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PREDICTIVE ROLES OF MOBILE LEARNING ATTITUDE AND COPING STRATEGIES ON TECHNOSTRESS AMONG UNIVERSITY STUDENTS

A thesis submitted for the requirements of the degree of Master of Science in Clinical Psychology

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I hereby declare that this thesis title “Predictive Roles of Mobile Learning Attitude and Coping Strategies on Technostress among University Students" is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that the proposed dissertation has not been previously or concurrently submitted for the award of any degree at Effat University, any other University or Institution.

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Abstract

The utilization of mobile devices has transformed modern education. Mobile learning is any type of formal learning where mobile devices are used for educational purposes. This type of learning has brought benefits as well as additional stress to the students. Students' attitudes toward mobile learning and the factors that influence these attitudes have not been fully explored. This study aims to analyze the relationships between mobile learning attitude, technostress, and coping strategies used to mitigate stressful situations. It utilized the transactional model of stress and coping, in which mobile learning attitude was the primary appraisal, coping strategies were the secondary appraisal, and technostress was the response. Data was collected from 147 undergraduate students at a university in Saudi Arabia. A quantitative approach was used to collect the information. The results revealed that all three types of coping strategies can predict the level of technostress. The main predictor of technostress was avoidance coping. Mobile learning attitude did not predict technostress. The data suggested that both male and female students had similar technostress levels and attitudes about mobile learning. Male students used emotion-focused and problem-focused coping more often. No gender differences were found in avoidance coping usage. The findings can contribute to the literature on digital stress and provide valuable information for university policy makers, professors, and counselors to develop comprehensive strategies to manage the demands of digital learning. The study provides recommendations for universities, developers, and policymakers to keep students' mental well-being at the forefront in order to create sustainable mobile learning.

Keywords

Technostress, Mobile learning attitude, Coping Strategies, Undergraduate Students, mobile technology, Digitalization

المستخلص

أدى استخدام الأجهزة المحمولة إلى إحداث تحول كبير في التعليم الحديث. ويُعرَّف التعلّم المتنقّل بأنه أي نوع من التعلّم الرسمي الذي تُستخدم فيه الأجهزة المحمولة لأغراض تعليمية. وقد جلب هذا النوع من التعلّم فوائد عديدة، إلى جانب ضغوط إضافية يتعرض لها الطلبة. ولم تُستكشف بعدُ بشكلٍ كافٍ اتجاهات الطلبة نحو التعلّم المتنقّل والعوامل المؤثرة في هذه الاتجاهات. تهدف هذه الدراسة إلى تحليل العلاقات بين اتجاهات التعلّم المتنقّل، والضغط التكنولوجي (التكنوسترس)، واستراتيجيات المواجهة المستخدمة للتخفيف من المواقف الضاغطة.

اعتمدت الدراسة على النموذج التفاعلي للضغط والمواجهة، حيث مثّلت اتجاهات التعلّم المتنقّل التقييم الأولي، ومثّلت استراتيجيات المواجهة التقييم الثانوي، في حين عُدَّ الضغط التكنولوجي الاستجابة. جُمعت البيانات من 147 طالبًا جامعيًا في إحدى جامعات المملكة العربية السعودية، باستخدام المنهج الكمي لجمع المعلومات.

أظهرت النتائج أن جميع أنواع استراتيجيات المواجهة الثلاثة يمكنها التنبؤ بمستوى الضغط التكنولوجي، وكان أسلوب المواجهة التجنبية هو المتنبئ الرئيس بالضغط التكنولوجي. كما أظهرت النتائج أن اتجاهات التعلّم المتنقّل لم تتنبأ بالضغط التكنولوجي. وأشارت البيانات إلى أن الطلبة من الذكور والإناث لديهم مستويات متقاربة من الضغط التكنولوجي واتجاهات متشابهة نحو التعلّم المتنقّل. غير أن الطلبة الذكور استخدموا استراتيجيات المواجهة المتمركزة حول الانفعال والمشكلة بدرجة أكبر، في حين لم تظهر فروق بين الجنسين في استخدام أسلوب المواجهة التجنبية.

تسهم هذه النتائج في إثراء الأدبيات المتعلقة بالضغط الرقمي، وتوفر معلومات قيّمة لصنّاع السياسات الجامعية وأعضاء هيئة التدريس والمرشدين النفسيين من أجل تطوير استراتيجيات شاملة لإدارة متطلبات التعلّم الرقمي. كما تقدم الدراسة توصيات للجامعات والمطورين وصنّاع القرار بضرورة وضع الصحة النفسية للطلبة في مقدمة الأولويات من أجل تحقيق تعلّم متنقّل مستدام.

الكلمات المفتاحية

الضغط التكنولوجي، اتجاهات التعلّم المتنقّل، استراتيجيات المواجهة، طلبة المرحلة الجامعية، التكنولوجيا المحمولة، الرقمنة.

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CHAPTER ONE

INTRODUCTION

1.1.Background of the Problem

The rapid advancement of mobile technologies has transformed higher education, reshaping how student's access, process and engage with information (Naveed et al., 2023). Mobile learning is considered an extension or successor of e-learning (computer assisted learning) (Guy, 2009; Sönmez et al., 2018). Unlike e-learning, mobile learning is a type of learning that utilizes portable or mobile devices such as smartphones, tablets, and laptops to facilitate learning and teaching activities (Rafifing et al., 2025). Over the past decade, mobile learning has emerged as a significant educational tool enabling students to learn at any time and any place (Uzunboylu & Azhar, 2023). This type of learning has provided students the flexibility to obtain course materials and organize collaborative learning environments through their mobile devices even outside of classroom settings (Sisouvong & Pasanchay, 2024). Although mobile devices provide several benefits for students, the constant presence and overuse of these devices can contribute to poor mental health outcomes such as technostress.

There has been a major surge in mobile connectivity worldwide. Mobile device use and engagement have become a common part of life among university students across different regions. Studies show that university students, including those in Saudi Arabia, used their mobile devices for an average of 4-6 hours per day (Candussi et al., 2023). For example, in Thailand, students used their smartphones for 4-6 hours, with additional tablet use ranging from 0 to 4 hours per day, and similarly, students in Poland and Bosnia spent about 4 hours per day on their devices (Kaewpradit et al., 2025; Tomczyk & Selmanagic Lizde, 2023). This level of usage was higher than the 3–5 hours per day reported in older studies (Boumosleh & Jaalouk, 2017; Lepp et al., 2014). Since the 2010s mobile learning was starting to incorporated be incorporated into formal education (Pedro et al., 2018). These days, students use mobile devices almost every day for learning and accessing educational

apps (Daleiden et al., 2025; Nikolopoulou, 2022). In short, mobile devices are an essential part of students' everyday lives and are widely relied on for academic use.

This constant connectivity created by mobile devices also introduces challenges. The overuse and dependence on mobile devices can lead to technostress, a psychological strain arising from difficulties in adapting to, or managing, digital technologies. Technostress is also defined a type of stress that can arise from the use of digital technologies (Tarafdar et al., 2015). The factors, situations, and events that trigger technostress are called techno-stressors (La Torre et al., 2020). This includes psychological strain resulting from information overload, difficulty understanding and using technology, problems with adapting to new technology, and feeling the need to regularly be online for work and communication (Tarafdar et al., 2007). Common symptoms of this type of stress include anxiety, exhaustion, and decreased productivity (Ioannou, 2023).

Students' mobile learning attitude is a crucial factor in understanding the effectiveness of using mobile devices as a part of academic learning (Carmi, 2024). Mobile learning attitude is described as the positive, negative or neutral opinions that students or educators can have toward mobile learning (Salhab & Daher, 2023). Students who have a positive attitude about mobile learning are more likely to show higher engagement, greater satisfaction and better academic performance with this type of learning (Ogunmakin, 2018). Meanwhile, more negative attitudes can lead to technostress symptoms (Batolas & White, 2022). University students often spend prolonged time on mobile devices for academic, social, and entertainment reasons are vulnerable to technostress (Alkhalaf et al., 2024 ; (Daud, 2025; Yusuf et al., 2024). Hence, determining the relationship between mobile learning attitude and technostress is important to improve students' learning experience as well as performance in modern educational settings.

Moreover, students' capacity to cope with stressful situations can have an influence on mobile learning attitude and technostress. According to Lazarus & Folkman (1984), coping strategies are cognitive and behavioral attempts that individuals use to handle stress, difficult emotions, and challenges in everyday life. University students use multiple strategies to overcome technostress. Carver et al. (1989) classified coping strategies into three sub-categories namely problem-focused coping, emotion-focused coping and avoidance coping. Problem focused coping refers to the proactive measures taken by the individual to mitigate stress (Dagani et al., 2023). Emotion-focused coping pertains to the individual's responses to soothe emotions related to stressful situations (Aljaffer et al., 2025). Avoidance coping indicates the strategies that are related to withdrawing from and/or denying the issues caused by stressors (Zhao et al., 2025). Some students use problem-focused coping, examples include, effective management of time, reducing screen time. While, others utilize emotion-focused coping which includes mindfulness practices, getting emotional help from peers and family, and obtaining technical assistance from the university (Yao & Wang, 2022). Furthermore, some students adopt avoidance coping strategies, such as procrastination or ignoring academic responsibilities (Mi et al., 2024).

Despite the increasing use of mobile devices in academic learning, few studies have inspected students' mobile learning attitude, technostress and coping strategies in higher education setting in Saudi Arabia. Conducting research on these relationships can be a valuable contribution for educators, clinicians and institutions aiming to create supportive digital learning environments and protect students' wellbeing.

1.2. Purpose of the Study

Different sectors in the Kingdom of Saudi Arabia are quickly moving towards digitalization, education is one such sector. With the aim of enhancing education, Saudi universities are steadily expanding the use of digital technologies (Fraidan & Alaliwi, 2024).

Thus, the integration of mobile technologies in higher education has become the norm. The push from the COVID 19 pandemic to further adopt digital technologies, have led to mobile learning becoming an essential mode of instruction. Students now rely on mobile devices to access educational mobile applications, such as learning management systems, which are used for the documentation and submission of academic work. Regardless of the growing use of mobile learning, students' attitudes about it is underexplored. Mobile learning attitude is the learners' viewpoint on the advantages and disadvantages of mobile learning. Studying their response to this digitalization is necessary. It can provide feedback into understanding students' mental wellbeing.

Overuse of technology and difficulty adapting to new technologies, has led to multiple health-related psychological issues, amongst them, is technostress (Bondanini et al., 2020). Even university students can experience technostress, as they are required to stay on ever-changing systems, utilize a variety of devices, and deal with the relentless pressure of being constantly connected with education based activities (Yao & Wang, 2022). Previous studies that assessed technostress among university students have focused on how techno-stressors, such as techno-overload, techno-invasion, and techno-complexity, negatively affects students' academic performance and overall well-being. But, the individual differences that can contribute to technostress have received little attention. The current study aims to address this dearth in research by considering how coping strategies and mobile learning attitudes predict technostress. This study also furthers the understanding on other factors that influence this stress. Few studies that have focused on specific factors that have an influence on technostress. The use of mobile devices for academic reasons has been found to be related to technostress. But, the role that individual attitudes to mobile learning are less well understood.

The type of coping strategies utilized can either facilitate in reducing techno-stress or increasing it. According to the Transactional Model of Stress and Coping, developed by Lazarus and Folkman (1984), the way people perceive a situation as well as the way they manage it are key factors that influence the level of stress. In other words, coping strategies can either strengthen or weaken the effects of technostress in the context of mobile learning. Coping strategies are techniques that people use to deal with stressors. Students who are experiencing technostress with mobile learning, can use for example problem-solving, time management and asking for help are all good techniques, which allow them to navigate the demands of mobile learning and subsequently alleviate technostress (Kumar, 2024). However, students who use poor coping strategies, such as avoidance or denial, can exacerbate the stress of mobile learning and become overwhelmed, which in turn further increases stress levels (Alkhawaldeh et al., 2023).

Evaluating the adoption of mobile learning systems in Saudi Arabia, there seems to be a lack of empirical studies that investigate how students' attitudes toward mobile learning and coping strategies affect technostress. Thus, this study aims to examine the predictive role of mobile learning attitude and coping strategies on technostress among university students in Saudi Arabia. Findings of this study provide empirical insights into how students adapt psychologically to digitalized education. This can help maintain the mental well-being of university students.

1.3. Significance of Study

The present study attempts to address both empirical and contextual gaps in understanding technostress among university students in Saudi Arabia. First, it extends the limited research on the understanding of the impact of mobile learning attitudes on technostress. This is important because universities in Saudi Arabia have adopted mobile applications and websites to improve their educational systems. Moreover, assessing the if

there are gender differences in level of perceived technostress, coping strategies, attitude toward mobile learning. Understanding students' attitude toward mobile learning can provide insights into students' psychological responses toward the demands of mobile learning.

The study uses the Transactional Model of Stress and Coping (Lazarus and Folkman, 1984) to explain how technostress gets affected by the other variables. Using a widely accepted model, the research can take a closer look at the role of coping strategies that are related to mobile learning and technostress. Coping strategies and mobile learning attitudes rarely appeared in the same studies. Studies that focused on mobile learning attitudes investigated how students' acceptance or rejection of mobile learning tools were a prime factor in determining their stress levels. On the other hand, studies that looked at coping mechanisms assessed stress management techniques to alleviate stress triggered by technology. Yet, these investigations rarely explored any potential impact of people's attitudes toward mobile learning on their technostress. Therefore, this study combined mobile learning and coping strategies, two variables that were often studied separately, under one conceptual framework.

The findings can help inform educational institutions about technostress levels and attitude toward mobile based learning among students. This can assist universities administrators and policy makers develop training programs and digital support systems to lower technostress. Such programs will boost the positive side of mobile learning, giving students the confidence to tackle e-learning with increased confidence and interest, and encouraging them to learn from technology-related setbacks. Psychological programs and workshops can be introduced by universities to teach adaptive coping strategies to deal with stress caused by technology. Increasing awareness among practitioners and councilors about the psychological effects of technology, can promote healthier, more balanced, and technology-friendly learning environments.

On a larger scale, the study contributes by enhancing data on psychological wellbeing among students, especially in the context of higher education in Saudi Arabia. Despite the fact that mobile learning is now a popular teaching method in universities, there are few empirical investigations that have looked at how students' attitudes toward mobile learning and their coping strategies together determine technostress. Saudi Arabia's Vision 2030 facilitated the digital transformations of higher education institutions as way to improve quality and flexibility of learning. By generating local empirical data, institutions may gain evidence-based insights into Saudi students' experiences, allowing them to develop more successful digital learning approaches that are in line with students' psychological needs.

1.4. Definition of Key Terms

1.4.1 Mobile Learning Attitude

Positive or negative opinions that learners have toward learning with mobile technologies (Joo et al., 2016).

1.4.2 Technostress

Technostress is defined as the psychological stress that occurs due to the use of information and communication technologies (Tarafdar et al., 2007; Saleem et al., 2024). This includes digital systems and online applications. It occurs when the individual is unable to cope effectively with technological demands, resulting in psychological and physiological strain.

1.4.3 Coping strategies

Cognitive and behavioral efforts that individuals utilize to deal with external and internal demands of a stressful situation that may exceed their personal capabilities (Lazarus & Folkman, 1984). Carver et al. (1989) identified that coping strategies consist of three main categories namely problem-focused, emotional-focused, and avoidant coping.

CHAPTER TWO

LITERATURE REVIEW

The empirical review explores how mobile learning attitude and coping strategies predict the level of technostress that undergraduate students experience. These psychological variables if examined together can help further explain the variance of technostress beyond the effects of techno stressors. This information can provide a localized perspective about the ongoing adaptation to technology enhanced learning. Two psychological frameworks, the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984) and Technology Acceptance Model (TAM) (Davis, 1989) were used. These frameworks combine to explain how these three variables influence each other in modern education setting.

