

The entrepreneurial shift in education: The critical success factors of mobile learning in higher education institutions

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ABSTRACT

The objective of this investigation is to analyze the correlation among students' readiness for mobile learning, regulation of emotions, nomophobia, cyberloafing via smartphones, and addiction to smartphones while attending classes amidst the COVID-19 pandemic. Current research introduces a theoretical framework that outlines the factors influencing cyberloafing within the m-learning setting. The study involved a total of 719 participants. The structural equation modelling technique was utilized to evaluate a study's framework. The study's results suggest a significant association between the factors of m-learning readiness, emotion regulation, nomophobia, smartphone cyberloafing, and smartphone addiction among learners. The current study also introduces a conceptual framework for this entrepreneurial shift that outlines the factors influencing cyberloafing within the m-learning setting. The discourse pertains to the ramifications for both students and institutions of higher learning.

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1. Introduction

This entrepreneurial shift of utilizing digital technology in the classroom is a desirable outcome for educators due to its potential positive impact on the concept of learning, as noted by Fezile and Erinc (2021). The utilization of mobile phones as m-learning tools in educational settings has been observed, wherein they offer access to e-learning through the Internet (Coskun & Akar, 2020). Amidst the COVID-19 pandemic, educational institutions have enforced mobile learning as per the research conducted by Mohamad et al., (2019) and Tang et al. (2021). Numerous studies and practices have been conducted in relation to mobile learning (m-learning); however, there exists a dearth of knowledge regarding the manner in which these mandates will influence the processes of m-learning. Prior research has indicated that students who exhibit a preference for distance education are more likely to withdraw from courses (Wu et al., 2020). Nevertheless, the impact of mandatory participation in mobile learning on the millions of students involved remains unknown. The attainment of effective adoption of mobile learning initiatives in higher learning necessitates the identification of m-learning readiness as a crucial determinant (Vogel et al., 2018). The extent to which students are prepared to engage in the m-learning setting amidst the COVID-19 pandemic remains insufficiently comprehended, as posited by Tang et al. (2021). The framework of the research is revealed through the identification of the psychological factors underlying problematic smartphone use as well as the conflict between m-learning and cyberloafing that arises in the context of utilizing smartphones during the education procedure. A review of the literature was conducted to identify psychological variables associated with problematic smartphone usage (Khalifeh et al., 2020a). The identification of nomophobia and addiction as concepts linked to problematic smartphone usage has been established. The existing research suggests that there is a correlation between cyberloafing during class and factors such as addiction and nomophobia. This is supported by various studies, including those conducted by Demir and Seferoğlu (2016), Erdem et al.

