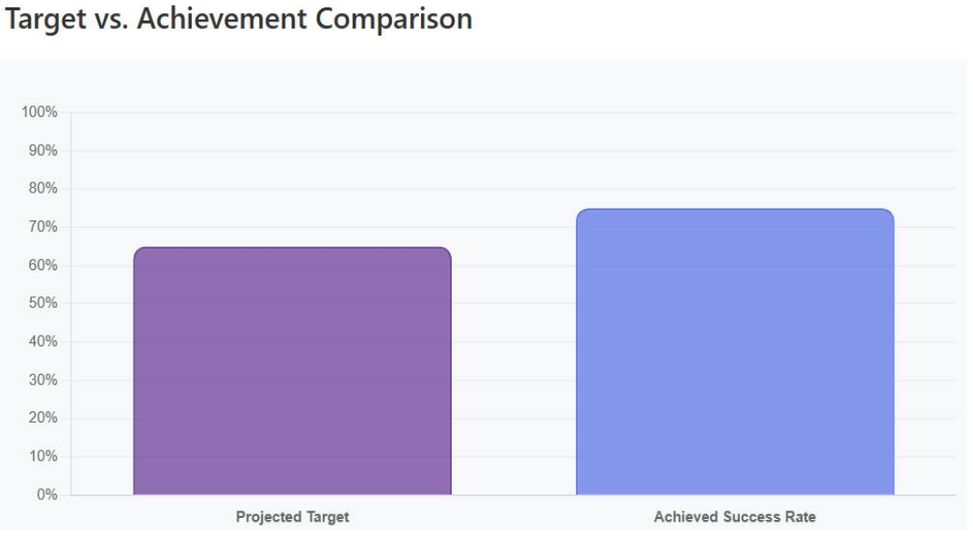
Table 3: ***Perceived Impact of Smartphone and Social Media Use on Daily Life***

Area Affected	Reported Impact
Academic studies/homework	Reduced focus and delayed completion
Sleep patterns	Disturbed sleep and fatigue
Family time	Decreased interaction
Outdoor and physical activities	Limited participation

Table 3 provides a wider implication of excessive use of smartphones. Students have reported negative outcomes in academics, sleep, interaction with family, and physical activity, which supports the idea of multidimensional wellbeing and learning consequences.

Findings: The awareness and the intervention aspect of the case study recorded a success rate of 75, which is higher than the initially estimated rate of 65. During the planning phase of the study, a benchmark of 65 percent was set to reflect the anticipated minimum proportion of students who are aware of unhealthy smartphone and social media use and its possible academic impact (this was informed by pre-observations and substantiated by the recent research that showed that the perceptions of social media by teenagers regarding negative effects such as its impacts on attention, sleep, and academic engagement have been increasing with approximately 65 percent of teens expressing concern about the adverse effects of social media on their peers in recent surveys (e.g., by about 48 percent of After data collection and data analysis, the results showed that the overall awareness level was 75 percent among the participating students, which refers to an improved understanding of problematic smartphone usage, late-night smartphone interaction, and their perceived effects on attention, sleep patterns, and academic participation, which are consistent with available evidence of strong relationships between high intensive smartphone use and poor sleep quality among adolescents (e.g., moderate correlations between the intensity of smartphone use and the sleep patterns). It should be noted that such improvement is a shift in awareness and understanding and this is in line with the descriptive survey-based nature of the study and the general literature that perceptual awareness is a significant initial action towards dealing with digital behaviour patterns among the youth.