This section first examines how the attitudes and perceptions towards mobile learning affect technostress in students. Next, the function of coping strategies, both adaptive problem-focused, emotion-focused and avoidant in influencing this type of stress was analyzed. The history and evolution of the concepts mobile learning and technological stress will also be discussed. The later sections in this chapter will analyze the relationship of these variables through the theoretical foundation of Transactional Model of Stress and Coping (Lazarus and Folkman, 1984) and TAM model. Furthermore, suitable research questions, hypotheses and conceptual framework was introduced.

2.1. Review of Empirical Studies

2.1.1 Mobile learning Attitude

Mobile learning is often described as the use of portable devices like smartphones and tablets, to access educational content at any time and place. According to recent systematic reviews, there had been a significant increase in research on mobile learning, particularly since 2020, as a result of the COVID-19 and technological advancements (Qazi et al., 2024; Saikat et al., 2021). University students and professors were the main subjects of most studies in this topic, and quantitative methods were mostly utilized. Mobile learning was

acknowledged for improving learning outcomes, and accessibility, especially through personalized and interactive experiences (Du Plooy et al., 2024).

On their mobile devices, students used various applications and websites for academic reasons. Learning Management Systems (LMS), such as Blackboard were used to access course materials and submit completed assignments (Al-Mamary, 2022). LMS also helped students to view their grades and attend optional online classes (Bradley, 2020). They used email every day to receive updates from their universities as well to communicate with professors outside the classroom to discuss their coursework (Konuk, 2021). Learners also utilized digital annotation tools, like PDF readers, to read e-textbooks and make notes. These are some of the many applications that can be accessed through mobile devices. These allow flexibility in formal higher education setting and break the barrier between class and home. When these applications are opened on mobile devices to aid physical education, it becomes mobile learning.

The continuous connection with academic tasks and multitasking were considered some of the challenges of this learning method. When using mobile devices for learning, students received multiple notifications which distracts from them from their work and decreases their academic performance (Ohly & Bastin, 2023). Excessive mobile device use was linked to poor sleep hygiene and depressive symptoms in Swedish students (Thomée et al., 2011). In Germany, students experienced lower levels of psychological wellbeing linked to technology due to digital technology invading their personal life (Sokół & Koç, 2024). When these negative effects became clear, concepts like mobile learning attitude and satisfaction were increasingly discussed in the field of research. Researchers emphasized that students' views about mobile learning were one of the key areas that needed to be studied in order to get a better understanding of mental wellbeing in the current education setting (Gómez-Ramirez et al., 2019; Li & Huang, 2025).

Mobile learning attitude referred to emotional, behavioral, and cognitive processes that determine people's acceptance of technology. Positive attitudes towards mobile learning fuel engagement and usage of these technologies (Hameed et al., 2022). Whereas, negative attitudes may make users less likely to adopt technology in a sustained way. Examining these attitudes can help determine the effectiveness of mobile learning.

An early study by Al-Fahad (2009) that looked at 186 students at King Saud University found a very positive attitude towards the flexibility and interactivity of e-learning, however the participants did show some concern over internet connectivity and data costs. Subsequently, Al-Emran et al. in their 2016 study found that factors such as age, gender, nationality, and academic level significantly influence users' mobile learning attitudes in higher education settings in Oman and the UAE. Moreover, it was found that approximately 82% of the students had already incorporated mobile learning into their studies. Zeyab et al. (2022) conducted a study in Kuwait higher education setting and found that the students there had positive attitudes towards using smartphones for learning. However, Hasan et al. (2024) found that students in universities had a mixed attitude towards using smartphones for learning purposes as they felt that smartphones can provide valuable information as well as distractions. This signifies that when having a positive attitude towards mobile learning and finding it useful, students were more likely to maintain a continuous intention to learn with portable mobile devices (Huang et al., 2021).

A study by Demir and Akpınar (2018) that used both quantitative and qualitative analysis, found that structured exposure to mobile learning improved attitudes related to this learning method. Altogether, these studies show that positive attitudes towards mobile learning systems were more likely when they were seen as being useful, easy to use, and have support systems. During COVID, the adoption of mobile learning systems depended on students' attitudes about the mobile devices and systems as well as social factors like the way

their peers react to technology (Alfalah, 2022). Therefore, mobile learning attitudes were affected by a wide variety of issues such as technical problems, support from universities, as well as the mental effort needed to keep up with ongoing technological advancements in the learning environment.

2.1.2 Mobile Learning Attitude and Coping Strategies

In a study by Rahmat et al. (2022) on Malaysian undergraduates, mobile learning attitude was found to be correlated with coping strategies. Savitsky et al. (2020) also found that positive coping strategies, like seeking information and humor, were linked to a more positive attitude. Using qualitative methods, Šramová (2023) found that avoidance and emotion-focused coping were linked to higher negative mobile learning attitudes in Slovak students. This was because they used mobile devices for procrastinating and were not able to able to focus on their course work while using these devices, so they had a more negative view about mobile learning.

2.1.3 Relationship between Mobile Learning Attitude and Technostress

With respect to the growing use of mobile learning in universities around the world, the dynamic interplay between attitudes towards mobile learning and technostress is a pressing concern. It is crucial to know how students' perceptions of mobile learning impact their experience of technostress, especially in Saudi Arabia where higher education systems are undergoing digital change.

The term technostress was first coined by Brod (1984), who stated that technostress is a present-day adaptation illness brought on by an incapacity to manage modern computing technology in a healthy way. In the 1990s, with the rise of personal computers, this type of stress also increased (George & George, 2023). There has since been an effort to understand what aspects of technology and technology-related behaviours cause this type of stress.

Tarafdar et al. (2007) identified that there are five main causes. First is techno-overload which arises when students feel pressured to work harder and longer hours. Second is techno-invasion which appears when students feel that the boundaries between university and home life is being disrupted (Daud, 2025). Third is techno-insecurity which occurs when students feel demoralized since the continuous innovation and insufficient training could lead to lower grades (Asad et al., 2023). Fourth is techno-complexity which is feeling that one is not skilled enough to use current technology. Fifth is techno-uncertainty when they feel overwhelmed by the managing of persistent changes in the technology used by their university (Yusuf et al., 2024). Nowadays, it is described as a type of stress caused by the utilization of information and communication technologies (Ayyagari et al., 2011; Li & Wang, 2020). This new definition shifted the focus from illness to perceptions and behaviors.

Recent works have focused on the thought patterns that influence technostress. This has led to its relationship to mobile learning attitude gaining attention. Understanding that one's attitude is what decides how they react to a new system, early studies in technology adoption also highlighted that a positive attitude to technology leads to greater satisfaction and a lasting commitment to its use (Davis, 1989). People who found mobile learning to be practical and simple were more likely to be engaged, and were less stressed during usage (Lu et al., 2022). On the other hand, when users were discouraged with what they perceived as complicated, time-consuming, and unreliable mobile apps, they were more likely to feel mentally fatigued and emotionally distressed. Research on mobile learning showed that beliefs characterized by enthusiasm, a sense of purpose and complete faith in technology are able to mitigate stress, but a disheartened, disempowered, or anxious attitude leads to technostress.

In recent times, exploration of technostress and factors related to it among the student population has gained popularity among researchers. With the advent of the COVID-19

pandemic, students had to spend more time at home as well as attend classes online, which in turn increased screen time. Higher screen time led to increased symptoms of stress and anxiety, lowered concentration, and reduced motivation (Means & Neisler, 2020; Son et al., 2020). Even after COVID, the dependence on mobile devices remained high compared to pre-pandemic figures. This encouraged researchers to investigate the relationship between problematic internet use and technostress. Mobile learning helped young people in academic learning, acquiring information, and maintaining connections with family and peers (Sampasa-Kanyinga et al., 2022).

Other well-known studies that took place during and after the transition to remote learning have also supported these observations. Research by Saleem et al. (2024) found that technostress in e-learning had a negative effect on students' satisfaction and learning quality, but good teaching and university support improved academic mobile technology, which in turn improved students' opinions about the use of technology. Yao and Wang (2022) found that medical students' over-reliance on smartphones increased technostress, but those who had a good outlook on mobile learning were able to reduce technostress and stay motivated. A UAE study by Khan and Quratulain (2023) also concluded that when students view mobile learning as useful and beneficial, they experience lower technostress. These investigations taken together show that attitude can serve as both a protective as well as risky factor depending on its level. Lazarus and Folkman's (1984) Transactional Model of Stress and Coping helps one to understand the psychological process connecting attitude and technostress.

Recent research has provided evidence about the cyclical nature of how users' level of technostress and how they respond to it can determine mobile learning attitude, when technostress becomes a regular feature of a learning environment it can cause negative mobile learning attitudes. A study by Khlaif, Sanmugam, and Ayyoub in 2022 found that

when teachers experienced a high level of technostress, their perception of the usefulness of the very technology they used also declined, and their desire to carry on using mobile technology was reduced. Due the environmental influence of both technostress and mobile learning attitude, the way teachers experience these two variables can pass on to the students. This is concerning for student populations as it implies that exposure to constant pressure to learn from digital tools may dissolve their enthusiasm for mobile learning. Understanding that stress and negative attitudes reinforce each other in a continuous loop, considerable efforts should be placed into creating learning environments that not only combat technostress but will also boost the positive attitudes that were previously high.

When it comes to the digital age, in the Saudi context, the push for rapid digitalization as part of the national modernization plans is making universities ask students to use mobile learning management systems for all of their coursework, assessments, and communication. Students who like the convenience and flexibility that mobile learning has to offer tend to find the adaptation much smoother, with less stress (Pedraja-Rejas et al., 2024). This makes it even more possible that a person's attitude towards technology can explain the inconsistent levels of stress experienced by university students in the digitally enhanced classroom.

2.1.4 Coping strategies and Technostress

Most research that investigated these two variables focused on IT professionals. For instance, Siitonen et al. (2025) examined how employees in the software industry cope with technostress and found that the most common coping strategies included avoidance coping, such as disengagement from ICTs and withdrawing from stressful situations, as well as problem-focused coping, particularly seeking technical support from the organization. While the results of this study gave important information, it cannot be generalized to university students whose use of ICTs may differ.

The type of coping strategies used by students to deal with techno-stressors significantly affected their degree of technostress. A study by Mi et al. (2024) examined the predictive as well as mediating effect of coping strategies on technostress. Their findings showed that coping strategies had a significant influence on technostress as well as played an important role as a mediating variable. In South African university students, problem-focused strategies coping was found to moderate the link between technostress and academic success (Cook & Belle, 2022) Problem-focused coping, such as problem-solving, has a significant negative correlation with technostress, whereas avoidance coping strategies, such as escapism and fantasy, had a positive relationship with technostress (Mi et al., 2024). Studies usually examined the coping strategies as a mediator or moderator. This resulted in the direct relationship between these two variables being less known.

Among students, some studies have explored the relationship between coping strategies and technostress. Weinert et al. (2021) found a significant relationship between technostress and coping strategies aimed at reducing it. Moreover, students use proactive coping strategies, such as lowering the time spent on applications for non-academic purposes. Similarly, Galvin et al. (2022b) reported that while dealing with techno-overload, the type of coping strategies that students used mattered; students who used problem-focused coping experienced a reduction in anxiety, but emotion-focused coping increased anxiety. However, it is important to note that their study considered avoidance strategies as a part of emotion-focused coping. This may be because the increasing technology used to ease painful emotions can lead to further techno-overload, which may result in more technostress. Furthermore, Jackson & Serenko (2023) found that when learning online for long periods of time, university students resorted to using problem-focused coping about 78% of the time.

2..1.5 Gender Differences in Mobile Learning Attitude, Technostress and Coping Strategies

Studies on coping found different results. Mallhi et al. (2022) identified that Saudi female university students turned to emotional support and relaxation techniques more often, and males, on the other hand, concentrated on planning, fixing problems, and rational thinking. Similarly, Khoshaim et al. (2020) found that females used emotion-based coping, specifically using social support when dealing with anxiety symptoms. Also, Qassim (2024) made the point that females were much more into emotional and social support, and that men were less likely to do so, but this study was conducted on professors in universities and may not be generalizable to students.

Baek et al. (2017) examined teachers' attitudes toward mobile learning and found differences by gender and experience. Women showed more positive attitudes toward interactive and communicative mobile tools, aligning with research suggesting that female educators were more engaged with collaborative digital tools, whereas male teachers appeared more skeptical. Research increasingly shows that gender differences in mobile learning are narrowing. Yu and Deng's (2022) meta-analysis of 20 global studies found no significant gender differences in e-learning attitudes, motivation, satisfaction, or self-efficacy. Males and females face similar challenges and benefits, with small differences sometimes favoring women but not substantially. But these studies focused on e-learning instead of mobile learning.

Research on technostress in education, such as Efilti et al. (2024), found no significant differences in technostress or life satisfaction between male and female academics. Technostress levels were consistent across experience and disciplines, except for slightly higher stress among social science teachers. Regression results showed that social-related technostress most strongly reduced well-being. This supported earlier studies (Lee et al.,

2016; Le Roux & Botha, 2021) showing that stress from constant social connectivity is particularly linked to lower happiness. Previous studies which examined the effects of gender on these three variables mostly focused on teachers as the participants. The comparison between the levels of mobile learning attitude, technostress and frequency of type of coping strategies used between male and female students needs further exploration.

2.2. Gaps in Literature

Even though the literature on the effects of mobile learning and technostress has grown rapidly since the COVID-19 pandemic, a knowledge gap in Saudi higher education still exists. Most recent research focused on the emergency remote learning phase of 2020 and 2021. These were conducted in a situation where students were turning to digital tools as a temporary way to navigate lockdowns, rather than a regular part of their academic routine. Thus, there is limited information about how technostress unfolds in the new normal, where mobile learning has become a regular and expected way of engaging with the learning material.

When looking at mobile learning attitude and technostress, the majority of studies did not take into account the role that coping strategies would play in this relationship. Coping strategies are an integral part of how individuals respond to stress. Since technostress is a subset of stress, it is also influenced by coping (Ragu-Nathan et al., 2008). However, there are few localized research identifying how type of coping influences this specific area of stress.

Most previous studies have looked at mobile learning attitude from the perspective of usefulness, ease of use and how much a student intend to use a technology without focusing on stress-related factors. Thus, there are limited studies that fully explore the relationship between mobile learning attitudes and technostress. Additionally, research into the

technostress experienced by students were centered around the issues of dealing with technology overload, overly complicated systems and invasion of personal life caused by devices. However, the studies have not given much consideration to how a student's attitude towards mobile learning can affect those stress responses.

Most research had exclusively focused on Western and East-Asian universities, leaving a significant gap in the understanding of how technostress due to mobile learning emerged within the social, cultural and digital infrastructure of universities in Saudi Arabia. Thus there are few studies that have explored the mobile learning attitude of university students in Saudi Arabia. Addressing these gaps, this study aims to examine the relationship between mobile learning attitude and technostress among university students and to determine the moderating role of coping strategies in this relationship.

2.3. Theoretical/Conceptual Framework

2.3.1 Transactional Model of Stress and Coping

This model was introduced by Lazarus and Folkman (1984) to explain how stress and coping strategies develop. According to this model, stress was not caused by the environment, but rather a personal transaction with it. In other words, stress is the result of the individual’s perception that he or she has inadequate ability to cope with the demands of the environment. Primary and secondary appraisal were two cognitive processes that were emphasized by this model. Primary appraisal is basically a self-assessment of what a situation or technological demand means to the individual, is it a threat, a challenge, or a loss. In the context of mobile learning, a student’s attitude to constant digital connectivity, multitasking, and system complexity can swing this appraisal from stressful to non-stressful. Secondary appraisal also referred to as the assessment of available personal coping resources and strategies, which effected how the individual responds to the perceived stressor. Helpful

coping strategies, such as problem-focused coping, can mitigate the effect of stressors and reduce stress. Stress is considered the outcome of primary and secondary appraisals.

2.3.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model, first proposed by Davis (1989), was used to explain an individual's attitude toward technology. It was used by several studies to describe the relationship between technostress and mobile or digital learning attitude (Khlaif et al., 2022; Kimathi & Zhang, 2019). It mentioned that if the individual perceived technology as useful and very easy to understand, then they were more behaviorally inclined to use it. In the case of mobile learning, a positive attitude towards using it emerges as learners perceive it as beneficial and easy to utilize. Meanwhile, studies had extended the model to state negative thoughts and feelings that arise due to technostress can weaken the perceived value of the technology, and make the individual less motivated to use it. Current studies on mobile learning were regularly based on TAM and placed a lot of emphasis on the user's enjoyment, self-assurance, and the backing of their educational institution in fostering a positive attitude towards mobile-based learning.