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(2017), and Şumuer et al. (2019). Nomophobia and addiction have been found to be correlated with cyberloafing. The intricate psychological process of m-learning is highlighted by the interplay between cyberloafing, nomophobia, and addiction in relation to smartphone usage. According to Ravizza et al. (2017), the inappropriate utilization of digital technologies in educational settings can lead to learner distraction and a reduction in their motivation to learn. The employment of technology in an unfavorable manner is a developing concern within the realm of learning, as noted by Chen et al. (2021) in their recent research. According to Chen et al. (2016), learners utilize portable devices to access the internet during in-person educational sessions. According to McCoy's (2020) recent study, it has been found that a considerable amount of class time is spent by learners at universities indulging in cyberloafing activities through their digital devices. In comparison to other information technology tools, smartphones pose a higher risk of distraction for learners due to their accessibility and user-friendly interface, as noted by Chen et al. (2016). Additionally, the use of smartphones may result in negative consequences for their users, as highlighted by Chen et al. (2021) and Gözümlü et al. (2020). The research carried out during the COVID-19 pandemic revealed that smartphones are extensively utilized for m-learning. Fortunately, the use of technological devices is associated with an elevated likelihood of indulging in non-course-related activities, which can result in cyberloafing behaviors. According to Saritepeci's (2020) research, using smartphones in class has a negative impact on the efficiency and productivity of learners' educational activities due to cyberloafing activities. Prior studies have indicated a correlation between cyberloafing and smartphone addiction (Hamrat et al., 2019; Ozdemir et al., 2021). Further study has demonstrated that young individuals exhibit a greater inclination towards smartphone addiction in comparison to other age cohorts (Ataş & Çelik, 2019). Individuals who exhibit problematic smartphone usage tend to experience challenges regulating their emotions. Consequently, young students may resort to utilizing their smartphones as a means of coping with negative emotions as a result of this emotional dysregulation (Polat, 2018). Research has indicated a correlation between emotion dysregulation and problematic smartphone usage as well as cyberloafing (McCoy, 2020). According to Minaz and Çetinkaya, (2017), cyberloafing poses a significant challenge to both online and face-to-face learning. Insufficient research has been conducted on the cyberloafing tendencies of students in online learning environments, including m-learning, particularly in light of the COVID-19 pandemic (Wu et al., 2020). The extant literature on the cyberloafing behaviors of students in asynchronous learning environments is limited, as noted by Syrek et al. (2018). The present investigation is centered on the phenomenon of cyberloafing, specifically as it pertains to the use of smartphones in a virtual synchronous classroom setting. During the period of this study, synchronous instructional sessions were carried out concurrently within the online classroom setting. Hence, the investigation does not encompass cyberloafing practices in the context of asynchronous learning activities that employ tools like forums, documents, and videos for course assistance. The present research endeavors to examine the correlation among various factors, namely students' preparedness for mobile learning, their ability to regulate emotions, their tendency towards nomophobia, their engagement in smartphone cyberloafing, and their susceptibility to smartphone addiction, in the context of the COVID-19 pandemic. The present study introduces a theoretical framework that outlines the factors influencing cyberloafing within the m-learning setting. This could contribute to the sustainability of education and society at large (Khalifeh et al., 2020b).

The succeeding parts of the paper are organized in the subsequent manner: The following section presents a comprehensive analysis of the key constructs of the primary research and develops relevant hypotheses. The subsequent section outlines the methodology utilized in the study. The section dedicated to results in the investigation offers the findings from the study, while the subsequent section delves into the implications of the findings, provides an overview of the limitations of the study, and discusses potential avenues for future research.

2. Literature Review

2.1 *The Entrepreneurial Shift to E-learning in COVID-19 Pandemic*

The global outbreak of COVID-19 was declared by the World Health Organization (WHO) on January 30, 2020, and was subsequently classified as a pandemic on March 11, 2020 (Alzoubi & Azloubi, 2020). According to UNESCO (2020), the global student population experienced a significant impact from the pandemic, with a total of 1.58 billion students affected, representing 90.2% of the world's student population. During the initial quarter of 2021, a significant number of 250 million students will still be experiencing the consequences of educational institution closures. As a result of the extensive closures during the pandemic, academic establishments have been compelled to incorporate electronic learning initiatives (Tang et al., 2021). Although e-learning has advantages, it is recognized for exhibiting a greater rate of student attrition when compared to conventional education, as noted by Saleem & Ahmad (2019). Concurrently, it is anticipated that the COVID-19 pandemic will not only result in suboptimal academic achievement among students but may also escalate the frequency of course withdrawals (Dorn et al., 2020). According to Yukselturk et al. (2014), there are various factors that can influence course withdrawals, such as prior online experience, readiness for e-learning, and self-efficacy in using online technologies. The significance of IT management was emphasized by e-learning managers, who identified the technology ownership of students, universities, and instructors as the primary determinants influencing the success of e-learning amidst the COVID-19 pandemic. The role of e-learning readiness in learning is significant, irrespective of technical proficiency, as highlighted by Alzoubi & Alzoubi (2019). The extent of students' preparedness for online learning remains largely unknown, and the efficacy of online learning programs in the context of a pandemic is even less understood (Tang et al., 2021).