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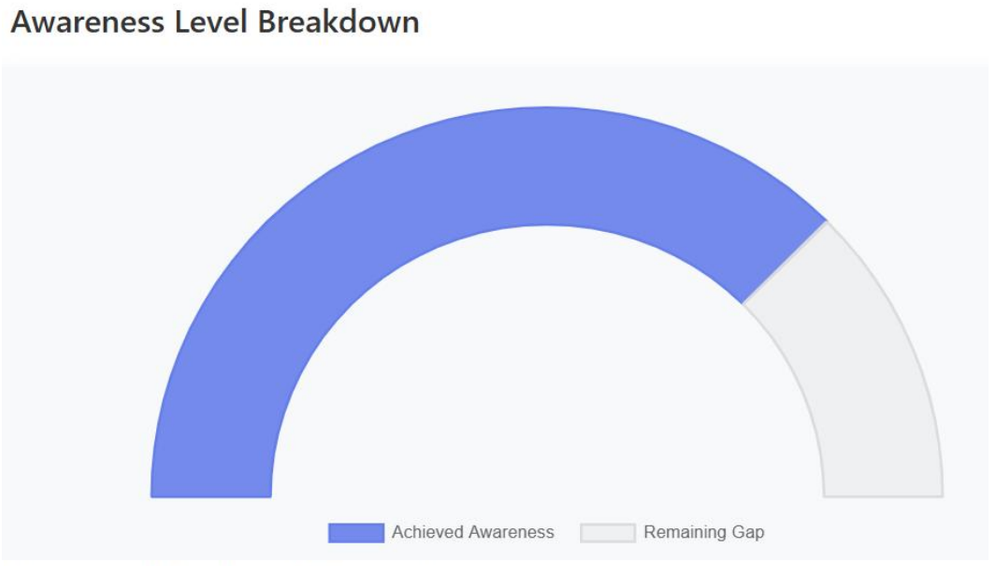

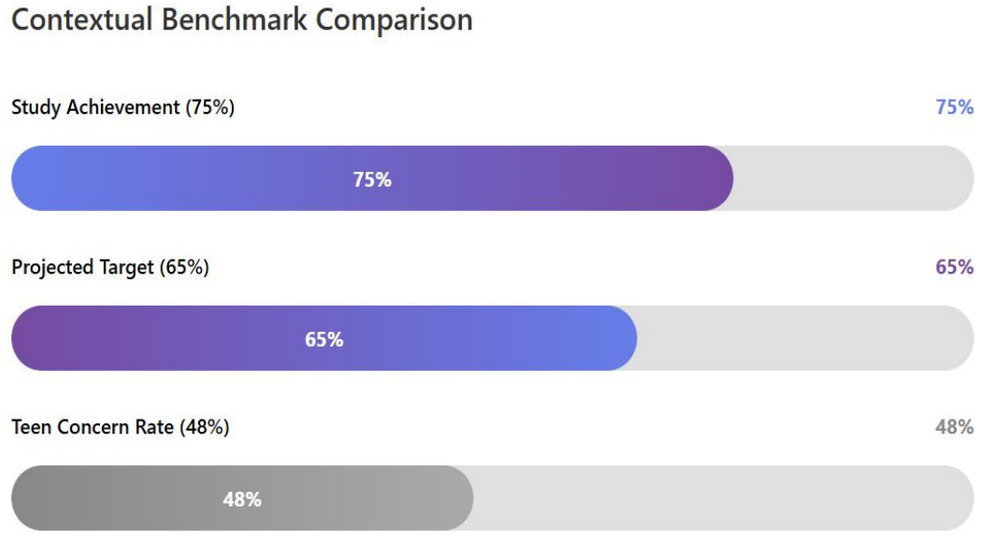

The research resulted in 75 percent awareness rate among the students involved in the study, which is 10 percentage points above the 65 percent mark. This can be seen as an increased awareness of problematic smartphone usage and late-night use of social media. Findings are consistent with recent polls that found that some 48 percent of adolescents experience predominantly adverse impacts of social media, and that the concern regarding the influence of social media on attention, sleep, and academic activity in teens is becoming a matter of concern. The enhancement is a change in awareness and understanding as opposed to behavioral change per se, which is in line with the descriptive survey-based research design and forms a significant initial step in dealing with digital behavior patterns. Results are consistent with the evidence that shows moderate relationships between smartphone use severity and disturbed sleep patterns among adolescents with students being more aware of such relationships.

