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AI-Driven Emotional Support as a Predictor of Digital Well-being Among Undergraduate Students in Pakistan

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ABSTRACT

The present study investigated the role of emotional support in predicting digital well-being among undergraduate students of Pakistan with the help of AI. The research design was quantitative and cross sectional. The total sample consisted of 210 undergraduate students from Psychology, Urdu, English and Education programs who were selected as a convenience sample for the purposes of the study, who completed an online survey instrument that included the researcher-developed AI-Driven Emotional Support Scale (AIES; 17 items) and the Digital Well-Being Scale was adapted (DWS; Appianing et al, 2026; 41 items). Four cases were rejected due to an embedded attention-check, resulting in the 206 cases used for analysis. The internal consistency of both instruments was found to be good at Cronbach's between α .80 and .86. The students reported moderate level of emotional support from AI ($M = 3.32$, $SD = 0.71$, on a 1 to 5 scale). A Pearson correlation revealed a statistically significant strong positive correlation between the provision of emotional support using AI-driven and digital well-being, $r(204) = .70$, $p < .001$. The simple linear regression showed that AI emotional support significantly predicted digital well-being, $F(1, 204) = 194.70$, $p < .001$ ($R^2 = .488$). The results indicated that interaction with the AI conversational system through its emotional support is significantly related to digital well-being functioning among Pakistani undergraduate students. Therefore, the study recommended that University affiliated colleges should consider AI-supported emotional tools as an adjunct to counseling and wellness services, given their meaningful link to digital wellbeing.



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Introduction

Artificial Intelligence (AI) has revolutionized the way students engage with digital technologies. AI-powered conversational systems provide more than academics; they offer personal reflection, emotional expression, reassurance, companionship, and everyday assistance. By mimicking human behaviour and interactions, AI systems can respond to users in conversational, emotionally responsive ways, which has opened a new form of human-technology interaction. Researchers have started to examine AI not only as an educational technology but also as a possible source of emotional and psychological support for young people and university students.

Research from around the world indicates that AI-powered conversational agents can aid users' mental well-being and emotional needs. In a systematic review and meta-analysis, Li et al. (2023) identified evidence that AI conversational agents helped to improve a variety of mental-health-related outcomes, although the evidence was mixed and should not be interpreted as AI being a substitute for professional psychological support. Studies on college students specifically have also demonstrated a trend towards an increased interest in AI chatbots as reaching, scalable, and easy-to-access sources of mental-health and well-being support, albeit with inconsistent and limited evidence of effectiveness (Khan et al., 2025).

The increased use of AI in the emotional realm has also sparked worries about emotional dependency, overuse, and human-AI relationships. Users can come to feel empathy and connection to the conversational AI, especially when talking about personal or emotional topics. For instance, a small longitudinal exploratory study also showed that participants who were prompted to use conversational AI for social and emotional reasons felt more attached, more comfortable and more

empathetic to AI and were more likely to seek personal and social support from AI (Chandra et al., 2025), highlighting the need to establish safeguards for problematic use of conversational AI.

The developments relate to the growing concept of digital well-being; the degree to which individuals are able to use digital technologies in ways that foster psychological, emotional, social, cognitive, and behavioral health. Modern perspectives move beyond screen time or digital addiction to viewing a balance, self-regulation, perceived control, emotional regulation, and responsible digital behavior. Burr et al. (2020) put digital well-being in the context of the role digital technologies play in promoting flourishing in humans. Later, Appianing et al. (2026) created and tested a multidimensional Digital Well-Being Scale for university students which comprises six aspects: task interference, digital safety and responsible use, perceived control and satisfaction, digital life balance, emotional regulation, and digital dependence and frustration.

This evidence is not entirely consistent. While potentially providing emotional support in an accessible and convenient way, intensive or excessive use of AI can lead to challenges with emotional regulation, interpersonal relationships, and digital engagement. Increased frequency of using chatbots for conversations has been associated with worse mental health, especially for those who reported low levels of social support from others (Fang et al., 2025). That's why there's no doubt that the connection between AI emotional help and digital well-being must be examined empirically and not simply supposed to go either way.

The question is significant in Pakistan as digital technologies and generative AI are increasingly becoming a part of students' academic and personal journeys at the

university level. Students in Pakistan are using AI instruments for academic support, information retrieval, communication, and personal use, with some indications of emotional significance forming between the students and the tools. For example, research by Qasim et al. (2025) with Pakistani medical students investigates how emotional and psychological reliance on AI chatbots goes beyond mere instrumental academic interaction into more emotional modes.

Research in Pakistan has also investigated the relationship between the use of AI and loneliness and emotion regulation (Fatima, 2026). This study is informative but does not specifically examine the relationship between students' overall digital well-being and the use of AI for emotional support. What is found instead is a patchwork cover of studies with respect to AI usage, psychological effects, emotional reliance, and use of digital technology, none of which are linked with each other in a single model.

The Pakistani higher education system is a helpful example to study this relationship. The academic, social and personal landscape is a multi-layered one, and as more and more undergraduate students work in AI-supported digital environments, there is a growing need to address the impact of this environment on their academic, social and personal well-being. Recent findings extend the impact of AI into Pakistani student life, connecting students using AI tools to academic stress, grade outcomes (CGPA), and peer interactions (Ali & Rafay, 2026). AI systems can also provide instant, relatively anonymous interactions, something that could be preferred by those students who are reluctant to discuss personal issues with others. Meanwhile, relying on an AI for emotional assistance might influence students' emotional regulation, digital interactions, human relationships, and technology control.

The key question is, however, not whether Pakistani undergraduate students are utilizing AI, but whether the use of AI for emotional support is linked to the quality and healthiness of the overall digital experience. It's a more complex question to answer because digital well-being is a multi-faceted concept, not just an outcome, that includes emotional regulation, digital balance, perceived control, and digital dependence.

Research Problem

While the role of AI conversational agents in mental health, emotional support, loneliness, and psychological well-being has been explored in international literature, there has been less research on the broader impact of AI-driven emotional support on digital well-being. Previous research concentrates on clinical symptoms in the form of anxiety and depression or constructs like chatbot dependence and loneliness, and results on general well-being are mixed. This divide is harder to bridge in Pakistan. There is limited empirical research on the use of AI, emotional dependence, loneliness, and emotion regulation in Pakistani research, while of AI driven emotional support on digital well-being among under-graduate students. It remains to be seen whether emotionally supportive AI interaction is linked to healthier digital functioning or to problematic dependence and a diminished digital balance. This gap should be filled, as it is one of the largest groups of users of AI, being undergraduate students. There is currently insufficient context-specific evidence to support the ability of educators and HEIs to grasp the link of the emotionally oriented use of AI to students' digital well-being. This study attempts to fill that void by investigating the predictive relationship between AI emotional support and digital well-being of undergraduate students in Pakistan.