2.3.3 Conceptual Framework

Combining these two models in the area of mobile learning can explain factors that increase or decrease technostress. In this context, technostress was a type of stress caused when the challenges of mobile learning far exceeded the students' capacity to cope with it. Primary appraisal is a self-assessment of what a situation or technological demand means to the individual, is it a threat, a challenge, or a loss. Mobile learning attitude represents the psychological assessment of the situation in this case, mobile learning. This is why many studies considered mobile learning attitude as being similar to primary appraisal (Restrepo et al., 2023; Zamroni & Hilmia, 2023). Positive attitude is when students assess that mobile learning is beneficial and engaging, meanwhile, a negative attitude is when this type of

learning is seen as bothersome. As stated by the TMSC framework and extended by Carver et al. (1989), coping strategies consist of problem-focused, emotion-focused, and adaptive.

The TMSC also stated that primary appraisals, in this case mobile learning attitudes, predicted coping responses. Students with positive attitude towards mobile learning would more likely view mobile learning demands as manageable. This would encourage the adoption of more adaptive coping strategies. On the other hand, students with negative attitudes may appraise these demands as overwhelming and would be more prone to utilizing avoidance coping strategies. Coping strategies can also determine the strength of technostress in mobile learning situations. Avoidance coping may intensify stress reactions and adaptive coping may reduce them.

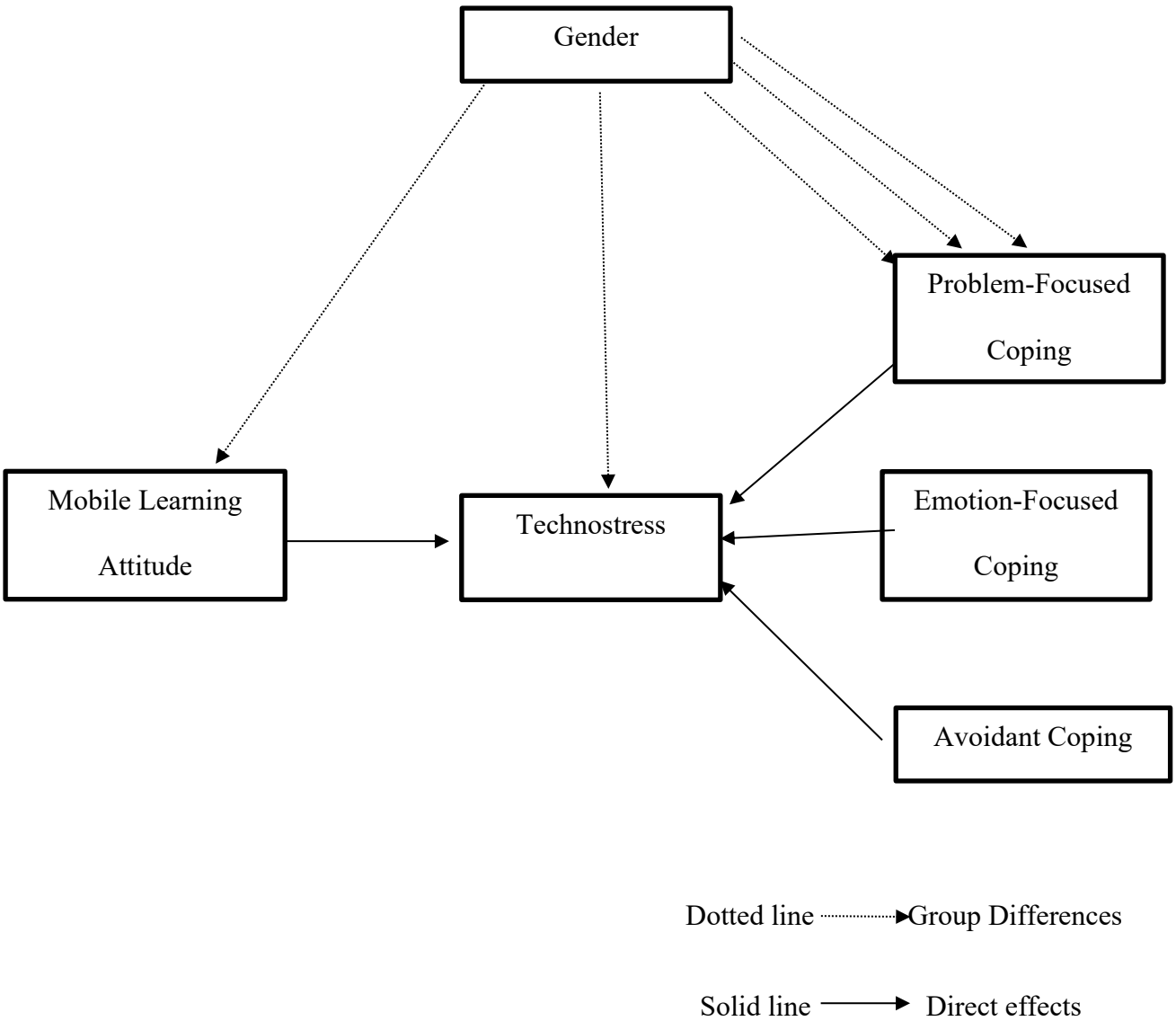
Although mobile learning attitude and coping strategies were theoretically interrelated, the present study focused on investigating their independent predictive effects on technostress. This method showed how each variable uniquely contributes to technostress and still acknowledged their interrelationship at a theoretical level.

Gender was included as a grouping variable in the conceptual framework. It was used to assess whether differences exist in students' mobile learning attitudes, level of technostress and preferred methods of coping between males and females. This can help provide contextual information about whether gender can affect the technological learning experience.

Figure 1 describes the conceptual framework made based on existing theoretical models.

Figure 1

Conceptual Framework



2.4. Research Questions & Hypotheses

Using the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984) and TAM model as a guide, the study aims to investigate how university students' mobile learning attitude affects their technostress. It also explored the effects that three different types of coping strategies on this type of stress. Specifically, this study aims to answer the following research questions:

RQ1) What is the connection between students' attitudes towards mobile learning and their technostress levels?

RQ2) Do coping strategies of university students significantly affect their technostress?

RQ3) Are there gender differences in regards to the experience of technostress, coping strategies, and attitude toward mobile learning?

Based on the research questions and existing literature, the following hypotheses were developed:

H1: Mobile learning attitude significantly predicts technostress among university students.

H2: Problem-focused coping strategies have a significant effect on technostress.

H3: Emotion-focused coping strategies have a significant effect on technostress.

H4: Avoidance coping strategies have a significant positive effect on technostress.

H5: There is a significant difference in the technostress level between male and female students.

H6: There is a significant difference in mobile learning attitude between male and female students.

H7: There is a significant difference in the problem-focused coping strategies between male and female students.

H8: There is a significant difference in the emotion-focused coping strategies between male and female students.

H9: There is a significant difference in the avoidant coping strategies between male and female students.

CHAPTER THREE

METHODOLOGY

3.1. Research Design

This study employed a quantitative survey research design to gather data from students at a university in Saudi Arabia. This university used various mobile learning platforms like LMS applications and other apps that were as part of the formal education experience. These were used by students for obtaining course materials, submitting assignments, and communicating with instructors. The study utilized a cross-sectional research approach. It examined the relationships between mobile learning attitudes, coping strategies, and technostress. The study aimed to understand the degree to which mobile learning attitude predicts technostress and how coping strategies influence technostress among university students.

Quantitative research is suitable for validating conceptual models and measuring the strength of relationships (Sürücü & Maslakçi, 2020). This method also makes use of statistics and mathematical equations to make predictions. The use of a predictive-regression design allowed the researchers to see how two independent variables influence dependent variables. This facilitates in the understanding that mobile learning attitude could affect technostress. This type of analysis can also help predict technostress based on coping strategies.

3.2. Participants

3.2.1. Population

The study participants consisted of undergraduate students from a university in Saudi Arabia. The included age range was within 18 to 24 years. The participants were university students from all programs and levels. An online survey was distributed to the university students; the link to the Google Forms survey was sent to several WhatsApp groups to ensure

that participants were from various majors. The participants were also asked to share the survey to their peers. Thus, convenience-snowball sampling was used to gather data.

3.2.2. Sample Size Determination

The calculation of the sample size was carried out using G*Power 3.1 software. It ensured that the research would have the statistical power to see a real relationship between these three elements. G*Power 3.1 (Faul et al., 2007) was conducted using a small effect size of $f^2 = 0.02$, a significance level of $\alpha = .05$, and a desired power of 0.80. It was found that a minimum of 100-150 participants were required for any type of analysis.

3.3. Instruments

Data were gathered through a survey conducted in English. Three standardized self-report scales were employed to assess each of the main variables. All three instruments were standardized scales that already showed good reliability and validity in the higher education setting.

3.3.1. Socio-demographic questionnaire

A short questionnaire was prepared which contained questions inquiring about general demographic information. It asked the participants about their age, gender, academic year, academic field, and local or non-local residency status. Also, there were questions about the total time spent on mobile devices (smartphones and laptops) as well as time spent on these devices for academic purposes.

3.3.2. Mobile Learning Scale (MLS)

The Mobile Learning Scale or MLS v1.0 was developed by Khaddage and Knezek (2012). It evaluates university students' opinions about mobile learning. This scale defined mobile learning as using mobile devices/apps being used for informal or formal learning at a higher educational institution. It assessed responses using 5-point Likert scale which range

from “Strongly Disagree” [1] to "Strongly Agree" [5]. This scale was composed of seven items. It had a Cronbach alpha between 0.80 and 0.85, indicating good internal consistency (Khaddage & Knezek, 2012). It had items such as “The rapid development of mobile learning devices and tools (Apps) has empowered informal learning”; “Mobile Apps could be integrated seamlessly to support informal learning”. The scale was unidimensional and higher scores showed greater enthusiasm toward using mobile devices for learning.

3.3.3. Technostress Creators Questionnaire

This questionnaire was developed by Tarafdar et al. (2007b) to measure work-related technostress. This study utilized the adapted version of this questionnaire, which was designed by Booker et al. (2014), to evaluate technostress caused by academic use of ICTs. The questionnaire consisted of 20 items that measured five components: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty (Tarafdar et al., 2007b). It can assess the level of technostress as well as the reasons that might cause it. It used a 5-point Likert scale which ranked from “Strongly Disagree” (1) to “Strongly Agree” (5). Furthermore, the adapted version had a good internal consistency, with Cronbach’s alpha between 0.71 and 0.79.

3.3.4. Brief Cope Scale

The Brief Cope scale was used to evaluate the various ways that people reacted to stressful situations (Carver, 1997). It was a 28-item scale and a 4-point Likert scale system from “I haven’t been doing this at all” (1) to “I have been doing this a lot” (5). It comprised of three sub dimensions namely: 1) problem-focused (planning, active coping, seeking practical support), 2) emotion-focused (acceptance, seeking emotional support, religion, positive reframing), and 3) avoidance (self-distraction, behavioral disengagement, refusal, substance use, self-blame, venting) (Carver, 1997). It showed which coping strategies individuals were more likely to use during stressful situations. It did not have a total score;

instead; the scores of each of the three sub-sections were taken separately. Also, two items from the avoidance coping sub-section were removed as per the instructions of the Ethics committee of the university.

3.4. Procedures (Data Collection)

Approval from Effat University Research Ethics Committee was acquired prior to conducting the study. The consent of the authors of the instruments were also obtained via email. The survey was made using Google Forms, a widely used website, which was easily accessed through both mobile devices and laptops.

Participants were invited to join the study via WhatsApp academic groups and classroom announcements. They were told that the study aimed to look at students' experiences of mobile learning and technostress. They were also briefed that their participation was completely voluntary, anonymous and that they could opt-out at any time. They were provided a digital informed consent form preceding the questionnaire. They could only access the main survey once they clicked “I have read the above information and agree to participate” option. The survey had a completion time of about 10-15 minutes. The data was inputted to SPSS for statistical analysis.

The data was assessed for normality and outliers. Additionally, the 10 responses that were incomplete were not included. The final result was 147 responses.

3.5. Data Analysis Plan

3.5.1. Preliminary Analysis

IBM SPSS Statistics version 29 was used to analyze the data. Descriptive analyses were utilized to summarize the means, standard deviations, and frequencies for the demographic variables.

3.5.2. Inferential Analysis

Pearson correlation was used to investigate the bivariate relationships. It examined the relationship between mobile learning attitude, coping strategies, and technostress

Simple linear regression was utilized to see how mobile learning attitude can predict the level of technostress in students. Likewise, it was also used to assess the extent to which coping strategies predict technostress. A t-test was utilized to investigate if there exist differences in the use of coping styles, levels of technostress, and mobile learning attitude between male and female students. An ANOVA was carried out, as an investigative analysis, to measure whether there were any dissimilarities in technostress intensity between students from different academic years. An exploratory independent sample t-test was utilized to explore the differences in technostress between psychology and non-psychology students.

3.6. Ethical Considerations

This study was approved by the Effat University ethics committee (RCI_REC/26.August.2025/7.1.Exp.60). It followed Effat University's Research Ethics Policy and the APA Ethical Principles of Psychologists and Code of Conduct (APA, 2020). Prior to participation, each participant had to read an electronic informed consent form. It explained the purpose of the study, the right to withdrawal, as well as confidentiality. The participants could only progress in the study once they had electronically confirmed their agreement to do so.

Furthermore, personally identifiable information was not collected. All data was stored in password-protected devices and was accessed only by the researcher and the supervisor.

CHAPTER FOUR

RESULTS

4.1 Overview

Statistical analysis IBM SPSS version 29 was used for investigating the relationships between mobile learning attitudes, technostress, and coping strategies in Saudi Arabian university students. The characteristics of the 147 participants and their responses to the scales were summarized, and inferential tests, including Pearson's correlations, simple linear regression t-tests, and one-way ANOVA, were also conducted.

4.2 Reliability Analysis

The reliability was measured using Cronbach's alpha (α). This step ensured that the scales used were accurate and produce consistent results (Bolarinwa, 2015). It was usually recommended that an α value of 0.70 or higher represented acceptable consistency, 0.80 was good and 0.90 shows excellent reliability (Nunnally & Bernstein 1994). The reliability coefficients of the included instruments were reported in Table 2.

The following scales were assessed: The mobile learning attitude scale by Khaddage and Knezek (2012), the technostress creators scale of Tarafdar et al. (2007), and the brief COPE inventory by Carver, (1997) (taking scores of each subset separately).

The reliability of the mobile learning attitude scale was almost excellent with an α score of 0.89. This scale had one dimension containing 12 questions. The alpha score fell in line with the results of Khaddage and Knezek (2012) who used university samples. The Technostress Creators Scale was a five-dimension scale with an overall α score of 0.87. The sub-scale known as techno-overload had an excellent α score of 0.89 and consisted of 4 items. Techno-invasion had 4 items as well and had the highest α of 0.90. Techno-complexity was made up of 5 items and also exhibited a strong α score of .86. Techno-insecurity demonstrated a robust α of 0.84 and comprised of 4 items. It was also revealed that techno-

complexity had 4 items and α of 0.87, which is a good value. A recent study also found similar Cronbach's alpha values for this scale (Urukovičová et al., 2023).

In the Brief-Cope scale had a Cronbach alpha of 0.85 were all three sub-types were taken together. Problem-focused coping showed excellent internal stability among this sample with α of 0.85. Emotion-focused coping demonstrated an α equal to 0.84. While, avoidant coping had an adequate α of 0.79. This was consistent with the study of it Marakshina et al. (2023) who got a total α between 0.72 to 0.89.

The reliability analysis suggests that all of these alpha values 0.79 to 0.89, were satisfactory. The instruments used in the online survey were reliable and had good internal consistency. Therefore, the results acquired can be used for hypothesis testing.