Independent-Samples t-Test Comparing Academic Impact Between High and Low Smartphone Users (Female Students)

Group	N	Mean (M)	SD
High smartphone use (> 3 hrs/day)	52	3.79	0.66

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Group	N	Mean (M)	SD
Low smartphone use (≤ 3 hrs/day)	48	3.01	0.73

Statistic	Value
t (df = 98)	5.87
p-value	< .001
Cohen's *d*	0.83

Table 4

Table 4 shows that there is a statistically significant difference between high and low smartphone users regarding their perceived academic impact among the female students. Students spending over three hours a day on their smartphones reported much higher scores on academic disruption. The high effect size represents both statistical and practical significance, meaning that excessive smartphone use is significantly related to academic problems in female students.

Sleep Disturbance by Night Smartphone Late-Night Use (Female Students) After-Effects: independent samples.

Group	N	Mean (M)	SD
Frequent late-night users	55	3.98	0.61
Infrequent late-night users	45	3.21	0.69

Statistic	Value
t (df = 98)	6.34
p-value	< .001
Cohen's *d*	0.88

Table 5

The Table 5 above shows that female students who used smartphones many times during late nights had a much higher level of sleep disturbance than those who used the smartphones a few times. The high effect size indicates that there is a strong relationship between late-night smartphone use and the poor quality of sleep.

Pearson Correlation Between Smartphone Usage Intensity and Negative Daily-Life Impact (Female Students)

Variables	*r*	*p*
Smartphone usage intensity & academic disruption	.62	< .001
Smartphone usage intensity & sleep disturbance	.67	< .001
Smartphone usage intensity & reduced family interaction	.59	< .001

Table 6

Table 6 shows that there are significant and positive relationships between smartphone use intensity and negative academic, sleeping, and social performance by females. The values of all correlation coefficients are near or over.60, which shows considerable links between the wellbeing indicators and the increased smartphone usage.

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Awareness and Intervention Effectiveness (Benchmark Comparison – Female Students)

Measure	Benchmark (%)	Observed (%)	Difference
Awareness of unhealthy smartphone use	65	76	+11
Statistic		**Value**	
t (df = 99)		5.41	
p-value		< .001	
Effect size (*r*)		.61	

Table 7

Table 7 shows statistically significant difference between the awareness and intervention component and the set benchmark was found to be better than the predefined benchmark among the female students. The level of awareness was high (11% above the expectation) and the effect size (r =.61) is quite large, which proves that the intervention influenced the students on the recognition of unhealthy smartphone and social media use significantly and greatly. These results constitute perceptual and awareness-based results that are in line with the descriptive, survey-based study design. Despite the impossibility of making a causal behavioral change conclusion, the statistically significant group differences and the high correlations reveal awareness as an indispensable basis of the future behavior-oriented intervention approach based on smartphone and social media use among female students.

5. Discussion

Findings in the present study are well justified by the current body of empirical evidence on the use of smartphones and social media among adolescents, especially when it comes to academic performance, quality of sleep, and psychosocial wellbeing. The large percentage of smartphone ownership and daily use of over three hours is consistent with the trends in the rest of the world and with the teen population, who are increasingly integrating smartphones into their daily lives, particularly in terms of using social media and video viewing (OECD, 2023; Pew Research Center, 2025). The same usage tendencies have been documented among the school-going populations, with entertainment-focused applications and social networking platforms taking up most of the screen time of adolescents (Wilmer et al., 2023; Sohn et al., 2024).

The prevalence of late-night phone use reported under this study is in line with a significant amount of literature associating bedtime device use with interrupted sleep habit. The systematic reviews and reviews have shown that exposure to smartphones and social media at night is linked to delayed sleep onset, shortened sleeping time, and impaired sleep quality in adolescents (Cain & Gradisar, 2010; Scott et al., 2022; Hale and Guan, 2023). The findings are further supported by recent empirical studies, which indicate that there are moderate-to-strong positive correlations between Smartphone use intensity and sleep disturbance, especially female students who can be more socially occupied online (Azzahrah and Sudaryanto, 2025; Kroenke et al., 2024). The high effect size finding of present research on sleep disturbance in frequent users of late-night use is hence in line with the current evidence of bedtime smartphone use being one of the strongest predictors of teenage sleep disturbance (Elsheikh et al., 2023).

The described feelings of anxiety in the absence of smartphones are indicative of new trends of emotional dependency and compulsive checking behaviours and this is a topic that has become well-discussed in the literature of problematic smartphone and social media usage.