Significance of the Study

There are several reasons why this study is important. It is positioned at a developing connection of artificial intelligence, emotional support, and digital well-being, extending beyond traditional mental-health results to new ground in AI research. It also provides context-specific evidence from Pakistan, where empirical studies of students' emotional engagement with AI are still in their infancy. A more concrete understanding of this relationship would enable educators, university administrators, counsellors, and policy makers, to consider how students use AI technologies in ways that are responsible and healthy.

Research Objectives

1. To assess the extent of emotional support that undergraduate students in Pakistan receive from AI-based sources.
2. To investigate the predictive relationship between AI-driven emotional support and digital well-being among Pakistani undergraduate students.

Research Questions

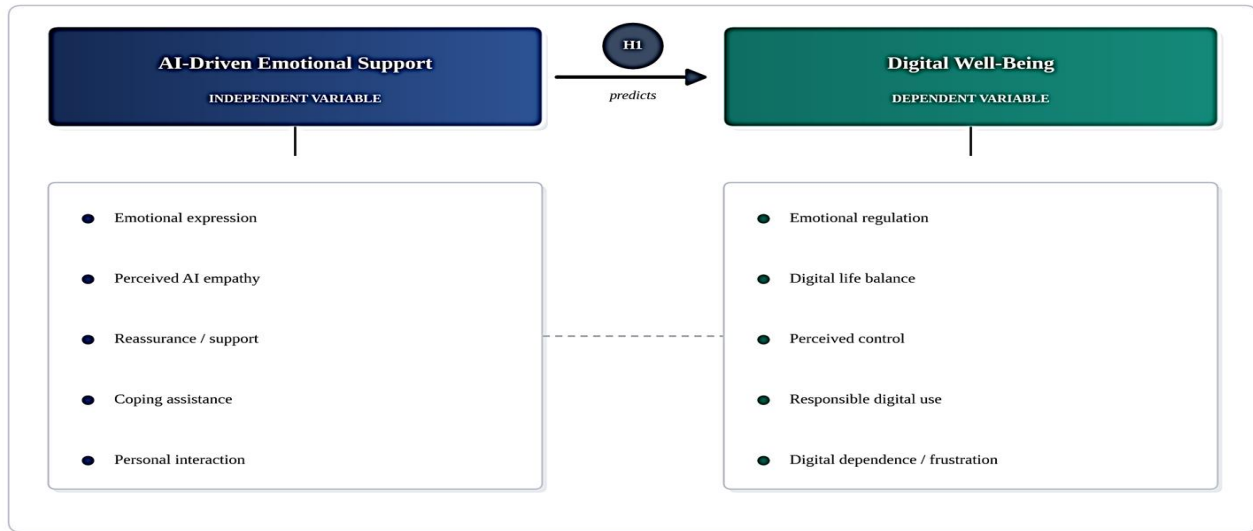
1. To what extent do undergraduate students in Pakistan receive emotional support from AI-based sources?
2. Is there a significant predictive relationship between AI-driven emotional

support and digital well-being among undergraduate students in Pakistan?

Conceptual Framework

The conceptual framework of the study is deliberately confined to two core variables, for the focus and feasibility of the study. Independent Variable (IV): AI-Driven Emotional Support This construct is a combination of student's expressions, reassurances, reflections, coping, perceived empathy and personal support with the help of AI-based conversational technologies sources. Dependent Variable (DV): Digital Well-Being is the students' capacity to function digitally healthily, balanced, with digital awareness, responsibly and without problematic digital dependence which includes aspects of emotional regulation, digital life balance, perceived control, responsible digital use and freedom from problematic digital dependence. This construct has a good foundation for operationalization because of its multidimensional structure validated among university students. The relationship between the use of AI's emotional support and digital well-being is mediated by students' engagement with technology. If that is so, and to what extent, was unresolved and not a priori assumed.

Figure 1
Conceptual Framework of the Study



Note. IV = independent variable; DV = dependent variable; H1 = Hypothesis 1, the proposed predictive relationship tested in this study (AI-Driven Emotional Support → Digital Well-Being).

Review of Literature

AI has become part of higher education at a fast pace, changing how students learn, communicate, access information, and seek help. Generative AI systems and conversational agents are no longer just learning and teaching tools, but are now capable of generating human-like dialogue, understanding the emotions in user responses, and providing personalized interactions. This is an emerging aspect of its role in students' emotional and psychological lives which is now an area of research of its own and is of particular concern for university students, who experience pressure in academics, lack of social support, uncertainties and fears about the future, and often have limited access to timely psychological support.

Emotional support using AI can be interpreted as using AI-powered conversational systems to communicate emotionally: listening, encouragement, reassurance, reflection, guidance related to mood, or just a place to share personal worries. While they are not the same as a

professional psychological service, their accessibility, privacy, constant availability and conversational nature can be attractive to students who are not keen to seek human assistance. Studies have begun to examine the potential of AI-powered chatbots to promote mental health and recognize the possible dangers of dependency, privacy, emotional bonds, false information, and the loss of human connection.

In addition, digital well-being has become a new term in response to the growing importance of digital technologies in our daily lives. It extends beyond the mere concept of screen time or tech addiction to inquire about the ability of humans to engage with digital technologies that promote psychological, emotional, social, cognitive, and behavioral health. Burr et al. (2020) looked at the issue of digital well-being in a broader sense, relating to what constitutes a good human life in the presence of digital technologies and how they can either create opportunities or pose risks to human flourishing.

This distinction is important for the academic community since digital technologies are integrated into the academic and personal lives of university students. Rather than the question of whether students use digital technologies, there is the question of how their digital experiences remain balanced, controlled, emotionally supportive, and conducive to healthy functioning. The purpose of this study is to see if the emotional support received through AI can predict digital well-being in undergraduate students of Pakistan.