4.3 Descriptive Statistics

Demographically, the participants included 147 valid responses. Table 1 describes factors such as gender, nationality, major academic year, total time spent on smartphones, and time spent using smartphones for academic reasons.

Table 1

Frequencies and Percentages for Categorical Variables (N = 147)

Variable	Category	Frequency (n)	Percent (%)	Valid Percent (%)
Gender	Female	132	84.1	89.8
	Male	15	9.6	10.2
Nationality	Non-Saudi	87	55.4	59.2
	Saudi	60	38.2	40.8
Major	Not Psychology	82	52.2	55.8
	Psychology	65	41.4	44.2

Variable	Category	Frequency (n)	Percent (%)	Valid Percent (%)
Academic year	Freshman	51	33.3	34.0
	Sophomore	43	28.1	28.7
	Junior	30	19.6	20.0
	Senior	26	17.0	17.3
Total Time Spent on Smartphone	Less than 1 hour	0	0.0	0.0
	1–2 hours	13	8.3	8.9
	3–4 hours	46	29.3	31.5
	5–6 hours	47	29.9	32.2
	More than 6 hours	40	25.5	27.4
Academic Use of Smartphone	Less than 1 hour	18	11.5	12.2
	1–2 hours	51	32.5	34.7
	3–4 hours	56	35.7	38.1
	5–6 hours	17	10.8	11.6
	More than 6 hours	5	3.2	3.4
Total Time Spent on Laptop	Less than 1 hour	20	12.7	13.6
	1-2 hours	36	22.9	24.5
	3-4 hours	63	40.1	42.9
	5-6 hours	18	11.5	12.2
	More than 6 hours	10	6.4	6.8
Academic Laptop Use	Less than 1 hour	47	29.9	32.0
	1-2 hours	56	35.7	38.1
	3-4 hours	12	7.6	8.2

Variable	Category	Frequency (n)	Percent (%)	Valid Percent (%)
	5–6 hours	21	13.4	14.3
	More than 6 hours	11	7.0	7.5
Total		147	100.0	—

Note. Percentages may not total 100 because of rounding. Missing values were excluded from valid percentages.

Most participants were female and made up 84.1% of the sample. Whereas male participants comprised 9.6% of the sample. All participants were from the same university. The sample included undergraduate students from all academic years: Freshman (n = 51, 33.3%), Sophomore (n = 43, 28.1%), Junior (n = 30, 19.6%), Senior (n = 26, 17.0%). They also came from a variety of academic majors. Psychology students made less than half of the sample (n = 65, 41.4%). Non-psychology students, consisted of students from 10 different majors, made up more than half of the sample, most common were computer science, electrical engineering and architecture and design students (n = 82, 52.2%).

Most students, 29.9% reported using smartphones for 5-6 hours daily, whereas 29.3% used them 3-4 hours. 25.5% for more than 6 hours and 8.3% had a daily use of 1-3 hours. Majority of students stated that they spent 3-4 hours using smartphones for academic purposes, succeeded by 1-2 hours (32.5%), then less than 1 hour (11.5%), 5-6 hours (10.8%), fewest used it for more than 6 hours (3.2%).

The total hours spent on laptop were: 3-4 hours per day (42.9%), 1-2 hours (22.9%), less than 1 hour (12.7%), 5-6 hours (11.5%), more than 6 hours (6.4%).

Hours spent using laptop for academic purposes were: 1-2 hours (35.7%), less than 1 hour (29.9%), 5-6 hours (13.4 %), 3-4 hours (7.6%), more than 6 hours (7.0%)

The means of the scores of each scale were presented in Table 2. Mobile Learning Attitude and Technostress creators scale used a five-point Likert scale, which ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). For the Brief Cope scale, it was advised to look at the three subscales separately. This scale used a four-point Likert system ranging from 1 (I haven't been doing this at all) to 4 (I've been doing this a lot).

Table 2

Mean and Standard deviation of the Scales

Variable	M	SD	Minimum	Maximum	Cronbach's α
Mobile Learning Attitude	3.54	0.69	1.00	5.00	.89
Technostress	3.19	0.74	1.00	5.00	.87
Techno-overload	3.22	0.90	1.00	5.00	.89
Techno-invasion	3.29	0.92	1.00	5.00	.90
Techno-complexity	3.20	0.84	1.00	5.00	.86
Techno-insecurity	2.97	0.91	1.00	5.00	.84
Techno-uncertainty	3.26	0.79	1.00	5.00	.87
Problem-Focused Coping	2.49	0.60	1.00	4.00	.85
Emotion-Focused Coping	2.50	0.49	1.00	4.00	.84
Avoidant Coping	2.34	0.56	1.00	4.00	.79

Note. N = 147. M = mean (average score); SD = standard deviation (variability of scores).

The overall mean mobile learning attitude score (M = 3.54, SD = 0.69) indicated that the students generally had a moderately positive attitude towards mobile learning. Also, the students experienced moderate technostress (M = 3.19, SD = 0.74). When it came to the sub-dimensions of technostress, students had a higher level of techno-invasion (*M* = 3.29, *SD* = 0.92) compared to techno-overload (*M* = 3.22, *SD* = 0.90). The mean score of techno-complexity (*M* = 3.20, *SD* = 0.84) was lower than that of techno-uncertainty (*M* = 3.26, *SD* =

0.79). Techno-insecurity had the lowest mean (*M* = 2.97, *SD* = 0.91). Students often employed emotion-focused coping (M = 2.50, SD = 0.49) to cope with stressful situations. Problem-focused coping (M = 2.49, SD = 0.60) and avoidant coping (M = 2.34, SD = 0.56) were less commonly used.

4.4 Statistical Analysis

4.4.1 Correlation Analysis

Table 3 shows the Pearson correlation relationships between mobile learning attitude, technostress, and coping strategies.

Table 3

Correlations among Mobile Learning Attitude, Technostress, and Coping Strategies

Sr	Variable	1	2	3	4	5
1	Mobile Learning Attitude	—				
2	Technostress	−.07	—			
3	Problem-Focused Coping	.33***	.17	—		
4	Emotion-Focused Coping	.35***	.30***	.67**	—	
5	Avoidant Coping	−.02	.34***	.27***	.47***	—

Note. Values are Pearson correlations. p < .05 (*), p < .01 (**), p < .001 (***).

The attitudes of students towards mobile learning showed a positive relationship with both problem-focused (r = .33, p < .001), emotion-focused coping (r = .35, p < .001), signifying that those who were more approving about mobile learning tended to use more adaptive methods. Furthermore, it had a weak but negative relationship with technostress (r = –.07), showing that as one's mobile learning attitude gets higher, their technostress levels seem to go down, although the connection was not statistically significant. Technostress, on

the other hand, was strongly correlated with emotion-focused ($r = .30$, $p < .001$) and avoidant coping ($r = .34$, $p < .001$), suggesting that people who felt a lot of technostress were more likely to use emotional and avoidance strategies. In contrast, technostress had a weak positive correlation ($r = –.17$) with problem-focused coping, and this relationship was not statistically significant. The three coping strategies were derived from the Brief COPE scale (Carver, 1997). The inter-correlations between the coping mechanisms themselves were also observed, and there was a moderate correlation between them.

4.4.2 Simple Linear Regression: Predictive Role of Problem-Focused Coping on Technostress

Table 4 indicates the results of linear regression, which was done to analyze the predictive effect of problem-focused coping on technostress.

Table 4

Simple Linear Regression Predicting Technostress from Problem-Focused Coping

Predictor	B	SE B	β	t	p	95% CI for B
(Constant)	2.66	0.26	—	10.42	< .001	[2.16, 3.16]
Problem-Focused Coping	0.21	0.10	0.17	2.10	.038	[0.01, 0.41]

Model Summary. $R = .17$, $R^2 = .03$, Adjusted $R^2 = .02$, $F(1, 145) = 4.42$, $p = .038$.

The results showed that problem-focused coping positively predicted technostress, B = 0.21, SE B = 0.10, β = 0.17, t(145) = 2.10, p = 0.038, 95% CI [0.01, 0.41]. In other words, for every unit increase in problem-focused coping, technostress rises by about 0.21 units, considering other factors. At β = 0.17, the standardized coefficient showed a weak, positive and significant effect. This type of coping explained 2.9% of the variance in technostress, showing that it is a weak but significant predictor.

4.4.3 Simple Linear Regression: Predictive Role of Emotion-Focused Coping on Technostress

Table 5 provides an overview of the effects of emotion-focused coping on technostress

Table 5

Simple Linear Regression Predicting Technostress from Emotion-Focused Coping

Predictor	B	SE B	β	t	p	95 % CI for B
(Constant)	2.09	0.30	—	6.98	< .001	[1.50, 2.68]
Emotion-Focused Coping	0.44	0.12	0.30	3.74	< .001	[0.21, 0.66]

Model Summary: $R = .30$, $R^2 = .09$, Adjusted $R^2 = .08$, $F(1, 145) = 13.96$, $p < .001$

When examining the predictive value of emotion-focused coping strategies have on technostress in university students, a simple linear regression analysis revealed a statistically significant model, $F(1,145) = 13.96$, $p < .001$, indicating that emotion-focused coping had a clear and substantial contribution to the explanation of variations in technostress. The R^2 value of .088 signaled that emotion-focused coping accounted for approximately 8.8% of the variance in technostress scores. The unstandardized coefficient $B = 0.44$, and the standardized coefficient $\beta = 0.30$ showed a moderate positive effect.

4.4.4 Simple Linear Regression: Predictive Role of Avoidant coping on Technostress

Table 6 explains the effects that avoidant coping has on technostress.

Table 6

Simple Linear Regression Predicting Technostress from Avoidant Coping

Predictor	B	SE B	β	t	p	95 % CI for B
(Constant)	2.14	0.25	—	8.71	< .001	[1.65, 2.63]
Avoidant Coping	0.45	0.10	0.34	4.38	< .001	[0.25, 0.65]

Model Summary: $R = .34$, $R^2 = .12$, Adjusted $R^2 = .11$, $F(1, 145) = 19.20$, $p < .001$

A linear regression analysis showed that avoidant coping had a significant predictive relationship to technostress, when examining the relationship between avoidant coping and technostress in university students. The statistical significance of the F-value at F (1,145) = 19.20, p <.001 implied a real relationship that was very likely to be true, and was significant. The model's R^2 value of.117 showed that out of all the coping styles, avoidant coping explained the most of the variance in technostress, which was roughly 12% of the variation. The unstandardized coefficient was 0.45, with a standard error of 0.10, and the standardized coefficient was 0.34. This indicated higher use of avoidant coping, such as denying, disengaging or backing away from problems was linked to higher levels of technostress.

4.4.5 Simple Linear Regression: Predictive Role of Mobile Learning Attitude on Technostress

To investigate this predictive hypothesis about mobile learning attitude, simple linear regression was used, with technostress as the dependent variable as shown in Table 7.

Table 7

Simple Linear Regression Predicting Technostress from Mobile Learning Attitude

Predictor	B	SE B	β	t	p	95% CI for B
(Constant)	3.43	0.32	—	10.79	< .001	[2.80, 4.06]
Mobile Learning Attitude	−0.07	0.09	−0.07	−0.78	.437	[−0.24, 0.11]

Model Summary: R = .07, R^2 = .004, Adjusted R^2 = −.003, F(1, 145) = 0.61, p = .437

It was found that the relationship between the variables was non-significant F (1, 145) = 0.61, p = .437. The β value of -0.07 in the equation implied a weak negative correlation. That meant higher positive attitudes towards mobile learning were associated with less technostress, but in a very negligible way.

4.4.6 Independent-Samples T-Test: Gender Differences in Technostress

An independent-samples t-test evaluated gender differences between, the level technostress experienced, mobile learning attitudes, and the three types of coping strategies. Table 8 summarizes the results of this t-test.

Table 8

Independent Samples t-Tests Comparing Male and Female Students on Study Variables

Variable	Female (n = 132)		Male (n = 15)		t(df)	p	Cohen's d
	M	SD	M	SD			
Technostress	3.18	0.67	3.20	1.18	−0.06 (145)	.949[a]	−0.02
Mobile Learning Attitude	3.52	0.67	3.72	0.86	−1.08 (145)	.283	−0.29

Variable	Female (n = 132)		Male (n = 15)		t(df)	p	Cohen's d
Problem-Focused Coping	2.49	0.60	2.53	0.66	−0.21 (145)	.831	−0.06
Emotion-Focused Coping	2.49	0.50	2.61	0.52	−0.89 (145)	.376	−0.24
Avoidant Coping	2.35	0.56	2.31	0.58	0.22 (145)	.828	0.06

Note. M = mean; SD = standard deviation. Student's t-tests reported. [a] Brown–Forsythe test indicated unequal variances.

The 15 male students (M = 3.72, SD = 0.86) compared to the 132 female students (M = 3.52, SD = 0.67) did not demonstrate significantly different mobile learning attitude scores, $t(145) = -1.08$, $p = .283$.

The 15 male students (M = 3.20, SD = 1.18) compared to the 132 female students (M = 3.18, SD = 0.67) did not demonstrate significantly different technostress scores, $t(145) = -0.06$, $p = .949$.

The 15 male students (M = 2.53, SD = 0.66) compared to the 132 female students (M = 2.49, SD = 0.60) did not show significantly different problem-focused coping scores, $t(145) = -0.21$, $p = .831$.

The 15 male students (M = 2.61, SD = 0.52) compared to the 132 female students (M = 2.49, SD = 0.50) did not show significantly different emotion-focused coping scores, $t(145) = -0.89$, $p = .376$.

The 15 male students (M = 2.31, SD = 0.58) compared to the 132 female students (M = 2.35, SD = 0.56) did not show significantly different avoidant coping scores, $t(145) = 0.22$, $p = .828$.

Because the preliminary Levene's test indicated that the two groups had unequal variances ($p < .05$). The researcher adjusted the t test result using the Welch formula. Welch's t showed no significant difference between male and female students with respect to technostress, $t(145) = -0.06$, $p = .949$, $d = 0.01$.

4.4.7 ANOVA Test to Analyze the Difference in Technostress Based On the Academic Year

One-way analysis of variance (ANOVA) was used to see if technostress levels varied between university students from different year levels. The academic year was the independent variable and numbers were designated to each year, 1 as the foundation year, 2 as the sophomore year, 3 as the junior year and 4 as the senior year. Technostress was the dependent variable. The outcome of the ANOVA analysis was presented in Table 9. Furthermore, Table 9 also shows the difference in the means of technostress scores among students of different years.

Table 9

One-Way ANOVA for Technostress Across Groups

Year Level	n	M	SD	SE	Coefficient of Variation	F(3,141)	p
1 Foundation	47	3.12	0.68	0.10	0.22	1.65	.181
2 Sophomore	43	3.19	0.80	0.12	0.25		
3 Junior	30	3.41	0.68	0.12	0.20		
4 Senior	25	2.99	0.78	0.16	0.26		

Note. M = Mean; SD = Standard Deviation; SE = Standard Error

The ANOVA results did not find any significant differences in technostress levels among students from different years ($F (3, 141) = 1.65$, $p = 0.181$). Levene's test indicated no violation of the homogeneity of variance. Junior students, on average, reported the highest

technostress levels, at 3.41, with sophomores coming in at 3.19, foundation students at 3.12, and seniors at 2.99, with standard deviations of 0.68, 0.80, 0.68, and 0.78 respectively.

4.4.8 Exploratory T-test to Measure Differences in Technostress Based on Major

Table 10 presents the results of the independent sample t-test that was conducted to evaluate the differences in technostress levels between psychology and non-psychology students**.**

Table 10

Independent Samples t-Test Comparing Technostress Between Psychology and Non-Psychology Students

Variable	Psychology		Non-Psychology		*t*	*df*	*p*
	M	*SD*	*M*	*SD*			
Technostress	3.09	0.61	3.28	0.82	−1.54	145	.126

Note. M = mean; SD = standard deviation. Levene's test indicated equal variances.

The 65 psychology students (M = 3.09, SD = 0.61), compared to the 82 non-psychology students (M = 3.28, SD = 0.82), did not show a statistically significant difference in technostress levels, t(145) = −1.54, p = .126.

