



RESEARCH ARTICLE

Section: *Digital Humanities***From immersion to addiction: Modeling the digital mind of students through social media use**Yahya M. Khatatbeh¹ * & Soliman, A. Alghadyan¹¹Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia*Correspondence: ymkatatbh@imamu.edu.sa**ABSTRACT**

Background

University students increased social media use has generated concerns about digital addiction and immersive digital experiences. Because gifted individuals are highly cognitively engaged with digital surroundings, this issue is very important.

Objective

This study examines university students' social media use, immersive experience, and digital addiction. It measures social media engagement, immersive digital experience, and internet addiction in the study sample. The study also examines the direct and indirect consequences of social media use on digital addiction, focusing on immersive experience as a mediator. The study examines how academic accomplishment and digital use features including social media time, electronic abilities, device type, and platform type predict immersive experience and digital addiction. Finally, the study will develop and test a structural explanatory model to explain the psychological mechanisms behind university students' digital addiction, providing empirical evidence to support preventive and educational interventions to promote healthy digital engagement.

Methods

This quantitative cross-sectional survey included 330 university students. Bergen Social Media Engagement and Experiences Scale (Be-SMEE), Immersive Experience Questionnaire (IEQ), and Internet Addiction Test data were obtained. SPSS and JASP were used to analyze direct and indirect relationships between study variables using descriptive statistics, Pearson correlation analysis, structural equation modeling (SEM), and bootstrapped mediation analysis.

Results

In addition to a moderate to high level of immersive experience, the findings revealed significant levels of involvement on social media platforms and

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behaviors associated with digital addiction. It was shown that the usage of social media did not have a significant direct effect on digital addiction. On the other hand, immersive experiences revealed a substantial negative effect, which indicated that higher degrees of immersion were related with lower levels of digital addiction. There was a substantial correlation between the ability to use electronic devices and the immersive experience, whereas the amount of time spent on social media was positively associated with digital addiction. One of the findings of the mediation study was that immersive experience had a substantial role in mediating the connection between electronic skills and digital addiction. However, this was not the case for the association between other digital use characteristics and addiction.

Conclusion

The results suggest that immersive experience functions as a protective psychological mechanism against digital addiction, particularly among students with higher electronic skills. Enhancing positive immersive engagement and digital competencies may therefore be an effective strategy for reducing problematic internet use among university students.

KEYWORDS: social media use, immersive experience, internet addiction, electronic skills, university students, structural equation modelingArabia.

1. Introduction

The fast growth of social media platforms has changed students' cognitive, emotional, and behavioral tendencies, making digital participation essential to academic and social life. Social media use by 18–24-year-olds has increased by more than 30% over the past five years Meltwater (2024) Immersive social media use has shifted students' digital experiences from enjoyable to behavioral addiction, especially in university and secondary schools. The expanding psychological and behavioral hazards of social media use are highlighted by recent findings showing 18.4% of students worldwide satisfy criteria for addiction, with rates reaching 22.8% in some Asian groups(Gopakumar et al., 2025)

Research indicates that excessive use of digital technologies, such as cellphones, social media, and online gaming, is linked to lower academic performance, with a tiny but substantial negative effect size ($d \approx -0.085$). Digital immersion's cumulative duration and cognitive burden may degrade pupils' sustained attention, working memory, and self-regulated learning(Kuş, 2025) , Social media environments are designed to provide clear proximal goals, moderate challenges, and continuous feedback through likes, comments, and notifications, making flow and immersion models a compelling framework for understanding this shift from functional use to problematic dependence. These design features intensify deep psychological absorption and temporal dissociation, which can be rewarding but also lead to compulsive engagement and difficulty disengaging from platforms, especially among young users who are sensitive to social reinforcement and digital validation(AL-ANZI & KHATATBEH, 2025; Yu et al., 2020), Recent empirical studies also show that higher social media use is positively associated with social anxiety and FoMO, which mediate the relationship between intense use and academic deterioration and procrastination. Research has linked social media addiction to increased academic procrastination and reduced self-control, creating a psychological cycle of immersion, compulsive checking, and neglect of academic responsibilities in college students (AL-ATTIYAH & KHATATBEH, 2025; Tang & He, 2025)Internet addiction among university students is estimated to be 41.8% worldwide, with post-COVID-19 rises and increased vulnerability among males, low-income students, and those with depression. These trends highlight the need for predictive structural models of the student "digital mind" that track the transition from immersive, seemingly normative social media use to entrenched addictive patterns, taking into account personality traits, emotional regulation, and educational context(Khatatbeh et al., 2025; Tang & He, 2025)