AI-Driven Emotional Support in Higher Education

The concept of conversational agents that provide psychological and emotional support has been around for years before the recent generative AI craze. Most of the previous systems had been rule-based or based on specific therapeutic methods; the current large language model (LLM) systems, however, produce responses that are flexible and context-dependent that make AI seem to perform a wider range of plausible emotional support functions. While Gaffney et al. (2019) uncovered a growing body of evidence for the role of conversational agents in mental-health interventions in a mixed-method systematic review, the quality of the evidence, along with the quality of the mental-health interventions, were criticized as lacking, and further research was called for to move these agents to the point where they could serve as replacements for traditional psychological services.

Subsequent studies, however, have been more hopeful, but not without some doubt. Abd-Alrazaq et al. (2020), in a systematic review and meta-analysis, examined the effectiveness and safety of chatbots for improving mental health. Chatbots demonstrated potential to help with some psychological outcomes, but the results did not indicate clinical effectiveness - with inconsistent findings across outcomes, small

sample sizes, high risk of bias, and limited safety evidence - according to the authors. When taken together, the two point to the possibility of using chatbots as an effective aid rather than a viable alternative for human psychological assistance.

More recent research has focused specifically on adolescents and young adults, who share many similarities with students in university. In the systematic review and meta-analysis of 14 articles, 15 trials and 1,974 children and adolescents, there was a moderate to large effect of AI-driven conversational agents on depressive symptoms, but no statistically significant effect on anxiety, stress, positive affect, negative affect, or mental well-being after adjusting for publication bias (Feng et al., 2025). That is, while AI-powered conversational support can have psychological benefits, these benefits do not necessarily equate with broader well-being outcomes.

Similarly, in a review of experimental studies on AI conversational agents for mental health and well-being, Li et al. (2023) concluded that the advantages of using these tools for mental health and well-being are significant. Their review found that there is a building body of evidence, but also significant variation in the characteristics of the interventions, the populations they serve, their outcomes, and the types of interactions they employ - a variation that makes it difficult to consider all AI conversational agents as the same. The effectiveness is likely to be influenced by the type of interaction, user expectations, frequency of use, emotional needs, and the particular AI system used.

There are other additions to this picture in terms of evidence from specific institutional settings. In a case study of an AI mental-health chatbot at a South African university, Khan et al (2025) identified a primary benefit of the chatbot for supporting student well-being and success was when it was supported

within a wider student-support ecosystem, as opposed to as a standalone tool. In a systematic review of AI-powered chatbots to support students' mental health, Umam, Suranata, and Lestari (2025) came to a comparable conclusion that while these chatbots hold promises for accessibility and early support, they require thoughtful institutional integration, ethical considerations, and human support mechanisms to complement them. The common thread here is that AI-based emotional and mental-health tools have meaningful promise - and they can make an impact just as much as they can fail to make an impact, depending on how they're designed, implemented and incorporated into students' broader support structures.

One of the elements that seems to be a significant factor in humans' perception of empathy from AI is the human element. The human factor seems to be a key element in how humans perceive empathy from AI. When a system responds like a human, students feel that it is listening to them, not judging them, and is responding emotionally, which may make them feel comfortable sharing information about themselves that they would not feel comfortable sharing with teachers, peers, family, or counselors. Some of the barriers to help-seeking may be reduced when using AI. However, simulated empathy is not necessarily real human empathy - AI will respond to learned patterns and calculations and can provide answers that may be incorrect, inappropriate, or overly reassuring.

The tension is directly evidenced by Al-Zahrani (2025) when they conducted a survey study of 819 students in higher education on the impact of AI chatbots, human interaction and emotional support. Students identified actual positive and supportive aspects, such as individualized support and access to information, as well as negative aspects, such as reduced human connection and emotional support. AI, that is,

can be a source of support and a challenge to the connectedness of humans all in one.

There is a related concern of emotional dependence. If a student "turns" to an AI system frequently for personal conversations, the relationship can become more than a means to an end, providing content and information. If the student is using these AI systems repeatedly for personal conversations, the relationship can become more than just a source of content and information. The study conducted on medical students in Pakistan revealed widespread use of chatbots (approximately 94% of students used chatbots and over half used them daily), moderate level of overall dependence and emotional and relationship-style dependence as a predictor of overall dependence (Oliver et al., 2020). The sample was restricted to medical students, but the study result is still significant at the national level as it highlights that the interaction with AI can be emotional with Pakistani learners.

Combined, the literature suggests two scenarios. AI's emotional support can aid in emotional expression, access, and perceived support; however, its overuse can be a source of dependence, diminish interpersonal interaction, or result in problematic digital engagement. Duality is precisely what makes digital well-being a valuable result to be explored when examining the overall impact of emotional support through AI.

Conceptualizing Digital Well-being

Digital well-being is a growing, multi-dimensional concept that is related to the impact of digital technologies on people's functioning and flourishing. Well-being is not simply the lack of psychological issues, but a balanced, healthy, meaningful and controllable relationship with technology. Burr et al (2020) suggested that digital well-being was the larger picture of digital technology affecting the human good - technologies can have a positive or negative effect on psychological and human life.

This is not a concept of lessening screen time or of not being addicted to screens. A student can spend hours online for academic purposes and be healthy, whereas another can spend a relatively small amount of time online and demonstrate a significant dysfunction in one or more of the following areas: control, distraction, emotional stress or dependence. Thus, digital well-being should be understood not just in terms of quantity but in terms of the quality and impacts of digital engagement.

This multidimensional perspective has been refined by recent research. Based on a sample of 1,533 university students, Appianing et al. (2026) created and tested a Digital Well-Being Scale, which consists of 6 dimensions: task interference, digital safety and responsible use, perceived control and satisfaction, digital life balance, emotional regulation, and digital dependence and frustration. Their well-constructed 41-item instrument had good reliability and provided evidence of convergent and discriminant validity as well – helpful support that digital well-being is not limited to a single narrow outcome, but is behavioral, emotional, cognitive and self-regulatory.

Within this context, emotional regulation and digital life balances are particularly relevant when considering emotional support through AI. AI systems have the potential to support healthier digital experiences by helping students manage emotions, reflect on problems, and deal with daily challenges. AI systems could potentially assist in creating healthier digital experiences by helping students control their emotions, think through problems, and address common daily obstacles. However, the more students rely on AI to manage their emotions, the more the technology might undermine digital balance and perceived control, and therefore undermine the learning process. The connection between Artificial Intelligence (AI) emotional support and digital wellbeing is not necessarily one-way.