4.5 Hypothesis Testing

Based on the evidence from earlier literature, five hypotheses were created. Appropriate statistical techniques were used to test each one of these hypotheses. The following statistical techniques were utilized: Pearson's correlation, simple linear regression, independent samples t-tests, all fixed the significance level at $\alpha = 0.05$.

H1: Mobile learning attitude significantly predicts technostress among university students.

To test this, a simple linear regression analysis was conducted with technostress as the outcome and mobile learning attitude as the cause. There was a statistically insignificant F-score of 0.60, p-value of 0.437. This meant that the link between mobile learning attitudes and technostress was weak. The result signified that the model faintly explained the variance in technostress. This showed that attitudes towards mobile learning may not contribute to a student's stress related to technology. The unstandardized coefficient of mobile learning attitude, at -0.07 and p-value of.437, was a negative number but not significant. Specifically, higher mobile learning attitudes were found to be linked to lower technostress levels. Hence, university students' positive or negative attitudes towards mobile learning would not lead them to have more or less technostress. Thus, there was weak evidence supporting Hypothesis 1.

H2: Problem-focused coping predicted the level of technostress.

Using simple linear regression analysis, it was found that problem-focused coping had a significant predictive effect on technostress, $F(1,145) = 4.40$, $p = .038$. This type of coping was responsible for 2.9% of the variance in technostress. This was relatively small, but still quite significant.

The unstandardized coefficient of problem-focused coping, at 0.21, was positive and significant, showing that basically, for every additional unit of problem-focused coping, the level of technostress rose by 0.21 units, and the 95% confidence interval for B [0.01, 0.41] did not have zero, which further proved that the connection was real. Therefore, problem-focused coping appeared to be associated with higher technostress and had a predictive role. Thus, Hypothesis 2 was supported based on the findings.

H3: Emotion-focused coping strategies have a significant effect on technostress

Simple linear regression was used to examine the potential predictive effect of overall coping. Technostress was treated as the dependent variable. The results showed that overall coping strategies significantly predicted technostress, $F(1,145) = 13.96$, $p < .001$. Emotion-focused coping accounted for 9% of the variance in technostress ($R^2 = .09$). The data revealed that greater levels of this coping type led to the increase in technostress. Hypothesis 2 was supported by the findings.

H4: Avoidance based coping strategies has a significant positive predictive relationship with technostress.

The results revealed that adaptive coping significantly predicted perceived technostress ($B = 0.45$, $p < .001$). The predictive effect of avoidance coping was the strongest among the three types, explaining 12% of the variance. Also this coping type had a moderate positive impact on technostress symptoms ($\beta = 0.34$). Meaning that an increase in avoidance coping causes a significant rise in technostress. The findings support Hypothesis 4.

H5: There is a significant difference in the technostress level between male and female students.

The results of the independent sample t-test showed that there were no significant differences in the variables between the gender groups. Both male and female students experienced almost the similar levels of technostress. Female students had a mean score of 3.18, whereas male students had 3.20. Hypothesis 5 was not supported.

H6: There is a significant difference in mobile learning attitude between male and female students.

But, male students (M = -3.72) demonstrated a slightly more positive attitude towards mobile learning compared to females (M = 3.52), again this was not a significant difference. The results did not support hypothesis 6.

H7: There is a significant difference in the problem-focused coping strategies between male and female students.

Gender differences in coping suggested that both males and females had almost similar use of problem-focused (t(145) = −0.21, p = .831*). The findings did not support hypothesis 7.

H8: There is a significant difference in the emotion-focused coping strategies between male and female students.

Male students used more emotion-focused (t(145) = −0.89, p = .376*) compared to females, but the dissimilarity was not significant. Therefore, Hypothesis 8 was not accepted due to the results.

H9: There is a significant difference in the avoidant coping strategies between male and female students.

Regarding avoidant coping strategies, female students had a mean score of M = 2.35 (SD = 0.56) and male M = 2.31 (SD = 0.58). The difference in the scores of male and female students for this type of coping was not significant (t(145) = 0.22, p = .828*). The findings did not support Hypothesis 9.

CHAPTER FIVE

DISCUSSION

This chapter presented a discussion of technostress and its relationship to mobile learning attitude and coping strategies among undergraduates in Saudi. It began by explaining the summary of the findings. Then it examines how these findings relate to previous research and theories. Followed by an evaluation of key implications. Lastly, it addressed the shortcomings of the current study as well as provided recommendations for future research.

5.1 Summary of Findings

Universities around the world are relying on the use of mobile technologies to enhance education. However, few studies have focused on how students respond to this type of learning, especially after the COVID era. Furthermore, mobile learning attitude, while considered important, was less explored. This study examined whether mobile learning attitude, different types of coping strategies, and technostress among undergraduate students in Saudi Arabia can be explained under one model. Moreover, it analyzed the influence of gender on technostress. By doing so, the study added to the existing technostress literature by highlighting mobile learning attitude and coping mechanisms' impact on it. Therefore, unifying these three, separately studied, variables into a one predictive framework.

Descriptive statistics, correlation, simple linear regression, and t-tests were used to answer the research questions.

The sample consisted of 147 undergraduate students, of whom 84% were female. Non-Saudi students made up a slight majority (55%) of the sample. Coming from a diverse disciplinary background, 55.8% of the students were non-psychology majors (from various majors), while 44.2% were psychology students. When smartphone usage was analyzed, it was found that close to a third of the students were using their smartphones for five to six hours a day. 31% of the participants were spending three to four hours a day on their

smartphones, 27% were expending over six hours and just 8.9% were spending less than an hour on a daily basis.

In the case of academic use of smartphones, 38% of the respondents claimed that they were using their phones three to four hours a day on university work. 35% of the students reported that they spent only one or two hours, 12% less than that. Only 3% actually exceeded six hours. Additionally, 37.4% of participants reported that sometimes digital technology was the main cause of their stress.

Applying Pearson's correlation to the variables yielded several patterns. There was a positive relationship between mobile learning attitude and the three types of coping strategies. Emotion-focused coping was most strongly correlated to mobile learning attitude, followed by problem-focused coping, with correlation coefficients of 0.35 and 0.33, respectively. But, technostress seemed to have an extremely weak correlation with attitude towards mobile learning.

Technostress, however, was found to have a clear positive relationship with various other coping mechanisms, including problem-focused, emotion-focused and avoidant coping. Technostress had a weak correlation with problem-focused coping. On the other hand, it had a more moderate correlation with emotion-focused and avoidant coping.

The different types of coping strategies also had a moderate positive correlation to one another. This suggested that students may use overlapping strategies when they tackle digital university tasks. The picture of coping being a single, clear-cut strategy doesn't fit. Thus, the study wanted to find out how the most frequently used coping strategy affects a student's technostress levels.

A basic linear regression confirmed that mobile learning attitude did not have any significant influence on technostress levels. This was because the coefficient was small (-0.07), which was not enough to be considered statistically important. This suggested that a positive attitude toward mobile learning did not increase nor decrease technostress levels.

When the effects of each of the three types of coping strategies were examined problem-focused proved to be a significant predictor. The regression for emotion-focused coping also showed important results. It indicated that students who invested in emotional coping could use it as a reaction to stressful situations instead of solutions. The avoidant approach on the other hand, had a significant and unfavorable effect. As shown by the regression analysis, its effect on technostress was very large and negative. Also, this type of coping explained 12% of variance in technostress, much more than the other two types. This meant that those students who refused to face or avoid dealing with the requirements of technology tended to have a lot more technostress.

Interestingly, a comparison of 15 male and 132 female students showed that there were no significant gender differences in technostress levels, mobile learning attitude, problem-focused, emotion-focused, or avoidant coping. Mobile learning and the related stressors, established no significant gender-based distinctions in a sample of 147 students, when studying the differences in how male and female university students perceived and coped with technostress. Technostress did not show a significant difference in the two groups, and nor did how often they use problem-focused or emotion-focused coping, or avoidant coping. The size of the differences that did exist were minuscule. However, the small number of male participants made it difficult to confirm the findings of this t-test.

The difference between technostress levels of first, second, third, and fourth year students was not statistically significant. Junior students' mean technostress score of 3.41 was

higher than the mean scores of the freshman, sophomore, and senior students. It was not statistically significant, because the differences were not large enough to be meaningful. Overall, the technostress levels in these university students seemed to be more or less the same at different stages of their studies.

The level of technostress between psychology and non-psychology students was compared. The results showed that there were no statistically significant differences in technostress experienced between the two groups. Even though not significant, psychology students experienced less technostress compared to non-psychology students.

5.2 Interpretation of Results

The findings revealed the roles that the three coping strategies, as well as mobile learning attitude, played on influencing technostress. Coping strategies had a more significant influence on technostress compared to mobile learning attitude.

The three coping strategies influenced technostress levels to varying degrees. Problem-focused coping had a weak positive link to technostress. This indicated that when students used strategies like problem solving and planning, they experienced a slight increase in technostress. Emotion focused coping had a strong positive effect on this type of stress. Students who used emotion-focused strategies, like seeking emotional support or venting, had higher technostress. Avoidance coping was the strongest predictor of technostress. It had a strong positive effect, which meant that students who avoided stressful situations and used procrastination as a form coping, experienced a high level of technostress. An explanation for this is that stressors do not get resolved and can accumulate when individuals try to avoid stressful situations.

Mobile learning attitude did not have a significant effect on technostress. This suggested that the opinions that students have about mobile learning did not directly affect

their level of technostress. In other words, students who had a more positive attitude toward mobile learning experienced similar level of technostress as students with less positive attitudes. The correlation analysis indicated that mobile learning attitude was a significant predictor of both problem and emotion-focused coping. This may mean that mobile learning attitude can influence technostress indirectly through coping.

The relationship between mobile learning attitude and coping strategies was articulated through correlation. Avoidance coping had a weak relationship to mobile learning attitude. This may mean that students' use of avoidance coping may not be strongly linked to their attitude toward mobile learning. On the other hand, mobile learning attitude was significantly and positively associated with problem-focused and emotion-focused coping. This suggested that students who had more positive mobile learning attitudes also utilized more of these two coping styles. Theoretically, mobile learning attitude and coping strategies were interconnected processes. The attitudes that an individual has towards a stressor affects how the stress is perceived and which coping strategies are utilized, as stated by the TMSC and TAM models.

The relationship between problem-focused and emotion-focused coping was significant. This may mean that when one type of strategy was being used, the other was often being used too. Students did not just use one way to deal with their digital challenges, they used a combination of different strategies. Students may use multiple types strategies when they tackle digital university tasks.

There were no significant differences in technostress levels, mobile learning attitudes and coping strategies between males and females. In this sample, both male and female experienced similar level of technostress and managed stress in comparable ways. Both

groups had almost equally positive mobile learning attitudes. But the results should be interpreted with caution because the number of male participants in the sample was small.

Technostress level was not significantly different across academic years. Students from all four years faced similar levels of technostress. This could mean that technostress was a constant part of the undergraduate experience instead of being confined to students of any specific academic year.

The technostress levels of psychology and non-psychology students was fairly similar. This could mean that students from all majors were reliant on digital learning tools. Psychology students may experience less technostress because they could be more aware about their emotions and coping. The results showed that academic major was not a strong factor in differentiating technostress of students.

5.3 Relation to Literature and Theoretical Framework

Students reported overall positive attitude about the use of mobile devices in formal education. This result is line with existing findings across the previous decade that have observed that Saudi university students generally had positive opinions regarding mobile learning due to the flexibility, portability and interactivity that comes with mobile learning, (Al-Fahad, 2009; Demir & Akpınar, 2018; Al-Azawei & Alowayr, 2020; Alfalah, 2022). Studies from nearby Gulf countries also found that students in general had a favorable attitude in Kuwait (Al-Hunaiyyan et al., 2016), Oman, and UAE (Al-Emran et al., 2016; Al-Emran et al., 2019).

Sulaiman et al. (2018) observed that high number of smartphones in these countries and supportive university policies have boosted the confidence and willingness of the students to dive into mobile learning platforms. However, there were a few issues such as patchy internet, out-of-date institutional policies, small screens of these devices, and getting

sidetracked during classes that were raised by students (Al-Siyabi & Dimitriadi, 2020; (Alsswey et al., 2020). Nevertheless, the immense convenience and usefulness of mobile phones far outweigh these problems, and so the widely accepted positive opinions about mobile learning remain.

5.3.1 Relationship between Mobile Learning Attitude and Coping Strategies

The results of the study showed that mobile learning attitude was related to two of the three coping strategies. Students who had a more positive attitude were also more inclined to use problem-focused and emotion-focused coping. This finding was supported by previous studies that indicated that students who used humor and seeking instrumental support had positive mobile learning attitude (Savitsky et al., 2020; Rahmat et al., 2022). Studies that used the Transactional Model of Stress and Coping also showed that positive attitude was associated with the use of adaptive coping strategies (Ruiz-Camacho et al., 2025; Yang et al., 2025).

5.3.2 Relationship between Mobile Learning Attitude and Technostress

The findings indicated that students' attitudes toward mobile learning was negatively associated with their technostress. The findings in this study were a bit different from prior research. Studies from different parts of the world showed that positive attitudes can reduce technostress. For example, the study by Jurek et al. (2021) found that having more positive attitude toward information and communication technology can the reduce the stress caused by the use of advance mobile learning technologies. Ogel-Balaban (2022) conjointly demonstrated that a more positive attitude toward online learning led to students perceiving this type of learning as advantageous and this brought about a reduction in stress Contrastingly, a study from Thailand argued that students with more positive attitudes also experienced more technostress symptoms (Chongkolrattanaporn, 2023). One possible explanation for this

discrepancy was that factors such as technical issues which included internet problems, lack of technical support, difficulty using university educational apps, had a major effect on their stress and attitudes (Alsahou et al., 2022). Another reason concerning the lack of significant effect in this study could be that prior studies took place during COVID-19 pandemic. This was when students were more dependent on mobile learning more than usual for lecture and online classes. These findings indicated that the effect of mobile learning attitude on technostress may not be as strong post pandemic, thus H1 was not supported.

5.3.3 Relationship between Coping Strategies on Technostress

Regarding coping strategies, problem-focused, emotion-focused coping, and avoidance coping were related to technostress symptoms. Several previous studies agreed with this finding, for instance, Michałowska et al. (2022) and Galvin et al. (2022b) demonstrated that avoidance coping was linked to the increase in technology related stress. Moreover, emotion-focused coping techniques, especially mindfulness was associated with technostress (Ioannou, 2023). Problem-focused coping was least associated with an increase in technostress. Planning, finding solutions to problems, finding positives in a situation and organizational skills were types of problem focused coping related to lower levels of stress (Giray et al., 2024; Gurvich et al., 2021).

It was found that technostress can be predicted by all three types of coping. A recent UAE-based study by Tafesse et al. (2024), showed that coping behaviors do seem to be closely related to the intensity of technostress. It was also found that problem-focused coping had a slightly positive predictive effect on this type of stress. This finding did not fully align with previous research. Similar to the current study (Hauk et al., 2019) found that a high level of technological load can even turn constructive coping strategies, such as problem-solving, into a stress amplifier, when investigating the relationship between coping and technostress. On the other hand, Ruiz-Camacho et al. (2025) found that problem coping negatively

predicted perceived technostress. Continuing this trend, (Diponegoro et al., 2021) noted that problem-focused approaches can cut down anxious symptoms caused by online learning. Still, Hauk et al. (2019) noticed that problem focused coping can also lead to an increase in technostress. This may be due to the fact that coping strategies are very logical in nature and require a ton of mental effort to apply. It is also worth noting that in the current study this coping style led to the least increase in technostress. This suggested that problem-focused coping was the most effective way to deal with technostress when the stressors are manageable (Forster et al., 2021). Even though the second hypothesis was rejected, it predicted technostress, just not significantly.