2.2 Emotion regulation and Smartphone addiction

According to Elhai et al. (2018), emotion regulation refers to the mechanism of regulating one's emotions in order to adjust to the surrounding environment. The regulation of emotions occurs at every stage of the emotional process when emotions are activated, as stated by Gökçearsan et al. (2023). Additionally, Coskun & Akar (2020) suggest that emotion regulation may have an impact on an individual's psychological and physical well-being. Emotion regulation difficulties may arise due to factors such as limited access to emotion regulation strategies, non-acceptance of emotional responses, lack of emotional clarity, impulse control difficulties, and difficulties engaging in goal-directed behavior (Yigit & Yigit, 2019). Estévez et al. (2017) suggest that difficulties in regulating emotions may serve as a potential predictor for various types of addiction, including substance addiction (e.g., alcohol and drugs) and non-substance addiction (e.g., problematic internet use and video game addiction). The study conducted by Keser et al. (2016) revealed that problematic internet use is associated with maladaptive emotion regulation among adolescents. In addition, prior research has indicated that emotion regulation is a predictive factor for both internet addiction and SA, as demonstrated by studies conducted by Chen et al. (2016) and Yildiz (2018). The study conducted by Yildiz (2018) showed a positive correlation between problematic internet use and emotion regulation with problematic smartphone use. Additionally, Rozgonjuk and Elhai (2019) have identified emotion dysregulation as a psychological factor that is linked to problematic smartphone usage. Firat and Bozkurt (2020) conducted a study that found a significant correlation between the sub-dimensions of emotion regulation (namely, clarity, goals, impulse, strategies, and non-acceptance) and an increased SA rate. Therefore, we formulated the following hypothesis:

H₁: *Emotion regulation in class has a significant impact on smartphone addiction.*

2.3 Emotion regulation and smartphone cyberloafing in class

Cyberloafing has been characterized as using the internet inappropriately for personal purposes while at work (Akbulut et al., 2017). Current research indicates learners frequently utilize their mobile devices for cyberloafing during class (Chen et al., 2021). Cyberloafing may be characterized as utilizing the internet for personal reasons while in a classroom (Gökçearsan et al., 2023). Cyberloafing in class is the term used to describe students who use their smartphones excessively during class (Karabatak & Alanoğlu, 2021). According to Elhai et al. (2018), the three sub-dimensions of cyberloafing are browsing-related cyberloafing, interactive cyberloafing, and entertainment-related cyberloafing. Website and internet browsing are included in browsing-related cyberloafing; interactive virtual login into networks is included in interactive cyberloafing; and smartphone usage for leisure is included in entertainment-related cyberloafing (Ozdamli & Ercag, 2021). Drawing drawings, checking emails, exploring the web, communicating with friends, updating statuses on social media, retweeting, reading, or liking tweets, installing applications, and watching videos are some examples of classroom cyberloafing activities. Wu et al. (2020) Students' cyberloafing practices in the classroom may have an impact on their personal and academic growth, which will have an impact on their academic achievement in turn (Yildiz, 2020). There aren't enough studies on students' cyberloafing behaviors in e-learning environments (Karabiyik, 2021) or in asynchronous learning environments (Zhang et al., 2020). Cyberloafing is said to have a challenging effect on both e-learning and traditional learning (Christensen & Knezek, 2017). Recent research has shown a negative association between emotion management and cyberloafing since it is an activity that regulates emotions (Windeler et al., 2017). Cyberloafing is less prevalent among those who are goal-oriented than it is among those who are less achievement-oriented (Demir & Seferoğlu, 2016). The following was hypothesized in this investigation based on the relevant literature:

H₂: *Emotion regulation in class has a significant impact on smartphone cyberloafing.*

2.4 M-learning readiness and smartphone cyberloafing in class

Using Wi-Fi and mobile communication devices, m-learning is a kind of e-learning, according to Ataş and Çelik, (2019). Yildiz (2018) defined m-learning as support for learning through mobile devices, regardless of time or place. The capacity of a person to use both new learning settings and technology is known as m-learning readiness" (Mohamad et al. 2019). According to Rohayani (2015), m-learning preparedness is regarded as a key success element for m-learning programs in higher education. Internet/computer self-efficacy, online communication self-efficacy, learner control, self-directed learning, and incentives towards m-learning are some of the components that make up m-learning preparedness (Hung et al., 2010; Widodo et al., 2020). The capacity of a learner to use technology tools for mobile learning is connected to factors like internet/computer self-efficacy and online communication self-efficacy, among others (Alzoubi & Azloubi, 2020). Although there are many studies on online education, it is still unclear whether learners are ready to enroll in real-time online classes, which were made compulsory during the pandemic (Tang et al., 2021). Learners often bring a smartphone or tablet to face-to-face sessions in order to access the internet (Yigit & Yigit, 2019). According to Ravizza et al. (2017), using information technology 'off-task' in learning settings may cause distractions for learners and reduce their drive for a comprehensive education. Saleem & Ahmad (2019) claim that cyberloafing increases preparation for mobile learning. Additionally, a study found that smartphones had the strongest correlation with e-learning readiness when compared to other technological tools (Coskun & Akar, 2020). As a result, we proposed the following:

H₃. *E-learning readiness in class has a significant impact on smartphone cyberloafing.*

2.5 Smartphone addiction and smartphone cyberloafing in class

Cyberloafing in office settings is recognized to be caused by habitual internet use (Vitak et al., 2011). Due in large part to the expansion of the internet in educational institutions, smartphone cyberloafing has also emerged as a subject in education (Chen et al., 2021). Learners have begun to utilize the internet for distracting activities during class because the usage of the internet in educational settings has grown (Alzoubi & Alzoubi, 2019). While it is well known that cyberloafing could affect effectiveness and productivity in educational activities (Saritepeci, 2020), learners in higher learning have discovered cyberloafing during classes by utilizing the internet with their mobile phones (Gözüm et al., 2020). The amount of time learners spend on their smartphones has decreased (Gözüm et al., 2020; Gökçearsan et al., 2023). According to Coskun & Akar (2020), there is a strong correlation between addictive behavior and the cause of a person's propensity for cyberloafing. As a result, we proposed the following:

H₄. *Smartphone addiction in class has a significant impact on smartphone cyberloafing.*

2.6 M-learning Readiness and Smartphone Nomophobia

Nomophobia, which refers to uneasiness, worry, stress, or pain brought on by the inability to make contact with a mobile phone or computer, is seen as a condition of modern digital and virtual culture. According to Voogt (2018), it is the pathological dread of being cut off from technology. Additionally, it is a health issue that has a negative impact on a person's personality, sense of self-worth, worry, stress, academic performance, and other aspects of physical and mental health; it also results in behavioral changes, physical changes, and psychological issues (Rodriguez-Garcia et al., 2020). When we look at the demographic categories impacted by nomophobia, we find that it is prevalent among college students as well as those with various levels of education, notably young individuals (Faroqui et al., 2017; Bartwal & Nath, 2019). Spitzer (2015), who evaluated the findings of 22 studies conducted in various countries and looked at the association between m-learning preparedness and nomophobia, emphasized the dangers that may occur if cellphones are utilized in educational settings. Some of these dangers include the potential for pupils to get anxious and develop addictions. Nomophobia and attitudes towards mobile learning were shown to have a favorable and substantial link in the research by Demir and Seferoğlu, (2016), which included 146 university students. The following hypothesis has been put forth since it is believed that the discovery of a substantial association between nomophobia and m-learning readiness will add to the literature:

H₅. *M-learning Readiness in class has a significant impact on nomophobia.*

2.7 Smartphone Nomophobia and Smartphone Cyberloafing

Upon examination of studies investigating the correlation between smartphone cyberloafing and nomophobia in academic settings, it was observed that university students who exhibit tendencies towards nomophobia are inclined to engage in phone usage during class hours (Akıllı & Gezgin, 2016). Additionally, it was established that students with elevated levels of nomophobia demonstrate a greater frequency of smartphone usage (Saritepeci, 2020). According to Yukselturk et al. (2014), one of the significant predictors of the utilization of mobile devices for extracurricular purposes is nomophobia. In consideration of the correlation established in existing literature between cyberloafing and nomophobia, the subsequent hypothesis has been put forth.