This broad exposure has increased scholarly attention in how normative digital immersion might lead to maladaptive or addicted behavior (Kuss & Griffiths, 2017) Neuropsychologically, social media platforms use likes, shares, and notifications to exploit reward-based learning systems. These traits appear to activate brain dopaminergic pathways like behavioral addictions (Farahani et al., 2026; Volkow et al., 2016) A recent US university student poll found that 41% have indications of problematic or compulsive social media use, including loss of control and psychological reliance (Massarat & Gelles-Watnick, 2022), In schools, excessive

social media use has been related to lower academic performance and attentiveness. Longitudinal studies show that students who spend more than four hours a day on social media have a 10–15% lower GPA than moderate users (Lepp et al., 2014; Rosen, 2017). High-frequency use also increases anxiety, depression, and sleep problems in undergraduates (Twenge et al., 2018). Digital immersion stresses ongoing and thoroughly integrated interaction rather than isolated use, making it a valuable analytical lens for this phenomenon. When immersion becomes compulsive and self-regulatory mechanisms fail, scholars say it may develop behavioral addiction (Billieux et al., 2015; Brand et al., 2016). Students, whose executive functions and identity formation are still developing, are especially affected by this change. This study models the “digital mind” of students by examining healthy immersion to problematic and compulsive social media use. The study uses integrative models like the I-PACE framework to identify the psychological, cognitive, and affective mechanisms that drive this progression (Andreassen, 2015; Brand et al., 2016).

“From Immersion to Addiction: Modeling the Digital Mind of Students through Social Media Use” integrates contemporary psychological and media theories to explain how goal-directed social media use can become obsessive and addictive. This framework describes the micro-level processes (reinforcement, cognitions, needs satisfaction) and macro-level structures (digital architectures, social norms) that shape students’ “digital mind” and their trajectories from functional use to problematic dependence, based on leading behavioral, cognitive, and motivational (Dong et al., 2025).

Uses and Gratifications Theory (UGT) says students use social media for information, amusement, social connection, and escape. Researchers say kids utilize online interactions to control mood, cope with stress, and maintain social identity, which can lead to dependency (Fabio & Iaconis, 2024). UGT studies show that teenagers who use social media for emotional escape and validation have more salience, mood modification, tolerance, and conflict. The expectation that online environments will meet students’ psychological needs better than offline contexts is shaping their “digital minds” and reinforcing immersive engagement patterns that may shift from voluntary, need-based to compulsive, hard-to-control use (Sun & Zhang, 2021). Another important pillar of the system is flow theory and immersion structures, which describe deep digital interaction. Social media platforms use endless scrolling, algorithmic personalization, real-time feedback, and intermittent rewards to produce flow-like experiences in students, resulting in intense attention, altered time perception, and reduced self-awareness (Miranda et al., 2023). Recent study reveals that students are drawn into loops where the pleasant, immersive state becomes a reinforcing target, leading to longer and more frequent social media use. According to behavioral addiction criteria, students go from episodic, adaptive flow states to chronic, dysregulated immersion, prioritizing digital engagement above academic responsibilities, sleep, and offline interactions (Fabio & Iaconis, 2024).

SDT discusses how social media use affects psychological needs for autonomy, competence, and relatedness and how need satisfaction or frustration influences well-being. SDT-based scoping reviews show that teen social media use can promote relatedness (connection and belonging) and decrease it (social exclusion, comparison, and cyberbullying) while affecting autonomy (freedom vs. compulsion) and competency, (West et al., 2024). This study shows that students’ “digital minds” are dynamic systems in which social media either meets needs (e.g., supportive peer networks) or frustrates them (constant comparison), with need dissatisfaction meaning greater addiction. Social media can dominate need satisfaction, especially relatedness and competence, causing students to build internalized pressures (“I must be online,” “I must respond immediately”) that change autonomous needs into addiction (Chen et al., 2025).

Also, Social media addiction influences psychological and academic results through sequential mediators in Frontiers and Springer multi-pathway structural models. A college student structural model found that chain mediation decreased self-efficacy, maladaptive coping, and anxiety from social media addiction. A recent study on college students’ social media dependency examines internet addiction, social media dependence, and mediating and moderating factors like self-control, coping, critical thinking, and social comparison. From Immersion to Addiction: Modeling the Digital Mind of Students states that (a) gratifications and flow experiences initiate and sustain immersion, (b) need frustration and maladaptive cognitions develop dependence, and (c) reinforcement contingencies and individual vulnerabilities form a stable addictive pattern that affects mental health and academic (Abueva et al., 2025; Dong et al., 2025). In addition, Immersion impacts working memory, inhibitory control, and task-switching. Immersed students may have poor self-regulation due to distraction and

low metacognition, These cognitive changes allow intense engagement to cause hazardous use(Wegmann & Brand, 2020).

A review of previous studies that addressed these variables and the impact of social communication and digital addiction reveals their effect on the individual, their cognitive abilities, and the electronic integration associated with addiction to using social media in its various forms. Among the most prominent of these studies are Andreassen (2015) sought to conceptualize social media addiction within behavioral addiction frameworks in analytical research that was carried out in Norway. The study found that excessive social media usage is linked to decreased self-control and elevated psychological reliance, based on data collected from several university student samples with different sizes. In the United States Junco (2012) examined the impact of Facebook use on academic performance among 1,839 undergraduate students from multiple universities. The results indicated that intensive non-academic use of social networking sites was significantly associated with lower GPA and reduced academic engagement. In a large-scale longitudinal study including thousands of American high school and college students, Liu et al. (2024) looked at the correlation between screen use and mental health. Researchers found that students whose social media use was higher also reported higher levels of anxiety and depression, which had a negative impact on their academic performance. Brand et al. (2019) proposed the I-PACE model for theoretical considerations using data obtained from many samples of German college students. The model describes the progression from digital immersion to addiction and how executive control, cognitive processes, and personality attributes interact with one another. The UK-based researchers Kuss and Griffiths (2017) conducted a thorough literature review on social media addiction, concentrating on studies that involved university students. Students are a high-risk population, according to the report, because of academic pressure and the rise of social comparison. Finally, Wegmann and Brand (2020) examined the cognitive mechanisms behind social media addiction in a group of one thousand German university students. In particular, they discovered that attentional bias and inhibitory control deficits were strong indicators of addiction.