There is another theory that fits in here, too: Self-Determination Theory (SDT). SDT believes that psychological wellness is based on healthy fulfillment of three basic needs – autonomy, competence, and relatedness. AI-powered emotional support may potentially enhance relatedness by responding to students' emotions with empathy and autonomy by providing immediate assistance to students. However, the excessive reliance on AI may reduce autonomy when students begin to lack the capacity to manage emotions without the aid of technology, or when human relationships are substituted with AI interactions, there are questions about the actual relatedness of the interaction. More recently, SDT was used directly to investigate students' experiences of autonomy, competence, and relatedness within technology-rich contexts.

International Evidence Linking AI, Emotional Support, and Well-Being

Students and young adults are turning to AI conversational technologies, and the research now has a global presence, to reflect and express emotions, to keep company and to seek psychological assistance, beyond academic settings. There is mixed evidence, however, in relation to their general impact on well-being.

Experimental studies of technology-based journaling capture one aspect of this: conversational technologies can enable emotional disclosure and alter the effects of emotions. Sayis & Gunes (2024) conducted a study with undergraduate and graduate students comparing the technology-assisted journal writing with the regular journal writing, showing that the technology-assisted journal writing led to better mood and self-disclosure for the social-robot condition. This study did not directly explore the impact of generative AI or digital well-being, but rather uncovered that conversational technologies can have an impact on emotional processes more generally.

But longitudinal evidence further muddles the picture. To understand the effects of the modes of interaction and types of conversation between the chatbot and participants on the psychosocial outcomes of the conversation, Fang et al. (2025) conducted a randomized controlled study that involved 981 participants and more than 300,000 messages. The more people use the bots daily, they become lonelier, more dependent, more problematic, and less socially oriented with human beings – a clear indication that emotionally intuitive AI can have real dangers when use becomes excessive or when it begins to replace human interaction.

Similarly, Al-Zahrani's (2025) research on higher education students found that students were aware of the usefulness of chatbots, but they also knew that they would lose human connection. This is relevant to the university population in particular, as inter-personal relationships, belonging and social participation are key aspects of student well-being which is not only dependent on individual emotional regulation.

Overall, the international literature provides for a mixed reading. Emotional support via AI can be accessible, convenient, perceived as private, and allow for expressing emotion; the impact of emotional support via AI on students' broader well-being would likely be dependent on how they use it - moderate and purposeful use likely has positive implications, intensive or substitutive use could foster emotional dependence and diminish off-line social engagement. Most of this research, however, has been centered around depression, anxiety, stress, loneliness, or therapeutic outcomes, rather than on the larger construct of digital well-being and thus lends conceptual space for the current study.

Empirical Evidence from Pakistan

While the research on AI and student well-being in Pakistan is still in the early stages, some recent studies suggest that Pakistani

university students are gradually incorporating AI technologies into their day-to-day lives. This study aimed to explore the use of Artificial Intelligence (AI) tools, feelings of loneliness and emotion regulation in university students of Lahore and was conducted on 100 students (university students). The study was conducted on 100 university students from Lahore to examine the use of Artificial Intelligence (AI) tools, feelings of loneliness, and emotion regulation among university students. While the majority of participants used AI-generated tools daily, primarily for academic purposes, the study revealed no significant impact of AI use on loneliness, and there was mixed feedback regarding emotion regulation. It also highlighted the importance of not relying too heavily on AI and the potential impact this may have on social interaction and communication skills.

This finding undermines the notion that using AI always leads to psychological benefits. While AI can be helpful and convenient for students, the connection with emotional outcomes seems more complex. It also makes clear a distinction that should be made clear: AI use in the academic context and AI use for emotional support are different and may have implications for students' psychological and digital functioning that differ.

Further evidence comes from Qasim et al. (2025) who explored medical students' emotional and psychological reliance on AI chatbots in Pakistan with over a thousand valid responses. Overall, there was a high level of chatbot use, with about half of the chatbot users interacting with them daily, and moderate level of overall dependence and satisfaction as the largest predictor of dependence, followed by emotional expression, and psychological help-seeking. The respondents were limited to medical students, but the result still shows the existence of emotionally meaningful AI

interaction in the higher education system of Pakistan.

Research in Pakistan also shows links between digital experiences and student well-being. Junejo et al. (2022) examined 254 university students and found that social media weariness had a significant correlation with academic performance, learning attitudes, and subjective well-being - students who used social media excessively had lower scores on subjective well-being and academic performance. In line with the literature from Pakistan, Umber, Niazi, and Latif (2025) looked into the sleep and social-media consumption of students in Pakistani universities, where digital engagement has become a part of students' psychological and educational lives. This research, however, tends to focus on social media usage, smart phone usage, digital addiction or the general use of AI, not its emotional support role.

Relationship Between AI-Driven Emotional Support and Digital Well-Being

Most of the current literature is based on intervention studies or clinical trials, cross-sectional surveys or systematic reviews on mental health outcomes. The predictive power of AI emotional support on a multidimensional digital well-being measure in the context of a simple university-student survey design has been scarcely studied. A predictive cross-sectional design does just that and provides some helpful preliminary evidence of the association between the two constructs in a Pakistani context.

This distinction is worth making explicitly. When a student uses ChatGPT to summarize a lecture, he or she is involved in instrumental or Academic AI use. A student who discusses their loneliness, academic stress, interpersonal conflict, or emotional state with an AI system is engaging in a different type of use, emotionally oriented AI use. Care should be taken not to equate the two, and in this study only the latter is emphasized. Explore the potential

multifaceted role of AI-driven emotional support in digital well-being.

There are several mechanisms that could potentially link AI emotional support with digital well-being. The first is accessibility: students can access AI systems without needing an appointment, without geographical restrictions, and without the social judgment that might be attached to in-person assistance. This access could be beneficial to students as they navigate normal emotional issues and develop more positive digital experiences.

Emotional regulation is a second mechanism. That conversational interaction to express concern could generate reflection, cognitive reframing or problem solving, which are processes associated with emotional regulation, one of the elements in recent digital well-being frameworks. The focus here is not on the notion of chatbots or other AI tools taking the place of counseling, but rather on the ability of AI-powered emotional interaction to serve as a readily available supplementary tool for daily emotional needs.

A third mechanism runs through perceived control over digital experiences. If students use AI intentionally and selectively to respond to emotional issues, they might develop a sense of self-reliance and independence in their relationships with technology. Students selectively and intentionally using AI to handle emotional issues could view technology as a tool that is helping them to be more independent. However, students who use AI as their primary coping response to emotional discomfort could become more dependent on it and less self-regulated - especially given the evidence of emotional dependency and problem use as a consequence of high AI use.