H₆. *Nomophobia in class has a significant impact on smartphone cyberloafing.*

2.8 Smartphone Nomophobia and Smartphone Addiction

Upon analyzing studies that investigated the correlation between nomophobia and addiction, Durak's (2019) research revealed a noteworthy association between nomophobia and smartphone addiction among adolescent individuals. Semerci's (2019) study investigated the correlation between nomophobia and smartphone addiction among students in secondary school. The study yielded findings indicating a moderate yet significant correlation between nomophobia and smartphone addiction. Moreover, the study revealed that nomophobia emerged as the most robust predictor of smartphone addiction. In consideration of the correlation between nomophobia and smartphone addiction as documented in existing literature, the subsequent hypothesis has been posited.

H₇. *Nomophobia in class has a significant impact on smartphone addiction.*

The literature indicates that there are noteworthy associations among the variables of m-learning readiness, emotion regulation, nomophobia, smartphone cyberloafing, and smartphone addiction concerning the utilization of smartphones by students during their undergraduate studies. The present study introduces a proposed model aimed at establishing connections among the variables under investigation, as depicted in Figure 1. The objective is to address the research inquiries through the examination of the hypotheses that have been identified in alignment with the proposed model.

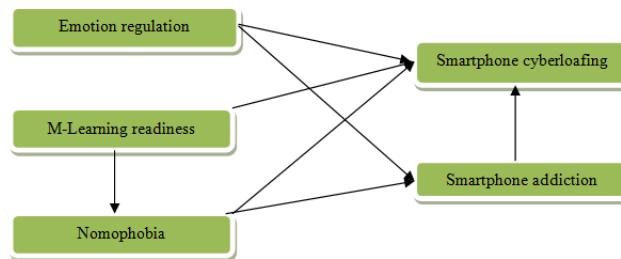


Fig. 1. The research model

3. Research Methodology

3.1 Population and Sample

The study involved the participation of 719 students from Yarmouk University. The eligibility requirement for inclusion in the study was limited to individuals who were enrolled as students in online teaching during the pandemic. The act of participation entailed the completion of an electronic survey. The collection of data was carried out by means of the official learning management system (LMS) of the university, with the participation of the subjects. The study involved a sample size of 800 students, with 81 students being excluded from the analysis due to the presence of outliers or missing and invalid data. The university's Ethics Committee granted ethical approval for the study. The respondents provided responses pertaining to their demographic attributes and the Time Use Survey, which were presented alongside four scales and associated inquiries. This research involved the presentation of all items to the participants situated in Jordan. In the context of this research, an electronic questionnaire was formulated and subsequently disseminated to students enrolled at a public university in Jordan. Prior to the commencement of the application, a notification was disseminated to the participants regarding the extent of the study and its pivotal orientations. The participants were informed that their cyberloafing behavior during online synchronous lessons served as the foundation for the study. The survey was distributed via the Research Center's Learning Management System (LMS) platform, which was utilized for student registration. Voluntary participation was a requirement for inclusion in the study. The duration of participation for each participant was between 15 to 20 minutes.

3.2 Variable measurement

Yurdugül and Demir (2017) established the m-learning readiness scale. The scale utilized in this study assesses optimism through seven items, self-efficacy through six items, and self-directed learning through four items. The survey comprises 17 items that are rated on a 7-point Likert scale, ranging from 1 (indicating a complete lack of suitability for the respondent) to 7 (indicating a high degree of suitability for the respondent). Bjureberg et al. (2016) developed and evaluated the emotion regulation scale. The instrument, which was translated into Turkish by Yigit and Yigit (2019), comprises a 16-item scale that employs a 5-point Likert scale ranging from 1 (representing 'almost never') to 5 (representing 'almost always'). The aforementioned scale comprises five distinct subscales, namely clarity (consisting of two items), goals (comprising three items), impulse (comprising three items), strategies (comprising five items), and nonacceptance (comprising three items). The Yildirim and Correia (2015) questionnaire on nomophobia pertaining to smartphones was culturally adapted to Turkish society by Yildirim et al. (2016). The scale underwent construct validity tests, which led to the creation of a form consisting of 20 items categorized into four sub-scales: "inability to access information," "sacrificing convenience," "communication barriers," and "diminished connectedness." The survey instrument employs a seven-point Likert scale. Gökçearsan et al. (2023) conducted a study on smartphone cyberloafing among Turkish university students by utilizing a scale previously developed by Blau et al. (2006). The aim was to determine the extent of in-class cyberloafing among the participants. The measurement tool comprises 16 items that are rated on a 6-point Likert-type scale ranging from 1 (never) to 6 (always). The items are categorized into three sub-dimensions: browsing-related cyberloafing (consisting of 7 items), interactive cyberloafing (consisting of 6 items), and entertainment cyberloafing (consisting of 3 items). Kwon et al. (2013) initially developed the scale for measuring smartphone addiction, which was later adapted by Gökçearsan et al. (2023). The measurement instrument comprises a uni-dimensional construct of ten items, utilizing a six-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (6). Moreover, the internal consistency of all constructs was validated by means of Cronbach's alpha and composite reliability (CR), both of which exceeded the threshold of 0.70 (Hair, 2016; Khalifeh, 2020) (Table 1).