Therefore The bulk of studies on college students' social media addiction have only examined associations between students' high usage and specific psychological or academic issues, even though there is a growing body of research on this topic. There has been no effort to model the cognitive-behavioral mechanisms that go from non-addicted to compulsive digital use. Another issue is the underutilization of integrative theoretical models that account for emotional, cognitive, and executive aspects simultaneously.

Furthermore, research on the "digital mind of students" and the ways in which platform design and the academic environment impact it is severely lacking. Researching addictive trajectories has other limitations, one of which is the over use of cross-sectional designs. To address these gaps, the present research proposes a comprehensive modeling approach that might theoretically represent the transition from absorption to addiction.

Hypothesis

H_1 Arithmetic means and standard deviations of internet addiction behavior, social media interaction, and immersive experience among students

H_2 The Relationships among Social Media Use, Immersive Experience, and Digital Addictive Behavior in Gifted Students

H_3 To what extent do academic achievement (GPA) and digital use characteristics (platform type, time spent on social media, electronic skills, and device type) predict immersive experience (IEQ) and digital addictive behavior (IAT) among students

H_4 immersive experience mediate the relationship between social media use and digital addictive behavior among students

2. Methods

2.1. Study Design

This quantitative, cross-sectional study examined gifted students' social media use, immersive experience, and digital addiction. Standardized self-report measures were used to collect data at one time to investigate direct and indirect (mediated) correlations between research variables, The suggested theoretical model was

tested using structural equation modeling (SEM), which allows simultaneous estimate of many linkages and robust analysis of complicated dependence structures. In addition, bootstrapped mediation analysis was used to determine if immersive experience mediates the relationship between social media use factors and digital addiction using bias-corrected confidence intervals, The approach permits theory-driven modeling of digital interaction behavioral and experience processes while keeping methodological rigor and statistical efficiency, making it suitable for the study aims.

2.2. Sampling And Analysis

Samples were taken in stages after institutional and ethical approval. First, university students were randomly solicited across colleges to assess their interest in the project. After being informed of the research’s goal and procedures, interested students gave preliminary consent, In-person data collecting was chosen to better manage the research instruments. Students with initial consent were invited to engage in data gathering. The final sample included students from all university colleges to represent all academic specialties, All individuals gave informed consent before completing the study instruments and participated voluntarily. The final dataset for statistical analysis only includes students who completed all measures.

Table 1 presents the characteristics of the study sample, which consisted of 330 students. The majority of participants were aged between 18 and 20 years, followed by those aged 21–22 years. Female students slightly outnumbered male students. With respect to academic specialization, students from humanities and social sciences and Islamic studies were almost equally represented, whereas a smaller proportion were enrolled in applied sciences, In terms of academic achievement, most participants reported high cumulative grade point averages. Smartphones emerged as the most commonly used electronic devices, and nearly two-thirds of the students indicated having basic electronic skills. A substantial proportion of participants reported spending more than four hours per day using electronic devices. Regarding social media use, TikTok was identified as the most frequently used platform, followed by YouTube and Snapchat, This multistage sampling approach ensured adequate participation while maintaining ethical standards and procedural transparency.

Table 1.: Demographic, Academic, and Digital Characteristics of the Study Sample (N = 330)

Variable	Category	n	%
Age	18–20	12	3.6
	21-22	189	57.3
	Mor than 22	129	39.1
Gender	Male	149	45.2
	Female	181	54.8
Major	Humanities and Social Sciences	121	36.7
	Applied Sciences	89	27.0
	Islamic Studies (Sharia Sciences)	120	36.4
Cumulative GPA	Very High	83	25.2
	High	41	12.4
	Very Good	151	45.8
	Good	55	16.7
Most Used Electronic Device	Smartphone	249	75.5
	Tablet	34	10.3
	Personal Computer (PC)	47	14.2
Electronic Skills	Basic	207	62.7
	Advanced	123	37.3
Daily Time Spent on Device	2 hours	58	17.6
	2–4 hours	60	18.2
	More than 4 hours	212	64.2

Most Used Social Media Platform	TikTok	93	28.2
	YouTube	75	22.7
	Snapchat	69	20.9
	Instagram	39	11.8
	Other	54	16.4

2.3. Measurement

A structured questionnaire was developed to collect essential demographic information from participants. This instrument aimed to describe the sample accurately

Immersion Experience Questionnaire Short Form (IEQ-SF)

The Immersive Experience Questionnaire (IEQ) was used to assess students' immersive experience during digital interaction. The scale consists of 31 items covering five dimensions of immersion: cognitive involvement, emotional engagement, real-world dissociation, perceived control, and challenge. In the present study, the IEQ demonstrated excellent internal consistency, with a Cronbach's alpha of $\alpha = .91$, while reliability coefficients for the subscales ranged from $\alpha = .83$ to $.88$, indicating satisfactory construct validity. Items were rated on a five-point Likert scale, and negatively worded items were reverse-coded prior to analysis. Higher scores reflect higher levels of immersive experience.