The fourth mechanism relates to digital life balance and human connection. Emotional support has always been in the interpersonal realm. Students might receive emotional

support from AI and lower their engagement with human support systems, potentially leading to a sense of convenience and support without compromising the quality of their relationships with humans, as Al-Zahrani (2025) found with higher education students who appreciated the utility of chatbots but also were concerned about the potential loss of human interaction.

Considering these conflicting mechanisms, the connection between emotional support provided by AI and digital wellbeing is best approached as a research hypothesis, not a foregone conclusion that AI is necessarily a positive force. This study's novelty lies in exploring the relationship between increased engagement with AI for emotional support with increased digital well-being, while also examining the moderating effect of self-compassion. There are several gaps that need this study. While there are numerous studies on the relationship between the AI conversational agent and depression, anxiety, stress, and loneliness, the relationship between the AI conversational agent and the larger concept of digital well-being (balance, control, and healthy digital functioning) has been under-conceptualized and is not frequently explored; for example, a recent meta-analysis identified effects of the AI conversational agent on depression, but not on broader well-being outcomes after publication bias was controlled for. Existing research also tends to combine adolescents and young adults, or use clinical/medical-student samples, thus limiting the generalizability to undergraduates, and in Pakistan specifically, research did not include AI-driven emotional support as a predictor of digital well-being, but rather social media use, loneliness, and chatbot dependence. Most previous studies have adopted a narrow view of digital well-being, measuring it in terms of screen time or social media addiction, rather than a multidimensional perspective, and have used clinical or intervention designs, instead of a simple

survey-based measurement approach. Given the existing gaps in the literature, this study aims to fill the research void by evaluating the nature of emotional support provided through AI tools among the general undergraduate students in Pakistan through the application of the university student Digital Well-Being Scale in a predictive cross-sectional design.

From the literature reviewed, AI is rapidly becoming integral to students' academic, social, and emotional experiences. AI-based conversational agents have demonstrated potential for delivering emotionally and psychologically supportive services that are accessible to all, but with a mixed picture in terms of impact - it can be positive for some mental health outcomes, and problematic for others, including dependence, problem use, privacy, human connection and the inability of AI to respond with emotion.

Digital well-being has, however, evolved from a specific question into checking if individuals can have healthy, balanced, controlled, and meaningful relationships with digital technologies. The study of scale development conducted in recent years among the university students brings back to life the concept of digital well-being, encompassing various dimensions, including emotional regulation, digital balance, perceived control, responsible use, and digital dependence.

In the realm of Pakistani literature, there is growing evidence that university students are using AI and other digital technologies, with both positive and negative impacts emerging. AI usage has been researched with loneliness and emotion regulation in the Pakistani context, emotional and psychological dependence on chatbots, and the impact of social media on subjective well-being, which further validates the need to study digital engagement in Pakistan, specifically.

Despite this, there is still a definite gap. The existing literature has separated the streams of research related to AI and mental health, AI and emotional dependency, and digital technology and well-being. Not many studies have attempted to link them by asking if the emotional support provided by AI tools can predict digital well-being among undergraduate students, especially in Pakistan, thus the study targeted AI-driven emotional support as the predictor and digital well-being as the outcome. The study is guided, accordingly, by conceptual relationship AI-driven emotional support and digital well-being. This focused model is theoretically sound and empirically verifiable and can provide a platform for incorporating context-specific evidence from Pakistan in the rapidly expanding international literature on AI, student well-being, and digital mental health.

Research Methodology

Research Design

This study used a quantitative, cross-sectional, predictive-correlational research design (Creswell & Creswell, 2018) because there was no manipulation of the predictor variable (AI-driven emotional support) in this study, and the study aimed to determine whether it was a significant predictor of the outcome variable (digital well-being) at a single point in time. The relationship between both constructs could be tested empirically in accordance with the study objectives and the research questions, using the correlational and regression-based approach.

Population and Sample

The sample population of the study were the students at Graduate College affiliated with the University of Punjab in Pakistan. The respondents were 210 undergraduate students of four academic programmes (Psychology, Urdu, English and Education) who participated in the study by convenience sampling technique. They were aged 19-23

years and were selected from second and fourth semesters. The participation was voluntary and students were informed about the objective of instrument and gave consent. Inattentive responding was detected using an attention-check item within the questionnaire. Four of the participants (1.9%) did not pass this check and were not included in the analytic sample of 206 participants.

Instruments

Two instruments were used in the study. Emotional Support Scale (AIES) based on Artificial Intelligence (AI). The AIES is a 17-item, researcher-developed instrument created for this study to measure students' use of AI-based conversational technologies for emotional expression, perceived AI empathy, reassurance and support, coping assistance, and personal interaction. Each item was rated on a 5-point Likert scale (1 = very much disagree; 5 = very much agree) and the overall score for the AIES was calculated as the average of all 17 items. The researcher developed the instrument on the AIES pilot testing on 100 respondents before the final data collection and Digital Well-Being Scale (DWS) was adapted. The DWS (Appianing, Quansah, & Amoako, 2026) is a 41-item previously validated tool that examines six dimensions of digital well-being: Task Interference (TI), Digital Safety & Responsible Use (DSRU), Perceived Control & Satisfaction (PCS), Digital Life Balance (DLB), Emotional Regulation (ER), and Digital Dependence & Frustration (DDF). The rating was 4-point Likert scale. Items that were negatively worded were reverse coded for each of the subscales, Task Interference, Emotional Regulation, and Digital Dependence and Frustration, to yield an overall DWS total score with higher scores always indicating healthier digital well-being. The questionnaire gathered demographic and background information such as age, gender, academic year, academic program, and

frequency of AI use in addition to the two scales.

Data collection and data analysis procedure

A structured, self-administered online questionnaire was used for data collection, and questionnaires were sent to undergraduate students. Participants were asked to read an informed consent statement before filling out the questionnaire, and were assured of confidentiality, anonymity, and the voluntary nature of participation. The questionnaire contained demographic items, the AIES, the DWS, and one item on attention to filter out inattentive responses. Data collection was carried out for a period of time until the desired number of data points were obtained.