Table 1

Research constructs and Items source

Variable	No. of items	Cronbach's alpha (α)	Construct reliability
M-learning readiness	17	0.911	0.829
Emotion	16	0.923	0.894
Nomophobia	20	0.903	0.808
Cyberloafing	16	0.891	0.906
Addiction	10	0.818	0.878

3.3 Measurement model

The validity of parallel and discriminant indicators is utilized to evaluate the assessment framework for markers of reflection in PLS, as per Hair (2016). Furthermore, the AVE values of each construct were found to be above 0.50, which provides evidence for convergent validity (Hair, 2016) (refer to Table 2). The discriminant's validity was evaluated based on two criteria. As per Hair's (2016) findings, it is imperative for an indicator to exhibit a higher outer loading compared to its cross loadings on other constructs. According to Fornell and Larcker's (1981) criterion, the association between any component and other factors should exceed the square root of the average variance extracted (AVE) for that factor. Table 3 demonstrates that discriminant validity has been established in accordance with the prescribed criteria.

Table 2

Validity Analysis

Constructs	Items	Factor loadings	Average variance extracted
Readiness	R1	0.852	0.772
	R2	0.744	
	R3	0.766	
	R4	0.717	
	R5	0.751	
	R6	0.709	
	R7	0.735	
	R8	0.796	
	R9	0.791	
	R10	0.795	
	R11	0.822	
	R12	0.716	
	R13	0.737	
	R14	0.771	
	R15	0.779	
	R16	0.802	
	R17	0.749	
Emotion	E1	0.736	0.718
	E2	0.755	
	E3	0.775	
	E4	0.735	
	E5	0.886	
	E6	0.735	
	E7	0.733	
	E8	0.856	
	E9	0.812	
	E10	0.825	
	E11	0.889	
	E12	0.788	
	E13	0.776	
	E14	0.722	
	E15	0.711	
	E16	0.715	
Nomophobia	N1	0.809	0.765
	N2	0.810	
	N3	0.816	
	N4	0.835	
	N5	0.842	
	N6	0.748	
	N7	0.799	
	N8	0.792	
	N9	0.855	
	N10	0.821	
	N11	0.851	
	N12	0.819	
	N13	0.826	
	N14	0.717	
	N15	0.769	
	N16	0.770	
	N17	0.878	
	N18	0.824	
	N19	0.857	
	N20	0.828	

Table 2
Validity Analysis (Continued)

Constructs	Items	Factor loadings	Average variance extracted
Cyberloafing	C1	0.712	0.802
	C2	0.705	
	C3	0.714	
	C4	0.752	
	C5	0.781	
	C6	0.810	
	C7	0.845	
	C8	0.804	
	C9	0.843	
	C10	0.841	
	C11	0.830	
	C12	0.731	
	C13	0.752	
	C14	0.795	
	C15	0.789	
	C16	0.781	
Addiction	A1	0.744	0.797
	A2	0.829	
	A3	0.726	
	A4	0.763	
	A5	0.717	
	A6	0.829	
	A7	0.815	
	A8	0.854	
	A9	0.808	
	A10	0.814	

Table 3
Discriminant validity of constructs

	Readiness	Emotion	Nomophobia	Cyberloafing	Addiction
Readiness	0.731				
Emotion	0.842	0.767			
Nomophobia	0.844	0.756	0.757		
Cyberloafing	0.868	0.710	0.743	0.877	
Addiction	0.864	0.725	0.708	0.880	0.798