In the present study, the IEQ demonstrated excellent internal consistency (Cronbach's $\alpha = .91$), with subscale reliability coefficients ranging from $.83$ to $.88$, supporting satisfactory construct validity. Items were scored on a five-point Likert scale, with reverse-coded items recoded prior to computing total and subscale scores, where higher scores indicate higher immersive experience.

Bergen Social Media Engagement and Experiences Scale (Be-SMEE)

The Bergen Social Media Engagement and Experiences Scale (Be-SMEE) was used to assess students' engagement with and experiences of social media use. The scale consists of 20 items designed to capture key aspects of social media engagement, including behavioral involvement, experiential intensity, and subjective perceptions of social media use. The Be-SMEE is commonly treated as a unidimensional measure, with items collectively reflecting the overall level of engagement and experiential involvement in social media.

In the present study, the Be-SMEE demonstrated good internal consistency (Cronbach's $\alpha = .88$), supporting its reliability for use with university students. Items were rated on a five-point Likert scale, and total scores were computed by summing item responses, with higher scores indicating greater levels of social media engagement and experiential involvement

Internet Addiction Test (IAT)

Digital addictive behavior was assessed using the Internet Addiction Test (IAT) developed by Young. The scale consists of 20 items designed to measure problematic patterns of internet use, including excessive use, loss of control, neglect of daily responsibilities, and emotional dependence on online activities. The IAT is widely treated as a unidimensional measure, providing an overall index of digital addictive behavior. In the present study, the IAT demonstrated high internal consistency, with a Cronbach's alpha of $\alpha = .89$, indicating strong reliability. Items were rated on a five-point Likert scale, and negatively worded items were reverse-coded prior to analysis. Total scores were computed by summing item responses, with higher scores indicating higher levels of digital addictive behavior

2.4. Translation of Study Measures

To ensure linguistic and cultural accuracy, the translation of study instruments followed a rigorous five-stage process. The initial translation involved two bilingual experts independently translating the original English versions of the instruments into Arabic. This was followed by a synthesis process, where a review panel compared the translations and reconciled discrepancies to produce a unified Arabic version. The back-translation stage required two independent translators with no prior exposure to the original instruments to translate the Arabic version back into English. The back-translated English version was then compared with the original English

instruments to identify any semantic inconsistencies, and discrepancies were resolved through discussion with linguistic and subject matter experts. Finally, the validation and reliability testing stage involved expert review for linguistic clarity, cultural appropriateness, and religious sensitivity. In addition, Cohen's kappa coefficient and intraclass correlation coefficient were computed to evaluate inter-rater agreement and ensure the reliability of the translation process.³⁵

2.5. Ethical Considerations

The Institutional Review Board (IRB) of [College of Social Sciences - Imam Mohammad Ibn Saud Islamic University (IMSIU) – Riyadh] accepted the study protocol in accordance with the Declaration of Helsinki (2013 revision). After being told that participation was voluntary and confidential, all participants signed a written informed consent form. Data was collected privately,

2.6. Statistical Analysis

Statistics were done using IBM SPSS and JASP. To describe the demographics of the participants and the primary study variables, descriptive statistics like frequencies, percentages, means, and standard deviations were calculated, Pearson's correlation coefficients were used to explore bivariate connections between social media use, immersive experience, and digital addiction. Using route analysis, structural equation modeling (SEM) using observed variables tested the predicted associations simultaneously. As the models were newly identified, global goodness-of-fit indices were unhelpful, therefore model interpretation focused on standardized path coefficient magnitude and statistical significance, To explore immersive experience's mediating role, bootstrapped mediation analysis was performed in SEM. 5,000 bootstrap resamples and bias-corrected 95% confidence ranges estimated indirect effects. Mediation effects were statistically significant when confidence intervals did not contain zero. Each statistical test was tested at a significance level of $p < .05$.

3. Results

3.1. Arithmetic means and standard deviations of internet addiction behavior, social media interaction, and immersive experience among students

As a preliminary step, **Table 1** presents the descriptive statistics of the study variables, indicating generally high levels of social media engagement and digital addictive behavior, alongside moderately high levels of immersive experience among gifted students. **Table 1** describes gifted kids' internet addiction, social media use, and immersive experience. The Internet Addiction Test showed a high mean score ($M = 80.86$, $SD = 10.64$), indicating problematic internet use in the sample. According to Be-SMEE ratings ($M = 75.62$, $SD = 9.22$), participants were highly engaged with social media. The Immersion Experience Questionnaire mean score ($M = 119.93$, $SD = 15.20$) exceeded the predicted midway, indicating moderately high to high digital immersion. These descriptive findings imply that gifted students engage intensively with digital settings, including frequent social media use, immersive experiences, and increased internet addiction.