For the analysis of data, SPSS was used. Before hypothesis testing, the internal consistency of the AIES reliability was $\alpha .80$ and DWS reliability was $\alpha .86$ (and its subscales) was examined by calculating Cronbach's alpha at values of $\alpha \geq .70$ which were considered as the minimum acceptable level (Nunnally, 1978). To address Research Question 1, descriptive statistics (means, standard deviations and ranges) were computed for all scale scores. Pearson

product-moment correlation was calculated to look at the bivariate relationship between AIES and DWS total scores in order to address Research Question 2, followed by a simple linear regression with AIES as the predictor variable and DWS total as the criterion variable with R , R^2 , adjusted R^2 , regression ANOVA, and standardized and unstandardized coefficients reported (Creswell & Creswell, 2018). As a supplementary exploratory analysis, a one-way ANOVA was conducted to determine if there was a significant difference between the scores for the four academic programs in AIES. An alpha level of .05 was used for all significance tests.

Ethical Considerations

The study followed the ethical rules for conducting studies with human subjects. All the participants were completely voluntary, and informed consent was obtained before the data were gathered. All participants were informed that their answers would be anonymous and kept confidential and would only be used for research. There was no personal identification information gathered.

Results and Findings

This analysis reports the statistical results for the study's two research questions

Table 1: *Demographic Profile of Respondents*

Variable	Category	N	%
Gender	Female	110	53.4
	Male	96	46.6
Academic Year	2nd Semester	88	42.7
	4th Semester	118	57.3
Program	Psychology	51	24.8
	Urdu	51	24.8
	English	53	25.7

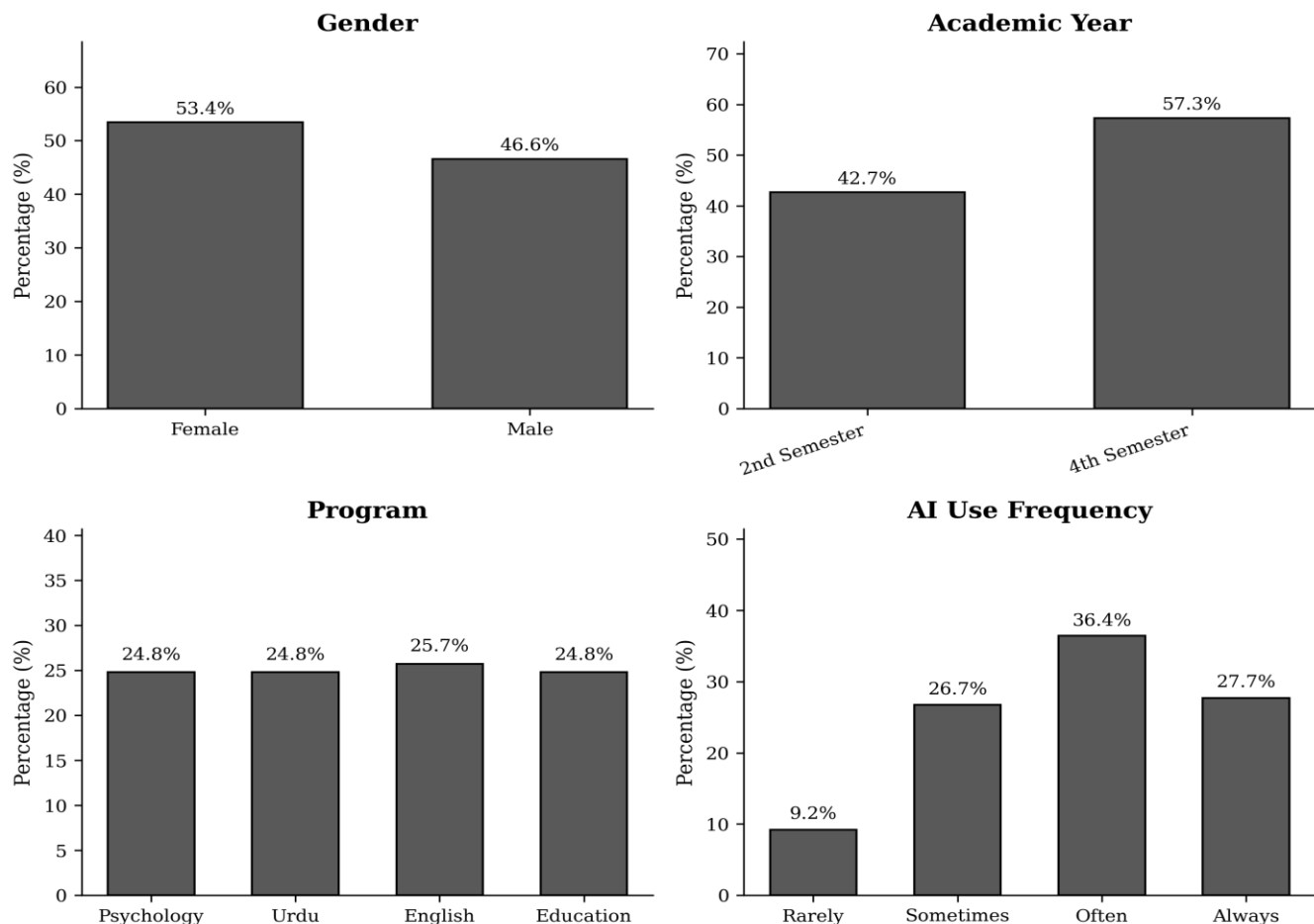
Variable	Category	N	%
AI Use Frequency	Education	51	24.8
	Rarely	19	9.2
	Sometimes	55	26.7
	Often	75	36.4
	Always	57	27.7

Note. $N = 206$.

Table 2 showed the demographic profile of the 206 participants included in the final analysis. Female students' participation was more (53.4%), than males' students and most respondents were fourth-semester students (57.3%) rather than second semester

(42.7%). The four academic programs were represented in roughly equal numbers, and AI use frequency skewed toward regular users: more than half of respondents reported using AI tools often or always.

Figure 2: Demographic Characteristics of Participants



Note. Bars represent the percentage of participants ($N = 206$) in each category across gender, academic year, program, and AI use frequency.