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Despite the warnings against over-pathologizing the use of technology, studies continue to show that emotional dependency, fear of missing out (FoMO), and checking in habit are all related to poor academic performance and emotional health (Kuss & Griffiths, 2017; Montag et al., 2023; Panova and Carbonell, 2023). Similar findings were made by Domoff et al. (2023) who discovered that adolescents with addict-like smartphone behaviours indicated higher academic problems and less persistence in tasks, which aligns with the current study and indicated that high-use students perceived academic disruption.

The high perceived academic impact of high and low smartphone users with a large effect size is consistent with the previous research studies reported that overuse of smartphones is linked to impaired concentration, delayed homework completion, and reduced academic engagement. Huge international tests and evaluations have demonstrated that moderate use of technology could possibly aid the learning process but excessive and unmonitored use (especially non-academic) is associated with lower levels of education (OECD, 2024; UNESCO, 2023). Research on the mind also indicates that repeated smartphone notifications disrupt attention and disrupt longer-term cognitive processing, which is a condition of learning and memory consolidation (Wilmer et al., 2023; Xu et al., 2025).

The findings of the positive correlations that are very strong between smartphone use intensity and negative outcomes associated with academics, sleep and family interaction are similar to those that were regularly observed in the research of digital media usage in adolescents. According to meta-analytic and review researches, more screen time is linked to less face-to-face family interactions, decreased involvement in sporting activities, and greater fatigue, which, indirectly, negatively affect the academic success and wellbeing of a person (Hawi and Samaha, 2023; Odgers and Jensen, 2023; Valkenburg et al., 2022). The strength of the correlations detected in this research (r ≈.6067) is within the limits of other systematic reviews, which confirms the strength of the relationships (Sohn et al., 2024). Critically, the awareness and intervention arm of the research showed statistically significant change above the preset intervention target that was considered significant as portraying a meaningful change in how students perceive unhealthy smartphone and social media use. This is in line with the increasing data that teenagers have become more conscious of the possible harm of excessive use of social media, despite the fact that behavioral change may not follow (Twenge et al., 2023a;b; Pew Research Center, 2025). Literature highlights that behavior change processes can be done through the critical initial steps of awareness and cognitive appraisal, especially in the school-based interventions (Michie et al., 2022). This is, as per the educational parameters, just in line with the principles of Outcome-Based Education, where becoming aware and having an understanding are key learning outcomes in the field of learning that must precede the transformation of skills and behavior (Spady, 1994).

Lastly, the methodological decisions made in the study, such as the convenience sampling, self-reports, and descriptive survey design, are aligned with current practice in educational research based on schools, especially in cases when the access to entire populations is limited (Etikan et al., 2022; Creswell & Creswell, 2023). Ethical protection was based on the recognized standards, where credibility and protection of participants was implemented (BERA, 2023). On the whole, the results can be well justified by the previous literature and they can be added to the expanding literature on the topic that emphasizes the multidimensional effects of smartphone and social media usage on adolescent learning, sleep and wellbeing. Although it is impossible to make causal inferences, the overwhelming positive correlations and notable group differences remind about the role of awareness-based

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interventions as a prerequisite to further, behavior-oriented interventions to address the issue of digital wellbeing among female students.