Table 1. Descriptive Statistics of Internet Addiction, Social Media Engagement, and Immersive Experience among Gifted Students

Measure	Mean	Standard Deviation
Internet Addiction Test (IAT)	80.864	10.644
Bergen Social Media Engagement and Experiences Scale (Be-SMEE)	75.615	9.216
Immersion Experience Questionnaire (IEQ)	119.927	15.198

3.2. The Relationships among Social Media Use, Immersive Experience, and Digital Addictive Behavior in Gifted Students

To examine the relationships among social media use, immersive experience, and digital addictive behavior, a stepwise analytical approach was employed.

Table 2. Pearson Correlations among Social Media Use, Immersive Experience, and Digital Addictive Behavior

Variables	IAT	Be-SMEE	Self presentation and social comparison
Internet Addiction Test – IAT	1	-.032	.117 ^b
Bergen Social Media Engagement and Experiences Scale – Be-SMEE)	-.032	1	.232 ^c
Self-presentation and social comparison	.117 ^b	.232 ^c	1
Negative acts	.055	.351 ^c	.644 ^c
Unwanted attention	.140 ^b	.225 ^c	.522 ^c
Subjective overuse	.093	.214 ^c	.488 ^c
Social obligations	.178 ^c	.313 ^c	.632 ^c
Source of concern	-.119 ^b	.271 ^c	.459 ^c
Immersion Experience Questionnaire – IEQ	-.307 ^c	.106	.026
Cognitive Involvement (Inv_C)	-.379 ^c	.146 ^c	.091
Emotional Involvement (Inv_E)	-.353 ^c	.235 ^c	.124 ^b
Real-World Dissociation (RWD)	-.394 ^c	.146 ^c	.115 ^b
Control (Ctrl)	-.273 ^c	.267 ^c	.315 ^c
Challenge	-.433 ^c	.224 ^c	.204 ^c

* $p < .05$, ** $p < .01$, *** $p < .001$

Also, The Pearson correlation results indicate significant associations between Internet addiction and several dimensions of social media use. The Internet Addiction Test (IAT) showed small but significant positive correlations with self-presentation and social comparison, unwanted attention, and social obligations, while demonstrating significant negative correlations with the Immersion Experience Questionnaire (IEQ) and its subdimensions. In addition, Bergen Social Media Engagement and Experiences Scale (Be-SMEE) scores were moderately and positively correlated with negative social experiences, particularly negative acts and social obligations. Overall, the findings suggest a clear distinction between problematic Internet use and healthy immersive engagement, with Internet addiction being more closely linked to socially driven stressors than to high-quality immersion. These bivariate findings highlight immersive experience as a potentially central variable in explaining digital addictive behavior, warranting further examination within a structural modeling framework. Building on these correlational results, a structural path model was specified to examine the direct and indirect relationships among the study variables. The proposed model is illustrated in **Figure 1**.

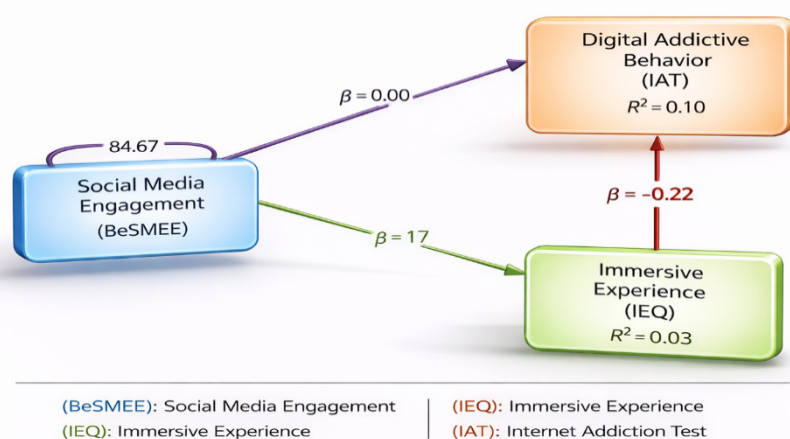


Figure 1. Structural Path Model of Social Media Use, Immersive Experience, and Digital Addictive Behavior
 Figure 1 shows the structural route model of social media use, immersive experience, and digital addiction. BeSMEE showed a weak and non-significant direct influence on digital addiction ($\beta = 0.00$), suggesting that social media activity alone does not predict internet-related addiction. In contrast, social media use positively impacts immersive experience ($\beta = 0.17$), indicating that stronger participation with social media platforms leads to greater digital immersion. Immersive experience had a moderate and substantial negative impact on digital addiction ($\beta = -0.22$), suggesting that higher levels of immersion are associated with lower levels of digital addiction. The model explains 10% of the variance in digital addiction ($R^2 = 0.10$) and 3% of the variance in immersive experience ($R^2 = 0.03$).
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addiction ($\beta = -0.22$), suggesting that higher degrees of immersion were linked to lower levels of addiction. The model also demonstrates that the stated paths explained a significant percentage of immersive experience and digital addictive behavior, validating the structural hypothesis. To further quantify these relationships and assess the statistical significance of each structural path, the standardized path coefficients of the model are reported in Table 3.