Group Comparison by Academic Program

Table 2: Mean AIES Scores by Academic Program

Program	N	M	SD
Education	51	3.33	0.70
English	53	3.34	0.72
Psychology	51	3.43	0.68
Urdu	51	3.17	0.72

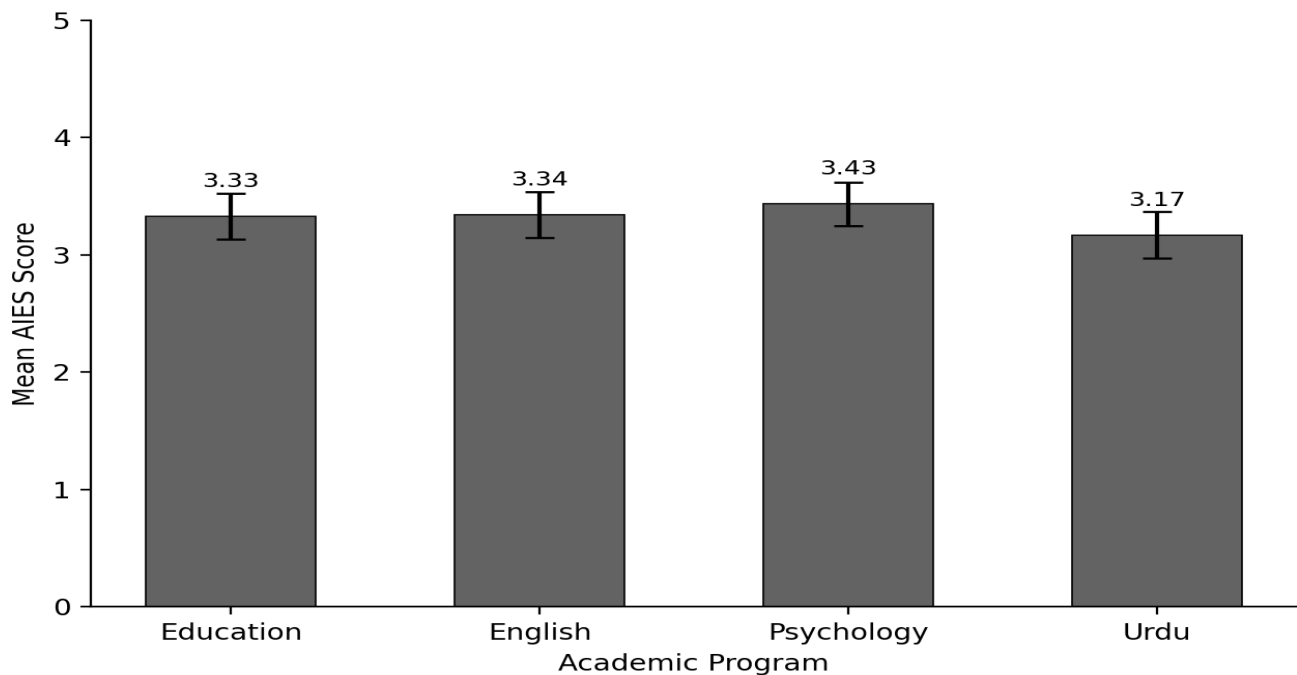
Mean AIES scores were similar across all four programs. Scores ranged from 3.17 (Urdu) to 3.43 (Psychology). This small variation aligns with the non-significant ANOVA result.

Table 3: One-Way ANOVA of AIES Scores by Academic Program

Source	SS	Df	MS	F	P	η^2
Between groups	1.84	3	0.61	1.23	.299	.018
Within groups	100.42	202	0.50			
Total	102.26	205				

The results indicated no statistically significant difference in AIES scores across academic programs, $F(3, 202) = 1.23$, $p = .299$, $\eta^2 = .018$. Program association accounted for approximately 1.8% of the variance in scores.

Figure 3: Mean AIES Score by Academic Program with 95% Confidence Intervals



Note. $p = .299$ ($p > .05$).

No statistically significant mean difference in AI-driven emotional support turned up among students of the four academic

programs, $F(3, 202) = 1.23$, $p = .299$, $\eta^2 = .018$.

Level of AI-Driven Emotional Support and Digital Well-Being (Research Question 1)

Table 5: *Descriptive Statistics for AIES and DWS Scales*

Scale	N	M	SD
AI-Driven Emotional Support (AIES)	206	3.32	0.71
Task Interference (TIF)	206	2.27	0.72
Digital Safety and Responsible Use (DSR)	206	2.90	0.72
Perceived Control and Satisfaction (PCS)	206	2.82	0.70
Digital Life Balance (DLB)	206	2.61	0.72
Emotional Regulation (ERG)	206	2.19	0.74
Digital Dependence and Frustration (DDF)	206	2.12	0.77
Digital Well-Being — Total (DWS)	206	2.78	0.70

Note: ($N = 206$)

As in the above table showed that students reported a moderate level of AI-driven emotional support ($M = 3.32$, $SD = 0.71$, on a 1–5 scale), which answers Research Question 1. Students also reported a moderate overall level of digital well-being ($M = 2.78$, $SD = 0.70$, on a 1–4 scale). Emotional Regulation difficulties ($M = 2.19$) and Task Interference ($M = 2.27$) were the lowest-scoring DWS domains, while Digital Safety and Responsible Use ($M = 2.90$) was the highest-scoring domain.

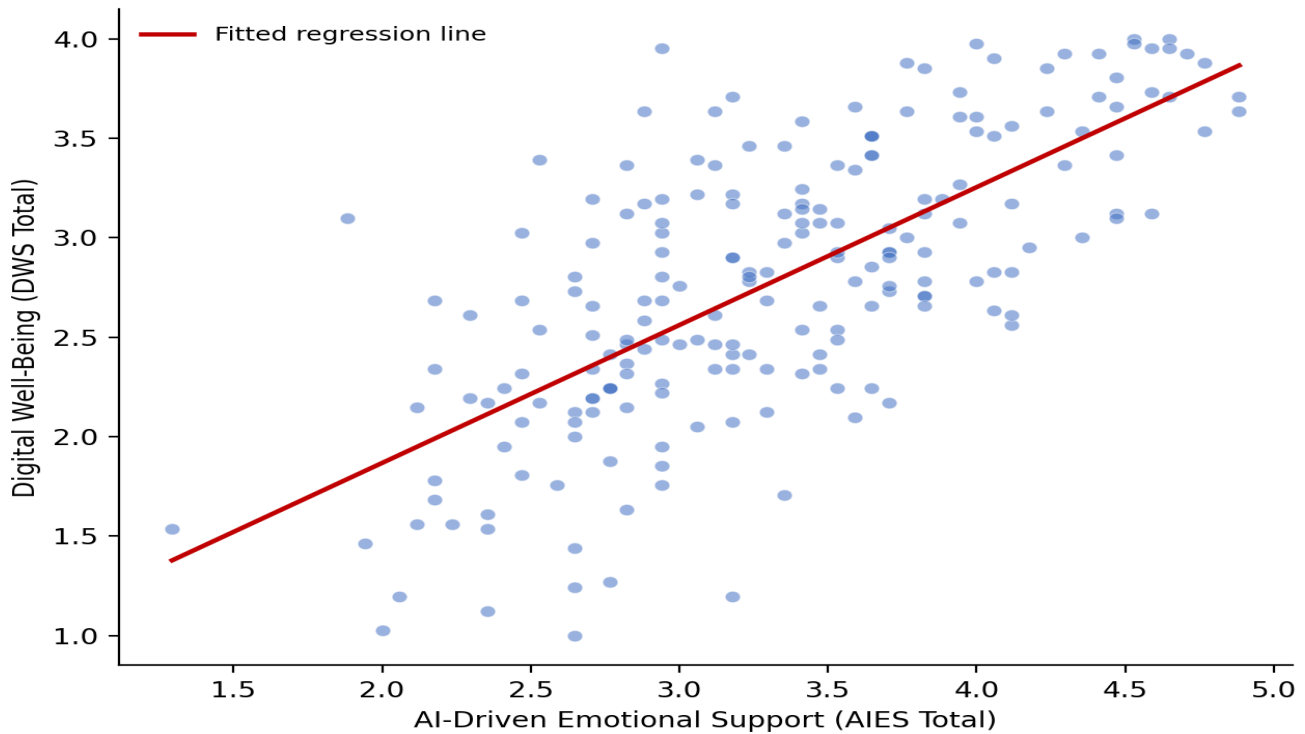
Relationship Between AI-Driven Emotional Support and Digital Well-Being (Research Question 2)