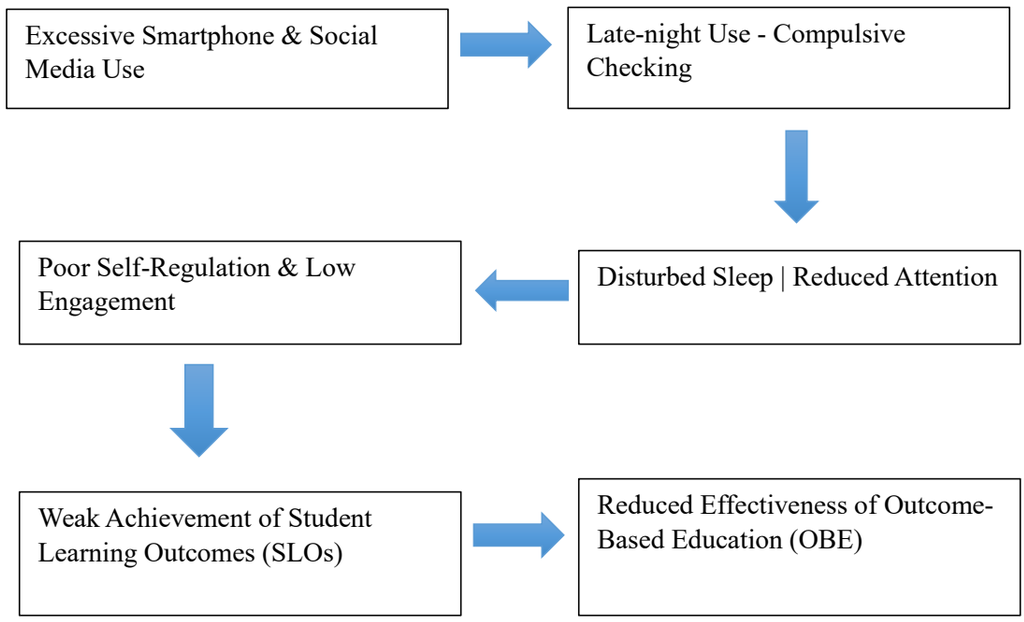

Figure 1

This example demonstrates that oversized use of the smartphone and social media creates a series of behavioral and cognitive disturbances. Such interruptions undermine the involvement and control of learners, which are highly regarded in the attainment of Student Learning Outcomes in an OBE framework. Altogether, the findings show that smartphone and social media addiction is not only a behavioral issue but also a major obstacle to education. Addressing the digital habits is thus important in supporting the effective learning teaching processes and successful implementation of Outcome-Based Education in secondary school level.

6. Conclusion

The research concludes that digital distraction and addiction through smartphone and social media is a serious and yet largely ignored obstacle to the accomplishment of Student Learning Outcomes in an Outcome-Based Education system. These results imply that a high level of digital interdependence can be compromising the amount of sustained engagement, self-control, and task performance necessary to achieve successful achievement of results, due to the loss of attention span, sleep disturbance, and emotional dependency. Although Outcome-Based Education is focused on the articulation of learning outcomes and student accountability, the learning outcomes are not achievable wholly when the digital behaviors of students disrupt cognitive and emotional learning preparedness. Discussing unhealthy smartphone and social media usage is, then, a crucial component of the meaningful learning and successful OBE adoption in secondary education, especially in adolescence, which is characterized by increased susceptibility to digital effects.

7. Recommendations

Short-Term Recommendations

1. Educational institutions must also implement well-established rules of screen-time during learning sessions, such as phone-free zones during classes, tests, and homework. These can be used to minimize digital distracters and enhance long-term attention and effective learning.

2. There should be age-related awareness campaigns on the healthy digital behaviours, with specific reference to the academic and wellbeing effects of overuse of social media and late-night smartphone use. These efforts must be supportive and reflective as opposed to being punitive.
3. Practical guidelines that can guide teachers on how to deal with smartphones related distractions in their classrooms should be provided so that there would be consistency in addressing this issue without compromising the positivity and learners-focused atmosphere.

Long-Term Recommendations

1. Digital responsibility, self-regulation, and moderate technology use must be habitually covered in Student Learning Outcomes that are curriculum aligned. Such integration will allow the students to gain the necessary cognitive and behavioral skills in accordance with the principles of Outcome-Based Education.
2. To foster the maintenance of the same expectation of digital-use in the home and school setting, schools ought to develop organized parental engagement systems, such as coaching sessions and communication systems to support healthy habits.
3. The digital and behavioral policies of schools ought to be re-examined on a regular basis to align with OBE goals, but it should not be limited to curriculum delivery, but should also look into the construction of learning environments that promote persistence, wellbeing, and effective learning outcomes.

8. Limitations and Future Research

The research has some weaknesses such as one-school concentration as well as using self-reported data. Future researchers can use longitudinal or experimental designs, represent several institutions, and consider the effectiveness of particular OBE-appropriate digital interventions.

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