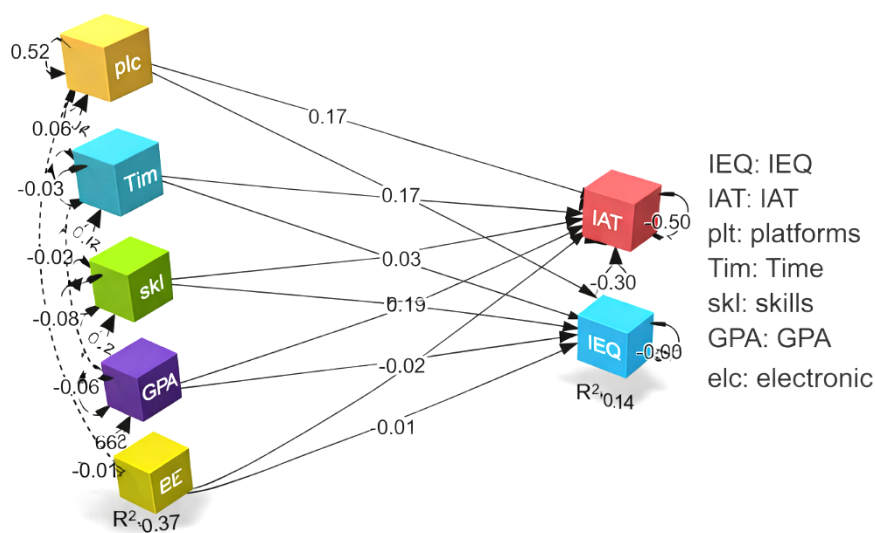
Table 3. Structural Equation Modeling Results for the Proposed Path Model (Regression Coefficients)

Outcome	Predictor	β	SE	z	p
IEQ	BeSMEE	0.106	0.090	1.93	.053
IAT	IEQ	-0.307	0.037	-5.83	< .001
IAT	BeSMEE	0.001	0.061	0.01	.991

Table 3 shows the structural equation model’s standardized route coefficients for social media use, immersive experience, and digital addiction. Table indicates a modest beneficial influence of social media use on immersive experience ($\beta = 0.11$, $p = .053$) although not statistically significant. Experience had a substantial negative impact on digital addiction ($\beta = -0.31$, $p < .001$), with higher levels of immersive experience being linked to lower levels of internet-related addiction. After incorporating immersive experience into the model, social media use did not independently predict digital addictive behavior ($\beta \approx 0.00$, $p = .991$). These data suggest that immersive experience is the main explanatory variable in the proposed model, while social media use is indirect and weak.

3.3. To what extent do academic achievement (GPA) and digital use characteristics (platform type, time spent on social media, electronic skills, and device type) predict immersive experience (IEQ) and digital addictive behavior (IAT) among students

To address Research Question 3.3, a structural equation model was estimated to examine the impact of academic achievement and digital use characteristics on immersive experience and digital addictive behavior. The model explained 3.7% of the variance in immersive experience and 13.6% of the variance in digital addictive behavior, indicating modest explanatory power for immersive engagement and a moderate level of explained variance for addictive digital behavior. To further illustrate the structural relationships among the



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Figure 2 shows the structural route model of academic accomplishment and digital use features on immersive experience and digital addiction. The figure shows that students with stronger technological skills reported increased digital immersion. In contrast, platform type, social media use, academic achievement, and electronic device type did not directly affect immersive experience. Social media usage time was a favorable predictor of digital addiction. Immersive experience directly diminished digital addiction, suggesting that more immersion reduced addiction. Platform type, electronic skills, academic achievement, and device type did not directly affect addictive behavior in the model, The standardized path coefficients and their statistical significance are reported in Table 5.

Table 5. Standardized Path Coefficients for the Structural Equation Model

Outcome	Predictor	β	p
IEQ	skills	0.17	.003
IEQ	platforms	-0.001	.990
IEQ	Time	-0.03	.603
IEQ	GPA	-0.05	.341
IEQ	electronic	0.07	.213
IAT	Time	0.19	< .001
IAT	IEQ	-0.30	< .001
IAT	platforms	-0.03	.512
IAT	skills	-0.04	.482
IAT	GPA	0.06	.235
IAT	electronic	0.08	.107

Note. IEQ = Immersive Experience Questionnaire; IAT = Internet Addiction Test; **platforms** = platform type; **Time** = time spent on social media; **skills** = electronic skills; **GPA** = grade point average; **electronic** = device type. Because the proposed structural model was just-identified, global model fit indices (e.g., CFI, TLI, RMSEA) were not reported, as such indices are not informative in just-identified path models, electronic skills were the only significant predictor of immersive experience, as indicated in Table 5. Higher electronic skills were related with greater immersive engagement. Social media had a beneficial effect on digital addiction, but immersive experience had a negative effect. The remaining factors did not directly affect immersive experience or addiction.

3.4. immersive experience mediate the relationship between social media use and digital addictive behavior among students

To examine whether immersive experience mediates the relationship between social media use and digital addictive behavior, a bootstrapped mediation analysis was conducted using structural equation modeling with 5000 resamples and bias-corrected confidence intervals.