According to the current study's results, emotional coping was a significant positive predictor of technology-related stress, supporting the third hypothesis. Previous studies also confirmed this finding, by suggesting that activities like seeking emotional support translated into higher technostress found that this type of coping (Galvin et al., 2022). A systematic review by Kumar (2024) showed that emotion-focused techniques, especially venting, can lower technostress in a variety of populations. Seeking emotional support led to lower of stress caused by information technology in both student and not student but instrumental support, which was a problem-focused technique but better at reducing technostress (Weinert et al., 2021). One plausible explanation for the mixed results found for emotion-focused coping could be that previous studies investigated the effects of this coping on IT workers' technostress or combined the results from both student and non-student populations in the same study. However, recent studies on student populations revealed that these findings could not be simply applied. Students and workers used digital technologies for different purposes and had discrete needs and issues related to technology.

In support of the fourth hypothesis, the present study found that avoidance coping led to an increase in technostress and that this relationship was statistically significant. This

finding was supported by previous research. Mi et al. (2024) found that avoidant coping like fantasy and evading stressors, enhanced technostress. A study by Morales-Rodríguez (2021) also found that avoidance strategies, like ignoring the effects of stressful stimuli, contributed to lower mental health in online learning environments. Avoidance coping such as rumination, led to an increase in stress related to problematic internet use (McNicol & Thorsteinsson, 2017). This type of coping did not resolve stressors and thus creates technostress (Bonanno & Burton, 2014).

5.3.4 Gender Differences in Mobile Learning Attitude, Technostress and Coping Strategies

Regarding the effects of gender, the current study did not find any significant differences in mobile learning attitude, technostress, and coping strategies between males and females. Male and female students showed very similar technostress mean scores in the current study. The fifth hypothesis was not supported. This was in contrast to some studies, which showed that female students had higher technostress compared to the male students (Upadhyaya & Vrinda, 2020; Bajwa et al., 2021). However, this study found that the level of technostress was virtually the same for male and female, with an average of 3.18 out of 5 for females and 3.20 for males, and this was not a significant difference. Research coming from the same region, also had come to the growing conclusion that mentioned that technostress affected both men and women equally in university settings. The studies of Efilti et al. (2024) And Abdelwahed et al. (2022) were two examples of this, they found that the differences in technostress between male and female academics were almost negligible. Turkish and Qatari university studies by Aktan & Toraman (2022) and Al-Ansari & Alshare (2019-2020) also showed that both males and females experience similar stress levels in remote and blended learning, but the participants were teachers in these studies. The Egyptian medical students in the study of Kasemy et al. (2022) showed a bit of a gender difference in their techno-complexity and techno-insecurity, but not a significant one.

When assessing mobile learning attitudes, the current study found that male participants had more positive average score of 3.72, with a standard deviation of 0.86, and female participants scored an average of 3.52, with a standard deviation of 0.67, however, this difference was not statistically significant. Therefore, there was no significant difference in attitudes towards mobile learning between male and female students. The sixth hypothesis related to attitude and gender was not supported. This was in line with the work of Korucu & Bicer (2018)'s Turkish study of postgraduate students, and a cross-cultural study by Yu and Deng (2022), which showed no gender dissimilarities in people's attitudes towards mobile learning. Gender did not seem to be a significant factor anymore when it came to mobile learning (Shahin et al., 2023). This is probably because learning with mobile technology is now fairly common. Both men and women get roughly the same amount of exposure making them fairly confident with digital tools. So, they might not think much differently about them.

While there were no statistically major differences in the use of coping mechanisms between male and female students, males. So, the seventh, eighth and ninth hypothesis were not supported. But there were minor differences. While females used an equal mix of problem-focused and emotion-focused coping frequently, males tended to use more emotion-focused coping. A handful of regional studies from the Middle East had hinted at a different story, which was previously seen in Khalaf el al. (2021) who stated that UAE based female students rely more on emotional, and avoidance based ways of dealing with online learning stress. Comparably, Mallhi et al. (2022) found that Saudi female university students turn to emotional support and relaxation techniques more often, and men on the other hand concentrated on planning, fixing problems, and rational thinking. In a more contemporary Saudi study, Qassim (2024) also made the point that females were much more into emotional and social support, and that men were less so. However, an older study from the region had similar results to this study, where both male and female students are equally likely to use

emotion-focused coping (Al Najjar et al., 2017). This may suggest that emotion based coping was commonly employed by both genders and may be a result of social, cultural, and individual factors. This discrepancy may be due to the small effect sizes of males in this sample. The small sample size for males in the present study may be due to lower number of male students compared to female students at the university.

5.3.5 Connection with Theoretical Frameworks

The findings showed that mobile learning attitude was significantly associated and predicted two of the coping strategies. All three types of coping strategies were correlated with technostress, with emotion-focused and avoidant coping significantly predicting it. In this study mobile learning attitude did not affect technostress but correlation analysis showed that mobile learning attitude correlated with two of the coping strategies and was associated with avoidant coping. It might be possible that it indirectly affects technostress by the way of coping strategies. Also all three coping strategies predicted this type of stress.

The results of the present study generally uphold the projections of the Transactional Model of Stress and Coping, devised by Lazarus and Folkman (1984) and TAM model. Stress can be the consequence of either the opinions of the demands coming from the world around us or the effectiveness and adequacy of our coping mechanisms. Mobile learning attitude was taken as primary appraisal which was the individual's viewpoint about their situation, whether it was stressful or manageable. Coping strategies were considered the secondary appraisal. According to the theory, both primary and secondary appraisal can influence stress independently. But primary appraisal can also indirectly effected stress through coping strategies. The current study confirmed that this model can be applied to technostress as well. It also highlighted the importance of coping responses within the students' technostress context.

For the TAM model, studies added technostress to further explain the various factors that can be explained by mobile learning attitude. Studies using TAM model had shown that students' mobile learning attitude had a predictive as well as bi-directional relationship with technostress. Utilizing this model Khlaif et al. (2023), found that attitudes may significantly effect on technostress symptoms during compulsory online learning period. For the bi-directional relationship studies showed that mobile learning was associated with lower levels of technostress (Olech et al., 2021; Wang & Yu, 2024). This study noted that attitudes were linked to a minor reduction in technostress. Even though this model was generally accepted, it did not fully explain the relationship between these two variables. One explanation was that technostress was an external variable rather than an original variable proposed by the model. Another reason could be that mobile learning attitude did not have a large effect after the pandemic because students in recent times can choose to a larger extent when and how long they want to engage in mobile learning. This can change the way these two variables relate to one another.

5.4 Implications

This study filled the gap in the literature by analyzing the interplay among university students, their use of technology, technostress and how they adapt to stressful situations. It drew from the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984) and the Technology Acceptance Model (Davis, 1986) to show how coping strategies can play a crucial part in influencing the stress that students experience due to technology. This extended theory of stress and coping into the new realities of technology-enhanced learning. The study explored new areas by investigating whether an individual's attitude towards mobile learning was a variable that decides if technology related pressures felt threatening or manageable.

In a real-world application, it was crucial to think about the emotional toll of students when educational technology gets too much for them. The study demonstrated that students had moderate levels of technostress, highlighting that this type of stress affects young people as well. This knowledge can help university counseling services and mental health professionals understand the need to address digital stress management in their programs. Since, those students who depended on emotion-based coping strategies may be at higher risk of getting stuck in a cycle of technology related stress, this can provide valuable insight to practitioners to design appropriate programs for this group. With regards to learning in the age of mobile technology, traditional assumptions about students' attitudes and mental well-being in the digital learning environment needs to be reframed and tested.

This study can shed light to topics such as aiding students who want to turn around negative perceptions about technology, and tools needed to build mental resilience to adapt to the pressures of mobile learning.

From an educational side, the study highlighted the necessity of constructing learning environments that reduce mental strain. Incorporating workshops that provide learners with appropriate mental health tools can increase their sense of digital self-confidence. Also, techniques such as problem solving, organizing digital work and seeking task-oriented support can also be integrated into student orientation programs. This can be highly effective in helping learners deal constructively with the digital challenges of university life. Universities also have major responsibility in creating intuitive and hassle-free online platforms that can be easily utilized by learners and instructors.

This study highlighted the need to develop policies that secure the mental health of students in digital learning systems in the Gulf area. This may involve creating digital wellness frameworks that encourage healthy digital habits, and provide mental health support

in universities. Making policies that carefully balance between innovation and the well-being of the students can help create sustainable growth in the educational sector.

5.5 Limitations of the Study

Despite its important contributions, the study had a few limitations. This study utilized a cross-sectional design to collect data from 147 university students. The variables were analyzed at a single point in time, this may reduce the understanding of the causal relationships between technostress and the other variables. Another limitation was that the study used self-report questionnaires to measure all variables. It might lead to common-method bias and social desirability effects may occur, where the participants may not accurately represent their stress levels and coping behavior. Also, this type of questionnaire provided a narrow understanding of participants' responses to mobile technology.

The sample drew exclusively from a single private university. So, the findings may not be representative of all university students. Private universities and public universities may differ in the latest technology, class sizes, speed of incorporation of technology and facilities for online learning. This could lead to different responses to mobile learning and stress in that particular setting. It was difficult to apply the results of this study directly to public university students. Another issue was that the participants consisted of predominantly female students. While this may accurately represent the university's population, it can make it difficult to accurately measure technostress variations between male and female students.

There was a gender imbalance in the sample. The number of male participants was small compared to the female participants. This may affect the interpretation of the findings because the results may represent the female students' experiences more accurately. The small sample size of males may also limit the generalizability of the results to male student population.

Also, the study took place in one university in western Saudi Arabia, this can limit generalizability of the results to other areas and cultures. Finally, even though the study highlights the effects of individual coping in stressful situations, it did not explore specific situational strategies that could be related to the demands of digital learning. Even though limitations exist, the study helped update the knowledge about the psychological effects of using constantly developing mobile technologies in education.

5.6 Recommendations for Future Research

Future studies may consider including participants from multiple private and public universities to gain a better understanding of the various socio-cultural and economic factors that may affect mobile learning attitudes and technostress. It can help examine how these variables affect students in public universities compared to the private ones. Further research can also widen the scope of the current study by including graduate students in order to locate key differences between various education levels.

Future studies can consider using longitudinal research design to measure technostress to have a better view of the factors that create and succeed it. It is also necessary to utilize qualitative approaches to gain a detailed picture of how students view mobile learning and the challenges they face due to technological demands. Future research could also explore coping strategies specifically aimed to reduce technostress, thus extending the research on the relationship between coping mechanisms and technology related stress.

The present study focused on mobile learning attitudes and found there was a weak correlation between it and technostress. Future research should investigate other variables that may control, or at least better explain the variance in technostress. Variables suggested for additional exploration are digital self-efficacy, institutional support, continued intention to use technology and personality traits. The ratio of male to female students in the sample was

similar to the nature of the population at the university. However, Further research is recommended to recruit a more even number of male and female participants for additional accuracy in the comparisons related to technostress.

5.7 Conclusion

Reliance on mobile learning will likely continue to increase in higher education. The Saudi Arabian university students are adapting to the increasing use of mobile technologies in higher education. Consequently, this study analyzed how students responded to digital technology in education. In particular, relationships between mobile learning attitudes, technostress, and coping mechanisms were investigated. It was found that students' moderately positivity towards technology was not enough. Their attitudes toward mobile learning did not directly affect their technostress levels. They also had moderate levels of technostress. The use of problem-focused coping led to the least amount of increase in this type of stress. Attitudes, technostress, and coping strategies did not differ much in terms of gender. It is recommended that universities should provide workshops aimed at improving students' digital skills as well as teaching digital hygiene. Education about effective coping skills can help them better deal with stressful situations of all kind. Future studies in this area may focus on different variables affecting mobile learning attitudes as well as more coping strategies that are specifically aimed at mitigating technostress. This can ensure that mobile technologies play a productive role in higher education as well as have as few negative effects as possible.

REFERENCES

Aktan, O., & Toraman, Ç. (2022). The relationship between technostress levels and job satisfaction of teachers within the covid-19 period. *Education and Information Technologies*, *27*(7), 10429–10453. https://doi.org/10.1007/s10639-022-11027-2

Al Najjar, A., Hamid, A., & Abdullah, A. (2017). Coping Strategies of Students in the United Arab Emirates University: A Research Application of the Arabic Version of the CISS . *Research on Humanities and Social Sciences*, *7*(18).

Al-Ansari, M. A., & Alshare, K. (2019). The impact of technostress components on the employees satisfaction and perceived performance. *Journal of Global Information Management*, *27*(3), 65–86. https://doi.org/10.4018/jgim.2019070104

Al-Azawei, A., & Alowayr, A. (2020). Predicting the intention to use and hedonic motivation for mobile learning: A comparative study in two Middle Eastern countries. *Technology in Society*, *62*, 101325. https://doi.org/10.1016/j.techsoc.2020.101325

Al-Emran, M., & Shaalan, K. (2015). Attitudes towards the use of mobile learning: A case study from the Gulf Region. *International Journal of Interactive Mobile Technologies (iJIM)*, *9*(3), 75. https://doi.org/10.3991/ijim.v9i3.4596

Al-Emran, M., Elsherif, H. M., & Shaalan, K. (2016). Investigating attitudes towards the use of mobile learning in higher education. *Computers in Human Behavior*, *56*, 93–102. https://doi.org/10.1016/j.chb.2015.11.033

Al-Mamary, Y. H. (2022). Understanding the use of learning management systems by undergraduate university students using the UTAUT model: Credible evidence from Saudi Arabia. *International Journal of Information Management Data Insights*, *2*(2), 100092. https://doi.org/10.1016/j.jjimei.2022.100092

Al-Fahad, F. N. (2009). STUDENTS' ATTITUDES AND PERCEPTIONS TOWARDS THE EFFECTIVENESS OF MOBILE LEARNING IN KING SAUD UNIVERSITY, SAUDI ARABIA. *Turkish Online Journal of Educational Technology, 8*(2). http://files.eric.ed.gov/fulltext/ED505940.pdf

Alfalah, A. A. (2022). Factors influencing students' adoption and use of mobile learning management systems (m-LMSs): A quantitative study of Saudi Arabia. *International Journal of Information Management Data Insights, 3*(1), 100143. https://doi.org/10.1016/j.jjimei.2022.100143

Al-Hunaiyyan, A., Alhajri, R. A., & Al-Sharhan, S. (2016). Perceptions and challenges of mobile learning in Kuwait. Journal of King Saud University - *Computer and Information Sciences, 30*(2), 279–289. https://doi.org/10.1016/j.jksuci.2016.12.001

Aljaffer, M. A., Almazam, A. A., Alzahrani, F. G., Alsultan, F. M., Alrasheed, A. M., Almousa, R. M., & Alsuhaibani, A. I. (2025). The relationship between coping strategies, stress, and anxiety among King Saud University Medical Students. *Journal of Family Medicine and Primary Care*, *14*(4), 1169–1173. https://doi.org/10.4103/jfmpc.jfmpc_1820_23

Alkhalaf, B., Alammar, F., & Al-Moumen, J. (2024). Risk Factors Related to Mobile Phones Use among Higher Education Students in Kuwait: Cross-Sectional Study. *Journal of Community Medicine & Public Health, 8*(2). https://doi.org/10.29011/2577-2228.100439

Alkhawaldeh, A., Omari, O. A., Aldawi, S. A., Hashmi, I. A., Ballad, C. A., Ibrahim, A., Sabei, S. A., Alsaraireh, A., Qadire, M. A., & ALBashtawy, M. (2023). Stress Factors, Stress Levels, and Coping Mechanisms among University Students. The Scientific World JOURNAL, 2023, 1–9. https://doi.org/10.1155/2023/2026971

Alsahou, H., Abbas, Z., & Alfayly, A. (2022). The attitude of undergraduates towards e-learning considering educational and technical challenges and requirements in Kuwaiti applied colleges. Journal of Technology and Science Education, 12(1), 33. https://doi.org/10.3926/jotse.1358

Al-Siyabi, M. A., & Dimitriadi, Y. (2020). Opportunities and challenges of mobile learning implementation in schools in Oman. *International Journal of Mobile and Blended Learning, 12*(3), 32–48. https://doi.org/10.4018/ijmbl.2020070103

Amal Azmuddin, R., Sulaiman, N. A., @Jamali, M. J., Che Abdul Rahman, A. N., & Roslan, F. H. (2025). The use of digital annotation tools in assisting reading English for Science and technology academic texts among L2 learners in higher institutions. *3L The Southeast Asian Journal of English Language Studies*, *31*(1), 235–254. https://doi.org/10.17576/3l-2025-3101-16

American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). APA.