4. Results and Hypothesis Testing

4.1 Hypothesis testing

This study aims to examine the correlation among various variables, including students' m-learning readiness, emotion regulation, nomophobia, smartphone cyberloafing, and smartphone addiction, during the COVID-19 pandemic. The methodology employed in this research is Structural Equation Modelling (SEM). The model was estimated using the Generalized Least Square (GLS) estimation strategy to account for the non-normality of the sample rather than relying on the default (maximum likelihood) estimation method. The results indicate that the model exhibited a satisfactory fit to the data, as evidenced by the following fit indices: CMIN/DF = 5.753, GFI = 0.885, CFI = 0.982, and AGFI = 0.872. The results presented in Table 6 provide support for H1, indicating a significant relationship between emotion regulation and smartphone addiction ($\beta = 0.578$, $p = 0.000$). The research findings did not support the hypothesis that there was no correlation between emotion regulation and smartphone cyberloafing (correlation coefficient = 0.545, p -value = 0.185), thereby rejecting H2. The study provided support for hypothesis 3, which stated that there exists a notable correlation between challenges in m-learning preparedness and instances of smartphone cyberloafing ($r = 0.587$, $p = 0.185$). The fourth hypothesis, which investigated the correlation between smartphone addiction and smartphone cyberloafing, received support with a coefficient of 0.582 and a p -value of 0.000. The study found support for H5, which posits a correlation between readiness for mobile learning and nomophobia related to smartphone use ($r = 0.566$, $p = 0.000$). The sixth hypothesis, which investigated the correlation between readiness for mobile learning and smartphone nomophobia, received support with a coefficient of 0.528 and a p -value of 0.000. The study found a statistically significant relationship (H7) between smartphone nomophobia and smartphone addiction (correlation coefficient = 0.517, p -value = 0.000).

Table 7
Results for the structural model

Causing construct	Caused construct	Hypothesis	Path Coefficient	p-Value
Emotion regulation	Smartphone addiction	H1	-0.578	0.000
Emotion regulation	Smartphone cyberloafing	H2	Not supported	0.185
M-Learning readiness	Smartphone cyberloafing	H3	-0.587	0.000
Smartphone addiction	Smartphone cyberloafing	H4	0.582	0.000
M-learning Readiness	Smartphone nomophobia	H5	-0.566	0.000
Smartphone nomophobia	Smartphone cyberloafing	H6	0.528	0.000
Smartphone nomophobia	Smartphone addiction	H7	0.517	0.000