Table 6. Direct Effects of Social Media Use Variables on Digital Addictive Behavior

Predictor	Outcome	Estimate	p
Time	IAT	2.441	< .001
electronic	IAT	1.316	.085
skills	IAT	-0.890	.443
platforms	IAT	-0.244	.533

As revealed in Table 6, social media use positively affected digital addiction. Electronic gadget, skill, and platform type did not appear to directly affect addictive behavior. Beyond these direct associations, the indirect effects through immersive experience were further examined.

Table 7. Bootstrapped Indirect Effects of Immersive Experience (IEQ) in the Relationship Between Social Media Use and Digital Addictive Behavior

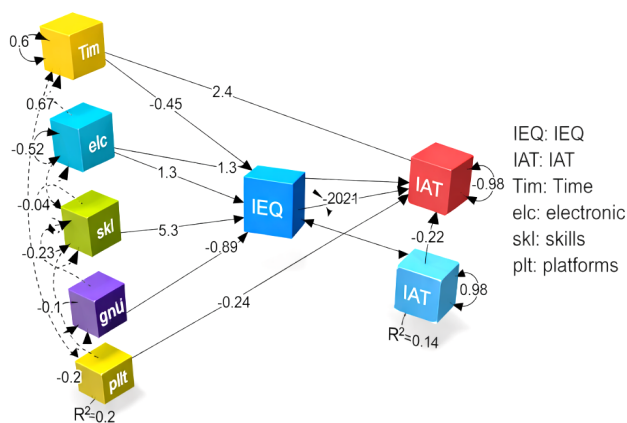
Indirect Path	Estimate	p
Time → IEQ → IAT	0.096	.676
electronic → IEQ → IAT	-0.285	.254
skills → IEQ → IAT	-1.128	.007
platforms → IEQ → IAT	0.005	.970

Table 7 shows that immersive experience strongly mediated the association between electronic skills and digital addiction, as the indirect effect was statistically significant and the confidence interval did not include zero. Immersive experience did not mitigate the impacts of social media, device, or platform type on addictive behavior. To provide a comprehensive view of these relationships, the total effects of social media use variables on digital addictive behavior are presented in Table 8.

Table 8. Total Effects of Social Media Use Variables on Digital Addictive Behavior

Predictor	Outcome	Estimate	p
Time	IAT	2.536	< .001
electronic	IAT	1.032	.198
skills	IAT	-2.018	.093
platforms	IAT	-0.239	.560

Table 8 shows that both direct and indirect impacts of social media use predicted digital addiction. Electronic skills, device kind, and platform type had no significant influence.



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Figure 3. Mediation Model of Immersive Experience in the Relationship Between Social Media Use and Digital Addictive Behavior

Figure 3 shows the mediation model, showing that immersive experience only mediates the association between technological skills and digital addiction, while other social media use variables had direct or non-significant impacts. The mediation analysis showed that immersive experience selectively mediates the relationship between technological skills and digital addictive behavior, while social media usage directly affects addictive behavior.

4. Discussion

4.1 The first hypothesis revealed high levels of social media engagement and digital addiction, alongside moderately high immersive experience among university students.

Effect of Disorder Type on Self-Awareness According to the first hypothesis, college students have a fairly high level of immersive experience, a high level of social media involvement, and a high level of digital addiction. The results corroborate those of other research that have found that college students from all cultures engage in heavy internet use and show signs of increased addiction (Andreassen, 2015; Gopakumar et al., 2025; Massarat & Gelles-Watnick, 2022; Miranda et al., 2023; Yu et al., 2020) have also shown similar trends in highly immersive digital experiences. In contrast to samples defined by academically structured or institutionally regulated digital usage, the results here show a higher prevalence of addiction (Junco, 2012; Lepp et al., 2014).

This finding can be interpreted through Flow Theory. Deep immersion occurs when perceived difficulty and competence are balanced, combined with a sensation of control and temporal detachment, according to Csikszentmihalyi's Flow Theory, which was initially published in 1990. This finding may explain all of these things. Two new empirical studies (Miranda et al., 2023; Yu et al., 2020) suggest that immersive experiences that provide a lot of control and a feeling of accomplishment could protect against addiction. This study adds to the growing body of evidence that adaptive immersion differs from compulsive involvement, since it found that immersive experiences were linked to decreased rates of digital addiction.

4.2. Social media use showed no direct effect on digital addiction, while immersive experience negatively predicted addiction.

This is consistent with research that places a greater emphasis on the quality of the experience rather than the amount of usage (Brand et al., 2016). Unlike the findings of studies that reported direct beneficial connections (Kuss & Griffiths, 2017) this one does not. This is something that may be understood via the lens of the I-PACE model, which suggests that adaptive immersion may actually increase self-regulation rather than fostering addiction. The I-PACE paradigm, which views addiction as a product of emotional, cognitive, and executive processes, explains this outcome. Thus, adaptive immersive experiences may improve self-regulation. Moreover, Self-Regulation Theory provides further support, suggesting that immersive experiences enhancing perceived control and mastery strengthen self-regulatory capacity and reduce compulsive use (Hall & Fong, 2007).