Asad, M. M., Erum, D., Churi, P., & Moreno Guerrero, A. J. (2023). Effect of technostress on psychological well-being of post-graduate students: A perspective and Correlational Study of Higher Education Management. *International Journal of Information Management Data Insights*, *3*(1), 100149. https://doi.org/10.1016/j.jjimei.2022.100149

Bajwa, R., Abdullah, H., Jaafar, W., & Samah, A. (2021). Information and Communication technology use, Technostress, Psychosocial effects and implications on University students. *Isra Med J., 13*(3), 207–212.

Batolas, D., & White, L. (2022). *Technostress and attitudes towards digital transformation.* IET Conference Proceedings., 2022(8), 71–75. https://doi.org/10.1049/icp.2022.2043

Becker, J., Derra, N. D., Regal, C., & Kühlmann, T. M. (2021). Mitigating the negative consequences of ICT use: the moderating effect of active-functional and dysfunctional coping. *Journal of Decision System, 31*(4), 374–406. https://doi.org/10.1080/12460125.2021.190133

Bolarinwa, O. (2015). Principles and methods of validity and reliability testing of questionnaires used in social and Health Science Researches. *Nigerian Postgraduate Medical Journal, 22*(4), 195. https://doi.org/10.4103/1117-1936.173959

Bonanno, G. A., & Burton, C. L. (2014). Regulatory flexibility: Individual differences in coping and emotion regulation. *PsycEXTRA Dataset*. https://doi.org/10.1037/e530972014-001

Bondanini, G., Giorgi, G., Ariza-Montes, A., Vega-Muñoz, A., & Andreucci-Annunziata, P. (2020). Technostress dark side of technology in the workplace: A scientometric analysis. *International Journal of Environmental Research and Public Health, 17*(21), 8013. https://doi.org/10.3390/ijerph17218013

Booker, Q., Kitchens, F., & Rebman Jr, C. (2014). A model for testing technostress in the Online Education Environment: An Exploratory Study. Issues In Information Systems. https://doi.org/10.48009/2_iis_2014_214-222

Boumosleh, J., & Jaalouk, D. (2017). Smartphone addiction among university students and its relationship with academic performance. Global Journal of Health Science, 10(1), 48. https://doi.org/10.5539/gjhs.v10n1p48

Bradley, V. M. (2020). Learning management system (LMS) use with online instruction. *International Journal of Technology in Education*, *4*(1), 68–92. https://doi.org/10.46328/ijte.36

Candussi, C. J., Kabir, R., & Sivasubramanian, M. (2023). Problematic smartphone usage, prevalence and patterns among university students: A systematic review. Journal of Affective Disorders Reports, 14, 100643. https://doi.org/10.1016/j.jadr.2023.100643

Carmi, G. (2024). E-Learning using zoom: A study of students' attitude and learning effectiveness in higher education. *Heliyon, 10*(11), e30229. https://doi.org/10.1016/j.heliyon.2024.e30229

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine, 4*(1), 92–100. https://doi.org/10.1207/s15327558ijbm0401_6

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*(2), 267–283. https://doi.org/10.1037/0022-3514.56.2.267

Chongkolrattanaporn, T. (2023). Perspectives on online learning and Technostress experienced by science and non-science first-year university students during COVID-19. *PASAA, 65*(1), 203–233. https://doi.org/10.58837/chula.pasaa.65.1.8

Conrad, C., Deng, Q., Caron, I., Shkurska, O., Skerrett, P., & Sundararajan, B. (2022). How student perceptions about online learning difficulty influenced their satisfaction during Canada's Covid-19 response. *British Journal of Educational Technology, 53*(3), 534–557. https://doi.org/10.1111/bjet.13206

Cook, G., & Belle, J.-P. (2022). Analysis of Technostress experienced by students at the University of Cape Town, during the covid-19 pandemic. *Issues In Information Systems*. https://doi.org/10.48009/1_iis_2022_106

Dagani, J., Buizza, C., Ferrari, C., & Ghilardi, A. (2023). The role of psychological distress, stigma and coping strategies on help-seeking intentions in a sample of Italian College students. *BMC Psychology, 11*(1). https://doi.org/10.1186/s40359-023-01171-w

Daleiden, B. K., Hartley, K., & Bendixen, L. D. (2025). A self-regulated learning perspective on smartphone presence, usage, and multitasking while studying. Education Sciences, 15(2), 128. https://doi.org/10.3390/educsci15020128

Demir, K., & Akpınar, E. (2018a). The effect of mobile learning applications on students' academic achievement and Attitudes Toward Mobile Learning. *Malaysian Online Journal of Educational Technology, 6*(2), 48–59. https://doi.org/10.17220/mojet.2018.02.004

Diponegoro, A. M., Santoso, A. M., Nurjannah, E. S., Diastu, N. R., Ali, K., Fidyawaty, Y., Marsha, G. C., & Rohaeni, E. (2021). Problem focused coping methods used by students during covid-19. *KnE Social Sciences*. https://doi.org/10.18502/kss.v4i15.8195

Du Plooy, E., Casteleijn, D., & Franzsen, D. (2024a). Personalized adaptive learning in higher education: A scoping review of key characteristics and impact on academic performance and Engagement. *Heliyon*, *10*(21). https://doi.org/10.1016/j.heliyon.2024.e39630

El-Malky, M., Abed, G., Abdel Wahab, S., El-Sayed, S., & Rabie, A. (2023). Relationship between e-learning acceptance and perceived e-learning stress among nursing students at Beni-Suef University. *Menoufia Nursing Journal, 8*(1), 355–365. https://doi.org/10.21608/menj.2023.331278

Efilti, E., Doğan, R., Zhumgalbekov, A., & Yalçın, S. B. (2024). THE IMPACT OF TECHNOLOGICAL STRESS ON ACADEMICS' LIFE SATISFACTION. *Problems of Education in the 21st Century, 82*(1), 48–65. https://doi.org/10.33225/pec/24.82.48

Fernández-Fernández, M., Martínez-Navalón, J.-G., Gelashvili, V., & Román, C. P. (2023). The impact of teleworking technostress on satisfaction, anxiety and performance. *Heliyon, 9*(6). https://doi.org/10.1016/j.heliyon.2023.e17201

Forster, M., Grigsby, T., Rogers, C., Unger, J., Alvarado, S., Rainisch, B., & Areba, E. (2021). Perceived discrimination, coping styles, and internalizing symptoms among a community sample of Hispanic and Somali adolescents. *Journal of Adolescent Health, 70*(3), 488–495. https://doi.org/10.1016/j.jadohealth.2021.10.012

Galvin, J., Evans, M. S., Nelson, K., Richards, G., Mavritsaki, E., Giovazolias, T., Koutra, K., Mellor, B., Zurlo, M. C., Smith, A. P., & Vallone, F. (2022b). Technostress, coping, and anxious and depressive symptomatology in university students during the Covid-19

George, D., & George, A. (2023). *The Cost of Convenience: How excessive email use impacts our health.* Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.8364416

Graves, B. S., Hall, M. E., Dias-Karch, C., Haischer, M. H., & Apter, C. (2021). Gender differences in perceived stress and coping among college students. *PLoS ONE, 16*(8), e0255634. https://doi.org/10.1371/journal.pone.0255634

Gurvich, C., Thomas, N., Thomas, E. H., Hudaib, A., Sood, L., Fabiatos, K., Sutton, K., Isaacs, A., Arunogiri, S., Sharp, G., & Kulkarni, J. (2020). Coping styles and mental health in response to societal changes during the COVID-19 pandemic. *International Journal of Social Psychiatry, 67*(5), 540–549. https://doi.org/10.1177/0020764020961790

Guy, R. (2009). *The evolution of mobile teaching and learning.* Informing Science Press.

Hameed, F., Qayyum, A., & Khan, F. A. (2022). A new trend of learning and teaching: Behavioral intention towards Mobile Learning. *Journal of Computers in Education*, *11*(1), 149–180. https://doi.org/10.1007/s40692-022-00252-w

Hasan, M., Karimuzzaman, Md., Abdulla, F., & Hossain, Md. M. (2024). Mobile use in the classroom is a mixed bag, and lecturers need to provide students with guidelines. *Sage Open, 14*(4). https://doi.org/10.1177/21582440241299481

Hauk, N., Göritz, A. S., & Krumm, S. (2019). The mediating role of coping behavior on the age-technostress relationship: A longitudinal multilevel Mediation Model. *PLOS ONE, 14*(3). https://doi.org/10.1371/journal.pone.0213349

Huang, R., Jabor, M. K., Tang, T., & Chang, S. (2021). Examine the moderating role of mobile technology anxiety in mobile learning: a modified model of goal-directed behavior. *Asia Pacific Education Review, 23*(1), 101–113. https://doi.org/10.1007/s12564-021-09703-y

Ioannou, A. (2023). Mindfulness and technostress in the workplace: a qualitative approach. *Frontiers in Psychology, 14*. https://doi.org/10.3389/fpsyg.2023.1252187

Jackson, S., & Serenko, A. (2023). Stress, affective responses, and coping mechanisms of Canadian university students toward online learning during the COVID-19 lockdown. *Journal of Global Information Technology Management, 26*(3), 224–250. https://doi.org/10.1080/1097198x.2023.2235232

Joo, Y. J., Kim, N., & Kim, N. H. (2016). Factors predicting online university students' use of a mobile learning management system (M-LMS). *Educational Technology Research and Development, 64*(4), 611–630. https://doi.org/10.1007/s11423-016-9436-7

Kaewpradit, K., Ngamchaliew, P., & Buathong, N. (2025). Digital screen time usage, prevalence of excessive digital screen time, and its association with mental health, sleep quality, and

academic performance among Southern University Students. Frontiers in Psychiatry, 16. https://doi.org/10.3389/fpsyt.2025.1535631

Khan, A. K., & Quratulain, S. (2023). An examination of antecedents and consequences of technostress among university students: Task -Technology Fit Perspective. 36th Bled eConference – Digital Economy and Society: The Balancing Act for Digital Innovation in Times of Instability: June 25 – 28, 2023, Bled, Slovenia, Conference Proceedings, 789–796. https://doi.org/10.18690/um.fov.6.2023.52

Jurek, P., Olech, M., & Brycz, H. (2021). Perceived technostress while learning a new mobile technology: Do individual differences and the way technology is presented matter? *Human Technology, 17*(3). https://doi.org/10.14254/1795-6889.2021.17-3.2

Kasemy, Z. A., Sharif, A. F., Barakat, A. M., Abdelmohsen, S. R., Hassan, N. H., Hegazy, N. N., Sharfeldin, A. Y., El-Ma'doul, A. S., Alsawy, K. A., Abo Shereda, H. M., & Abdelwanees, S. (2022). Technostress Creators and Outcomes Among Egyptian Medical Staff and Students: A Multicenter Cross-Sectional Study of Remote Working Environment During COVID-19 Pandemic. *Frontiers in Public Health, 10*. https://doi.org/10.3389/fpubh.2022.796321

Khaddage, F., & Knezek, G. (2012). Introducing a mobile learning attitude scale for higher education. *International Journal of Interactive Mobile Technologies, 6*(4), 35–41.

Khalaf, Z. F., Al Qasem, L., & Al-Shehhi, A. (2021). Coping strategies among university students during the COVID-19 pandemic: The role of gender and online learning stress. *PLOS ONE, 16*(10), e0255634. https://doi.org/10.1371/journal.pone.0255634

Khlaif, Z. N., Sanmugam, M., & Ayyoub, A. (2022a). Correction to: Impact of technostress on continuance intentions to use mobile technology. *The Asia-Pacific Education Researcher*. https://doi.org/10.1007/s40299-022-00646-5

Khlaif, Z. N., Sanmugam, M., & Ayyoub, A. (2022). Impact of technostress on continuance intentions to use mobile technology. *The Asia-Pacific Education Researcher, 32*(2), 151–162. https://doi.org/10.1007/s40299-021-00638-x

Khlaif, Z. N., Sanmugam, M., Hattab, M. K., Bensalem, E., Ayyoub, A., Sharma, R. C., Joma, A., Itmazi, J., Najmi, A. H., Mitwally, M. A., Jawad, A. A., Ramadan, M., & Bsharat, T. R. K. (2023). Mobile technology features and technostress in mandatory online teaching during the COVID-19 crisis. *Heliyon*, *9*(8). https://doi.org/10.1016/j.heliyon.2023.e19069

Kimathi, F. A., & Zhang, Y. (2019). Exploring the General Extended Technology Acceptance Model for e-learning approach on student's usage intention on e-learning system in University of Dar es Salaam. *Creative Education*, *10*(01), 208–223. https://doi.org/10.4236/ce.2019.101017

Knezek, G., & Khaddage, F. (2012). Bridging formal and informal learning: a mobile learning attitude scale for higher education. *British Journal of Social Sciences, 1*(2), 101–116. http://dro.deakin.edu.au/eserv/DU:30055285/knezek-bridgingformal-2013.pdf

Konuk, S. (2021). E-mail literacy in Higher Education Academic Settings. *International Journal of Education and Literacy Studies*, *9*(3), 29. https://doi.org/10.7575/aiac.ijels.v.9n.3p.29

Korucu, A. T. (2018). Examining postgraduate students' attitudes toward mobile learning according to gender and field of study. *Journal of Education and Learning, 7*(3), 179–186. https://doi.org/10.5539/jel.v7n3p179

Kumar, P. S. (2024). TECHNOSTRESS: A comprehensive literature review on dimensions, impacts, and management strategies. *Computers in Human Behavior Reports, 16*, 100475. https://doi.org/10.1016/j.chbr.2024.100475

La Torre, G., De Leonardis, V., & Chiappetta, M. (2020). Technostress: how does it affect the productivity and life of an individual? Results of an observational study. *Public Health, 189*, 60–65. https://doi.org/10.1016/j.puhe.2020.09.013

Lazarus, R., & Folkman, S. (1984). *Stress, Appraisal, and Coping.* Springer; Springer Publishing Company.