5. Discussion

The present investigation has also furnished valuable insights regarding the association between challenges in regulating emotions and the addiction to smartphones, as hypothesized (H1). The present discovery is consistent with the investigation conducted by Gökçearsan et al. (2023), wherein they also observed that challenges in regulating emotions were indicative of problematic Internet usage and addiction to video games (Gökçearsan et al., 2023). The study conducted by Gözümlü et al. (2020) revealed that problematic smartphone use can be predicted by emotional regulation difficulties. Additionally, Yildiz (2017) identified emotion regulation strategies as one of the predictors of internet and social media addiction. The present study's results indicate that challenges in regulating emotions have an impact on the development of smartphone addiction in the university student population. The present investigation also examined the correlation between emotion regulation and cyberloafing; however, the second hypothesis (H2) did not receive empirical support. According to Chen et al. (2021), it has been asserted that individuals with low self-regulation abilities may encounter greater difficulties as a result of cyberloafing. This phenomenon could potentially be attributed to the impact of cultural factors on emotional awareness, a crucial component of effective emotion regulation. The regulation of emotions has the potential to exhibit variability based on the cultural milieu. The present study's results indicate a correlation between e-learning preparedness and cyberloafing (H3). Consistent with prior research, a recent investigation revealed a noteworthy and favorable association between cyberloafing and preparedness for mobile learning (Gözümlü et al., 2020). The relationship between motivation for online learning and cyberloafing has been established in previous studies (Bjureberg et al., 2016; Alzoubi & Alzoubi, 2019; Wu et al., 2020). The readiness for mobile learning can be assessed through various sub-dimensions, including behavioral control as identified by Akbulut et al. (2017), as well as motivation to learn and self-discipline in managing one's studies. These factors have been found to be associated with the phenomenon of cyberloafing with the use of smartphones, as reported by Koay and Poon (2022). The potential for cyberloafing may be indicated by the level of preparedness of students for mobile learning. The study found a noteworthy correlation between smartphone addiction and cyberloafing, as indicated by H4. Consistent with this discovery, Sevinç and Dogusoy (2022) observed a correlation between smartphone addiction and cyberloafing. According to Saritepeci's (2020) research on the factors influencing cyberloafing, the variable that exhibited the strongest predictive power for cyberloafing behaviour was smartphone addiction. A study conducted by Fezile and Erinc (2021) found that the act of engaging in smartphone cyberloafing during class has a noteworthy impact on the development of smartphone addiction. This study has also contributed to the understanding of the correlation between mobile learning preparedness and smartphone addiction, commonly known as nomophobia (H5). The correlation values between the variables of m-learning readiness and nomophobia bear resemblance to the findings reported by Akıllı and Gezgin (2016) in their research. Hence, it is evident that the planning of educational environments holds significant importance when utilizing smartphones for m-learning settings. Undoubtedly, in inadequately designed mobile learning settings, the rise in nomophobia resulting from an increase in mobile learning preparedness may give rise to the emergence of severe health issues (Rodriguez-Garcia et al., 2020). As per the findings of the research, hypotheses 6 and 7 posit that nomophobia has a direct and positive impact on both smartphone cyberloafing during class and smartphone addiction. The correlation between nomophobia and smartphone cyberloafing during class is consistent with the findings of Şumuer et al.'s (2019) research. The findings of Blau et al. (2006) and Bartwal and Nath (2019) suggest a correlation between nomophobia and smartphone addiction. Hence, the findings of this study are consistent with the research outcomes reported in the existing literature.

6. Limitations and conclusion

The present investigation exhibits certain constraints. One primary constraint is that the information obtained from the questionnaires was self-reported. The self-reported measures pertaining to smartphone usage are unlikely to possess sufficient sensitivity to effectively anticipate behaviours associated with fundamental technology usage. Self-reported measurements of smartphone usage time can be comparable to actual usage measurements. Given the extensive number of participants, the analysis of log records would have been time-consuming. Therefore, it was imperative to gather self-reported data to obtain information regarding smartphone usage behaviour. In order to address this constraint, anonymous data collection was employed. To quantify the duration of smartphone usage, respondents were instructed to report the amount of time spent on their device as indicated by the screen time feature. In order to obtain impartial information regarding the frequency of smartphone usage and levels of cyberloafing among students, forthcoming researchers may consider utilising authentic cyberloafing data and applications that can retain participants' navigation logs. The study recommended employing factual measurements in clinical procedures. The utilisation of smartphones in the classroom, along with their unintended use, may have an impact on factors associated with electronic learning (e-learning). Reducing instances of cyberloafing during in-class sessions, as well as in general, could potentially enhance students' ability to concentrate on their academic pursuits and achieve their learning objectives. Subsequent investigations could prioritise the eradication of SA and in-class cyberloafing by emphasising the educational possibilities of smartphones. The absence of instructors' physical presence in the e-learning setting has led to an escalation in students' inclination towards cyberloafing behaviour during online classes. The ability to re-watch recorded lessons may potentially lead to cyberloafing behaviour among students, as the reduced risk of missing important information may encourage them to access the lesson activity repeatedly. The employment of student-centred learning approaches in e-learning, along with active participation in lessons, student interaction, open cameras, and the utilisation of smartphones to facilitate learning, may serve as differentiating factors for cyberloafing behaviour. The regulation of emotions has an impact

on the degree of social anxiety and engagement in cyberloafing. It is possible to design learning experiences aimed at enhancing emotion-regulation skills. The incorporation of educational pursuits aimed at enhancing learners' preparedness for e-learning could potentially mitigate instances of cyberloafing.

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