4.3. Electronic abilities indicated immersion, whereas social media use predicted digital addiction.

Exposure to social media and proficiency with electronic devices were predictors of digital addiction and immersive experience, respectively. Supporting previous research (Fabio & Iaconis, 2024; Kuş, 2025) our results show that digital competence is associated with adaptive engagement and screen time is associated with the risk of addiction, they disagree with research that has shown a correlation between GPA and addiction (Junco, 2012; Rosen, 2017). Skills, according to the authors, improve engagement quality, but exposure over time makes people more susceptible to addiction.

By making a distinction between qualitative experience and quantitative use, one might arrive at an interpretation of this investigation. There is no correlation between the frequency of usage and the development of addiction; rather, the psychological quality of involvement is what defines the levels of addiction, according to the I-PACE model, which conceptualizes addiction as arising from interactions between affective, cognitive, and executive processes, this result is in strong agreement with the model. Because of this, adaptive immersion, which is characterized by control and competence, may thus guard against addiction. Furthermore, the Self-Regulation Theory suggests that immersive experiences that enhance perceived control and mastery build self-regulatory ability and diminish compulsive usage. This hypothesis gives additional support for the aforementioned proposition.

4.4. Immersive experience mediated the relationship between electronic skills and digital addiction only.

This supports selective mediation models in recent structural research (Brand et al., 2016; Dong et al., 2025) It contrasts with broader mediation assumptions (Sun & Zhang, 2021), This can be interpreted as immersion transforming digital skills into psychological protection rather than risk

This finding can be interpreted through Flow Theory, provides an explanation for this discovery. According to Csikszentmihalyi (1990), the state of optimum immersion occurs when one's perceived abilities are in harmony with the demands of the job at hand, and when they are accompanied by a feeling of mastery and control. In this setting, being able to use electronics effectively allows for immersive experiences to serve as self-regulated, organized engagement rather than addiction. Brand et al. (2019) cite the I-PACE model as more evidence that immersion can either have adaptive or addictive effects, depending on the strength of the participant's executive and cognitive control mechanisms. That is why, with adequate digital competency, immersive experiences can modulate addiction pathways.

Consistent with other studies on college students' use of social media and potential addiction, this one finds that students spend an excessive amount of time on these platforms. Studies conducted by several researchers (Gong et al., 2025; Nguyen & Tran, 2024; Shannon et al., 2022) have shown that heavy, emotionally-driven social media use is consistently linked to increased psychological strain and worse academic performance. In agreement with this research, the current findings lend credence to the idea that the "digital mind" of students is molded by a mix of intrinsic motivation, dysfunctional thinking patterns, and platform-driven reinforcement mechanisms that, when combined, enable a slow transition from practical involvement to compulsive use. **Additionally**, previous studies have found that students' reliance on social media is associated with worse academic performance, higher levels of anxiety, and more procrastination. These studies have been carried out in various higher education settings, including large public universities in East Asia, research-intensive institutions in Western Europe, and teaching-oriented colleges in North America and the Middle East. These lines of evidence are coming together to show that students can develop problematic and possibly addictive behavior from their immersive social media use, regardless of the specific university system or cultural setting.

5. Conclusion

This study studies gifted university students' social media use, immersive experience, and digital addiction to understand their digital experiences. Use, skills, and interaction quality affect digital engagement, according to statistics, Immersive experience selectively buffered the relationship between technological talents and digital addiction, while social media use directly predicted it. Immersive experience can be a risk factor or regulator dependent on digital engagement environment and qualities; The findings underline the need to look beyond social media use assumptions and examine student technology use. Advanced digital skills and conscious participation can increase the benefits of digital immersion in education while reducing its limitations. Further longitudinal or experimental research should clarify causative pathways and provide evidence-based digital well-being solutions for gifted children.

6. Limitations& Strengths

There are a lot of downsides to this study, despite its benefits. It is more difficult to draw causal conclusions on social media, immersive experiences, and digital addiction from studies with cross-sectional methods. We need more studies that follow subjects over time or do experiments to figure out what causes what. Secondly, it's possible that self-reports boast better memory or are more socially desirable. Objective digital behavior indicators may supplement future research, even using trustworthy methods. Thirdly, it is limited to one university's sample, which means it doesn't represent a wide range of cultures and educational backgrounds. Regardless of these caveats, the study did have a number of strong points. Structural equation modeling using bootstrapped mediation analysis and a theory-driven analytical framework assess the direct and indirect interactions of significant variables. Digital engagement becomes more challenging during immersive experiences compared to regular online time. As a group, talented college students have received little attention in studies of online behavior, but this might change. Good psychometric evaluations yield valid and trustworthy results.

7. Recommendations

This study offers several suggestions. Digital literacy and advanced technological skills should be taught to gifted students to promote responsible digital use. Digital engagement quality and self-regulation should be prioritized over screen time reduction; Researchers should employ longitudinal and experimental methods to determine how immersive experience causes digital addiction. Future study may employ objective digital use measurements and contextual factors like academic stress and psychosocial support to drive evidence-based digital well-being policies for talented kids.

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Ethics Approval

Ethical approval for the study was obtained in accordance with the principles of the Declaration of Helsinki, following the approval of the Scientific Research Ethics Committee at Imam Mohammad Ibn Saud Islamic University, with full adherence to ethical standards of scientific research throughout all stages of the study.

Data Availability Statement

Data will be made available upon request to the corresponding author.

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