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. Computers in Human Behavior, 31, 343–350. https://doi.org/10.1016/j.chb.2013.10.049

Li, S., & Huang, W. (2025). Do mobile learning experiences affect college students' online learning readiness? Open Praxis, 17(4), 785–802. https://doi.org/10.55982/openpraxis.17.4.894

Lu, A., Deng, R., Huang, Y., Song, T., Shen, Y., Fan, Z., & Zhang, J. (2022). The roles of mobile app perceived usefulness and perceived ease of use in app-based Chinese and English learning flow and satisfaction. *Education and Information Technologies, 27*(7), 10349–10370. https://doi.org/10.1007/s10639-022-11036-1

Mallhi, T. H., Alzarea, A. I., Alshammari, M. S., Khan, Y. H., & Khan, A. (2022). Estimation of psychological impairment and coping strategies among students from a higher education institute in Saudi Arabia. *International Journal of Environmental Research and Public Health, 19*(21), 14282. https://doi.org/10.3390/ijerph192114282

Marakshina, J., Vasin, G., Ismatullina, V., Malykh, A., Adamovich, T., Lobaskova, M., & Malykh, S. (2023). The brief cope-a inventory in Russian for adolescents: Validation and evaluation of psychometric properties. *Heliyon, 9*(2). https://doi.org/10.1016/j.heliyon.2023.e13242

McNicol, M. L., & Thorsteinsson, E. B. (2017). Internet Addiction, Psychological Distress, and Coping Responses Among Adolescents and Adults. Cyberpsychology, *Behavior, and Social Networking, 20*(5), 296–304. https://doi.org/10.1089/cyber.2016.0669

Mi, W., Srisawat, P., & Voracharoensri, S. (2024). The Impact of Resilience and Coping Strategies on Techno-Stress in Chinese University Students. *Eurasian Journal of Educational Research, 110*, 297–311. https://doi.org/10.14689/ejer.2024.110.18

NASSER, M. A., PRATIC, K., LARAICHI, L., AHMINI, A., & SOISSA, S. (2023). Technostress and e-learning anxiety effects of teachers' satisfaction and performance in Morocco: The moderating role of teachers' efficacy. *Journal of Advances in Humanities and Social Sciences, 9*(2). https://doi.org/10.20474/jahss-9.2.4

Naveed, Q. N., Choudhary, H., Ahmad, N., Alqahtani, J., & Qahmash, A. I. (2023). Mobile Learning in Higher Education: A Systematic Literature review. *Sustainability, 15*(18), 13566. https://doi.org/10.3390/su151813566

Nikolopoulou, K. (2022). Students' mobile phone practices for academic purposes: Strengthening post-pandemic university digitalization. Sustainability, 14(22), 14958. https://doi.org/10.3390/su142214958

OGEL-BALABAN, H. (2022). The relationship between university students' attitudes toward online education and their stress during COVID-19 pandemic. *Turkish Online Journal of Distance Education, 23*(2), 45–57. https://doi.org/10.17718/tojde.1095740

Ohly, S., & Bastin, L. (2023). Effects of task interruptions caused by notifications from communication applications on strain and performance. Journal of Occupational Health, 65(1). https://doi.org/10.1002/1348-9585.12408

Ogunmakin, R. (2018). Students Attitudes and Effect of Mobile Learning on Academic Performance. *Global Journal of HUMAN-SOCIAL SCIENCE: G Linguistics & Education, 18*(9), 2249–460x. https://core.ac.uk/download/581121525.pdf

Olech, M., Jurek, P., & Brycz, H. (2021). PERCEIVED TECHNOSTRESS WHILE LEARNINGA NEW MOBILE TECHNOLOGY: DO INDIVIDUALDIFFERENCES AND THE WAY TECHNOLOGY ISPRESENTED MATTER? *Human Technology*, *17*(3), 197–212. https://doi.org/https://doi.org/10.14254/1795-6889.2021.17-3.1

Özkan, E. S. (2023). The moderating effect of coping strategies on the relationship between academic stress and burnout symptoms (Bachelor's thesis, University of Twente).

Pedraja-Rejas, L., Muñoz-Fritis, C., Rodríguez-Ponce, E., & Laroze, D. (2024). Mobile learning and its effect on learning outcomes and critical thinking: A systematic review. *Applied Sciences, 14*(19), 9105. https://doi.org/10.3390/app14199105

Pedro, L. F., Barbosa, C. M., & Santos, C. M. (2018). A critical review of mobile learning integration in formal educational contexts. International Journal of Educational Technology in Higher Education, 15(1). https://doi.org/10.1186/s41239-018-0091-4

Qassim, R. Y. (2024). Gender-based variation in stress, coping strategies, and emotional well-being among academic staff in Saudi public universities. *International Journal of Industrial Engineering & Production Research, 35*(1), 75–88. https://ijiepr.iust.ac.ir/article-1-1983-en.pdf

Qazi, A., Qazi, J., Naseer, K., Hasan, N., Hardaker, G., & Bao, D. (2024). M-learning in education during COVID-19: A systematic review of sentiment, challenges, and opportunities. *Heliyon*, *10*(12). https://doi.org/10.1016/j.heliyon.2024.e32638

Rafifing, N., Mosinki, J., Mabina, A., Otlhomile, B. E., & Mphole, O. (2025). Usability of Mobile Learning Technologies in open and distance learning. *Journal of Information Systems and Informatics, 7*(1), 138–157. https://doi.org/10.51519/journalisi.v7i1.989

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Tu, Q. (2008). The consequences of technostress for end users in organizations: Conceptual Development and empirical validation. *Information Systems Research, 19*(4), 417–433. https://doi.org/10.1287/isre.1070.0165

Rahmat, H., Aris, A., Mohd Miskam, H., Rajendran, K., & Mashudi, R. (2022). Students' attitudes and coping strategies relating to online learning during the COVID-19 pandemic: A cross-sectional study. F1000Research, 11, 320. https://doi.org/10.12688/f1000research.73610.1

Riquelme, V. C., Maureira, N., Navarro, C., & Puente, C. (2021). Anxiety to online learning: relationship with attitude, gender, environment, and mental health in university studentss. *Revista Digital de Investigación En Docencia Universitaria, 15*.

Rohwer, E., Flöther, J., Harth, V., & Mache, S. (2022). Overcoming the "Dark Side" of Technology—A Scoping Review on Preventing and Coping with Work-Related Technostress. *International Journal of Environmental Research and Public Health, 19*(6), 3625. https://doi.org/10.3390/ijerph19063625

Ruiz-Camacho, C., Gozalo, M., & Casado, I. S. (2025). The mediating role of active coping strategies in the relationship between academic stressors and stress responses among university students. *Healthcare, 13*(14), 1674. https://doi.org/10.3390/healthcare1314167

Saikat, S., Dhillon, J. S., Wan Ahmad, W. F., & Jamaluddin, R. A. (2021). A systematic review of the benefits and challenges of mobile learning during the COVID-19 pandemic. *Education Sciences*, *11*(9), 459. https://doi.org/10.3390/educsci11090459

Saleem, F., Chikhaoui, E., & Malik, M. I. (2024). Technostress in students and quality of online learning: role of instructor and university support. *Frontiers in Education, 9*. https://doi.org/10.3389/feduc.2024.1309642

Salhab, R., & Daher, W. (2023). The impact of mobile learning on students' attitudes towards learning in an educational technology course. *Multimodal Technologies and Interaction, 7*(7), 74. https://doi.org/10.3390/mti7070074

Shahin, M., Zahedi, M., Khalajzadeh, H., & Rezaei Nasab, A. (2023). A study of gender discussions in Mobile apps. *2023 IEEE/ACM 20th International Conference on Mining Software Repositories (MSR)*, 598–610. https://doi.org/10.1109/msr59073.2023.00086

Siitonen, V., Ritonummi, S., Salo, M., Pirkkalainen, H., & Mauno, S. (2025). Coping with Technostress in the Software Industry: Coping Strategies and Factors Underlying their Selection. *Journal of Systems and Software,* 112341. https://doi.org/10.1016/j.jss.2025.112341

Sisouvong, V., & Pasanchay, K. (2024). Mobile Learning: Enhancing Self-Directed Education through Technology, Wireless Networks, and the Internet Anytime, Anywhere. *Journal of Education and Learning Reviews, 1*(2), 39–50. https://doi.org/10.60027/jelr.2024.752

Sokół, I. P., & Koç, H. (2024). Exploring the digital landscape in Higher Education: Investigating the role of Technology, techno-invasion, techno-overload and tools in student well-being. Proceedings of the 2024 9th International Conference on Information and Education Innovations, 70–77. https://doi.org/10.1145/3664934.3664936

Sönmez, A., Göçmez, L., Uygun, D., & Ataizi, M. (2018). A review of current studies of Mobile Learning. *Journal of Educational Technology and Online Learning, 1*(1), 12–27. https://doi.org/10.31681/jetol.378241

Šramová, B. (2023). University students' experience with mobile learning during COVID-19 pandemic. Interactive Learning Environments, 32(9), 5537–5551. https://doi.org/10.1080/10494820.2023.2220362

SÜRÜCÜ, L., & MASLAKÇI, A. (2020). Validity and reliability in quantitative research. Business & Management Studies: *An International Journal, 8*(3), 2694–2726. https://doi.org/10.15295/bmij.v8i3.1540

Tafesse, W., Aguilar, M. P., Sayed, S., & Tariq, U. (2024). Digital overload, coping mechanisms, and student engagement: an empirical investigation based on the S-O-R framework. *SAGE Open, 14*(1). https://doi.org/10.1177/21582440241236087

Tan, G. W. H., Ooi, K. B., Sim, J. J., & Phusavat, K. (2012). Determinants of Mobile Learning Adoption: An Empirical Analysis. *Journal of Computer Information Systems, 52*(3), 82–91. https://doi.org/10.1080/08874417.2012.11645561

Tarafdar, M., Tu, Q., & Ragu-Nathan, T. S. (2007). The impact of technostress on productivity and the role of technology characteristics. *Journal of Management Information Systems, 24*(1), 301–328. https://doi.org/10.2753/MIS0742-1222240109

Thomée, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults - a prospective cohort study. BMC Public Health, 11(1). https://doi.org/10.1186/1471-2458-11-66

Upadhyaya, P., & Vrinda. (2020). Impact of technostress on academic productivity of university students. *Education and Information Technologies, 26*(2), 1647–1664. https://doi.org/10.1007/s10639-020-10319-9

Urukovičová, N., Rošková, E., Schraggeová, M., & Smoroň, J. (2023). Psychometric Properties of the Technostress creators inventory among employed Slovak respondents. *Computers in Human Behavior Reports, 12*, 100324. https://doi.org/10.1016/j.chbr.2023.100324

Wang, X., & Yu, X. (2024). Art students' technostress, perceived usefulness, satisfaction, and continuance intention to use mobile educational applications. *SAGE Open, 14*(2). https://doi.org/10.1177/21582440241260206

Weinert, C., Maier, C., Laumer, S., & Weitzel, T. (2020). Technostress mitigation: an experimental study of social support during a computer freeze. *Journal of Business Economics, 90*(8), 1199–1249. https://doi.org/10.1007/s11573-020-00986-y

Yang, S., Ma, H., & Zhan, X. (2025). Stressful life events and sense of coherence in college students: Roles of coping, self-efficacy, and stress mindset. Behavioral Sciences, 15(6), 762. https://doi.org/10.3390/bs15060762

Yao, N., & Wang, Q. (2022). Technostress from smartphone use and its impact on university students' sleep quality and academic performance. *The Asia-Pacific Education Researcher, 32*(3), 317–326. https://doi.org/10.1007/s40299-022-00654-5

Yu, Z., & Deng, Z. (2022). A meta-analysis of gender differences in e-learners' self-efficacy, satisfaction, motivation, attitude, and performance across the world. *Frontiers in Psychology, 13*, 897327. https://doi.org/10.3389/fpsyg.2022.897327

Zeyab, A., Alayyar, G. M., & Almisad, B. (2022). Qualitative study exploring college students' attitudes towards mobile learning in the College of Basic Education in Kuwait State. EduSearch, (28–1 ,(104ع. https://search.mandumah.com/Record/1281917

Zhao, J., Chapman, E., & Houghton, S. (2025). Personality traits, coping strategies, and mental health outcomes among Chinese university students during COVID-19. *COVID, 5*(3), 39. https://doi.org/10.3390/covid5030039 21`

Appendix

Appendix A

Survey Questionnaire and Informed Consent (Google Form Link: https://forms.gle/8LsJj732RZzADpzK8)

Section 1 – Participant Information and Informed Consent

You are invited to take part in a research study titled 'Predictive Roles of Academic Smartphone Use and Coping Strategies on Technostress among University Students.' This study investigates how students' use of mobile devices (smartphones, laptops) for academic purposes affects technostress and coping strategies.

Participation is voluntary, and all responses will remain anonymous, and confidential. The study has been reviewed and approved by the Effat University Research Ethics Committee (Reference: RCI_REC/26.August.2025/7.1.Exp.60). By proceeding to the next section, participants indicate that they have read the information above and agree to participate.

Section 2 – Demographic Information

1. 1. Are you between the ages of 15–24? (Yes / No)
2. 2. What is your gender? (Male / Female)
3. 3. What is your year of study? (Freshman / Sophomore / Junior / Senior)
4. 4. What is your major? (e.g., Psychology, Computer Science, Marketing, etc.)
5. 5. What is your nationality? (Saudi / Non-Saudi)
6. 6. On average, how many hours per day do you use your smartphone? (<1 hr / 1–2 hrs / 3–4 hrs / 5–6 hrs / >6 hrs)
7. 7. How many of those hours are for academic purposes? (<1 hr / 1–2 hrs / 3–4 hrs / 5–6 hrs / >6 hrs)
8. 8. On average, how many hours per day do you use your laptop? (<1 hr / 1–2 hrs / 3–4 hrs / 5–6 hrs / >6 hrs)

9. 9. How many of those hours are for academic purposes? (<1 hr / 1–2 hrs / 3–4 hrs / 5–6 hrs / >6 hrs)

Section 3 – Technostress Creators Scale (Tarafdar et al., 2007; adapted for students)

(1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree)

10. I am forced by technology to work with very tight time schedules.
11. I am forced to change my study habits to adapt to new technologies.
12. I have a higher workload because of increased technology complexity.
13. I have a higher workload because of the online learning environment
14. I have to spend a lot of time reading an overwhelming amount of messages and emails.
15. I have to spend a lot of time everyday reading an overwhelming amount of discussion board messages
16. I have to sacrifices my vacation and weekend time to keep current on changes to the courses and learning environment
17. I feel my personal life is being invaded by digital learning platforms.
18. I spend less time with my family due to this technology.
19. I do not find enough time to study and upgrade my technology skills to meet the needs of the program
20. I find new students in my major know more about complex technology than I do
21. I find the learning tools too complex for me to use effectively.
22. I worry that new technologies might affect my ability to complete my courses satisfactorily.
23. I find younger students in my major know more about computer technology than I do.
24. I feel constant threat to my ability to complete my program due to new technologies.
25. I have to work harder because of delays from hardware software and network problems.
26. There are always new developments in the technologies we use in our programs.

27. There are constant changes in software used for my courses.

Section 4 – Brief COPE Inventory (Carver, 1997)

(1 = I haven't been doing this at all 2 = A little bit 3 = A medium amount 4 = I've been doing this a lot)

28. I've been turning to work or other activities to take my mind off things.
29. 've been concentrating my efforts on doing something about the situation I'm in.
30. I've been saying to myself "this isn't real".
31. I've been getting emotional support from others.
32. I've been giving up trying to deal with it.
33. I've been taking action to try to make the situation better.
34. I've been refusing to believe that it has happened.
35. I've been saying things to let my unpleasant feelings escape.
36. I've been getting help and advice from other people.
37. I've been trying to see it in a different light, to make it seem more positive.
38. I've been criticizing myself.
39. I've been trying to come up with a strategy about what to do.
40. I've been getting comfort and understanding from someone.
41. I've been giving up the attempt to cope.
42. I've been looking for something good in what is happening.
43. I've been making jokes about it.
44. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.
45. I've been accepting the reality of the fact that is has happened.
46. I've been expressing my negative feelings.
47. I've been trying to find comfort in my religion or spiritual beliefs.

48. I’ve been trying to get advice or help from other people.
49. I’ve been learning to live with it.
50. I’ve been thinking hard about what steps to take.
51. I’ve been blaming myself for things that happened.
52. I’ve been praying or meditating.
53. I’ve been making fun of the situation.

Section 5 – Mobile Learning Attitude Scale (Khaddage & Knezek, 2012)

(1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree)

54. The rapid development of mobile learning devices and tools empowers informal learning.
55. Mobile apps could be integrated seamlessly to support informal learning.
56. Mobile apps could bring enormous opportunities into universities to further empower learning.
57. Student acceptance of mobile learning in higher education would be high.
58. Recent developments in mobile learning are leading to the exploration of new methods at universities.
59. Theoretical models can inform the design of mobile learning applications.
60. The integration of mobile applications and social platforms has become pervasive in teaching and learning.

Appendix B

Ethics Approval Form

معهد البحوث و الاستشارات
Research & Consultancy Institute

Notification of Research Ethics Approval

To whom it may concern,

The Research Ethics Committee of Effat University, in accordance with the University's Research Ethics Guidelines, has decided to grant approval for the study as follows

Research team	Aisha Amanulla & Dr Nisma Merdad
Decision number	RCI_REC/26.August.2025/7.1.Exp.60
Research title	Predictive Roles of Academic Smartphone Use and Coping Strategies on Technostress among University Students.
Duration of approval	One Academic Semester

The Research Ethics Committee has varied adherence to the following Principles:

- The research process will result in no harm or discomfort for the participants.
- All precautions were taken to guarantee participants' safety, and their rights were respected
- No harm will be generated to the used facilities.

The information will be used by the research team for research purposes only.

Your cooperation is much appreciated,

Dean of Graduate Studies and Research

Prof. Mady A. Mohamed