A Pearson correlation was calculated to examine the relationship between AI-driven emotional support (AIES) and overall digital well-being (DWS total), and the following null hypothesis was tested.

H0: *There is no significant relationship between AI-driven emotional support and digital well-being among undergraduate students.*

Table 6: *Pearson Correlation Between AIES and DWS Total*

Variable Pair	r	df	p
AIES Total — DWS Total	0.70	204	< .001

Figure 4: Scatterplot of AIES Total and DWS Total with Fitted Regression Line

Note. Each point represents one participant. $p < .001$ ($p < .05$).

The null hypothesis was rejected. A statistically significant, positive, strong correlation was found between AIES and DWS total scores, $r(204) = .70$, $p < .001$. As shown in Figure, students who reported greater emotional support from AI chatbots also reported meaningfully higher overall digital well-being ($r^2 \approx .49$).

A simple linear regression was conducted to determine whether AI-driven emotional support (AIES) significantly predicted overall digital well-being (DWS total). The following null hypothesis was tested.

H0: AI-driven emotional support (AIES) does not significantly predict digital well-being (DWS total) among undergraduate students.

Regression Analysis

Table 7: Regression Model Summary (Predictor: AIES; Outcome: DWS Total)

R	R ²	Adjusted R ²	SE of the Estimate
0.70	0.488	0.486	0.502

AIES accounts for roughly 48.8% of the variance in students' digital well-being ($R^2 = .488$, adjusted $R^2 = .486$).

Table 8: ANOVA for the Regression Model

Source	SS	Df	MS	F	P
Regression	49.17	1	49.17	194.70	< .001
Residual	51.51	204	0.25		
Total	100.67	205			

Table 9: Regression Coefficients

Predictor	B	SE	B	T	p
(Constant)	0.481	0.169	—	2.85	.005
AIES Total	0.693	0.050	0.70	13.96	< .001

Note. $p \leq .001$ B = unstandardized coefficient; SE = standard error; β = standardized coefficient.

The null hypothesis was rejected. The overall regression model was statistically significant, $F(1, 204) = 194.70$, $p < .001$, $R^2 = .488$, which means AIES is a strong predictor of DWS total and answers Research Question 2. For every one-unit increase in AIES score, DWS total is predicted to rise by 0.693 units ($B = 0.693$, $\beta = .70$, $t(204) = 13.96$, $p < .001$).

Discussion

The two research questions were: How much students rely on AI for emotional support, and Does emotional support from AI predict students' digital well-being?

Regarding research question 1, students indicated an average score of 3.32 ($SD = 0.71$) on a scale of 1 to 5, with 5 being high and 1 being low, on emotional support from AI. The results are consistent with previous Pakistani studies, which found that students are already using AI tools for various purposes in their daily lives, including as a source of emotional support, but not always as a main or heavy emotional support (Fatima, 2026). The moderate mean indicates that students in this sample use AI in emotionally meaningful ways most of the time, for instance, seeking reassurance and reflection from AI chatbots, but does not suggest that students in this sample use AI independently to an extraordinarily high degree, as has been reported for some international samples (Fang et al., 2025), or that students in Pakistan specifically use AI to a high degree (Qasim et al., 2025). This is a significant point: the current sample of general undergraduate students (Psychology, Urdu, English, and Education) does not seem to use AI for emotional support to the extent or with

the same intensity as more specialized or high-risk groups like medical students.

This study investigates how AI-driven emotional support can predict digital well-being. This research explores the potential of AI-based emotional support in predicting digital well-being.

Regarding Research Question 2, the main result of this study was that AI emotional support was a significant and strong predictor of digital well-being, $r(204) = .70$, $p < .001$, $R^2 = .488$. Students who indicated that AI chatbots provided them with more emotional support had significantly better overall digital functioning, including emotional regulation, digital life balance, perceived control, responsible use, and freedom from problematic digital dependence.

This discovery builds upon and expands upon literature. On the other hand, it matches previous studies indicating that AI conversational agents have the potential to offer meaningful psychological support (Li et al., 2023) and that, given the accessibility and emotional-regulation mechanisms described in the literature review, students could interact with AI whenever they want, and it would help them deal with daily emotional issues. There is also some support for a Self-Determination Theory interpretation here, as students' feelings of relatedness may be fostered by the strength of the association, and when done on purpose, by their autonomy over digital and emotional life.

Conversely, the study contradicts studies which focus on the dangers of AI companionship. Results from Fang et al. (2025) revealed that an increase in daily

chatbot use was related with loneliness and problematic use, while Fatima (2026) concluded that there was no positive impact of AI use and loneliness in Pakistani students. One possible explanation for this seeming paradox is conceptual: while this present study did not measure the frequency of or intensity of the use, it did measure the perceived quality and emotional support of the interaction in the role of AI, namely emotional expression, perceived empathy, reassurance, coping assistance, and personal interaction. Emotionally supportive and purposeful AI interactions may have a positive correlation with positive aspects of digital well-being, while excessive or compulsive interaction, whether emotionally supportive or not; may have a negative correlation with digital well-being. This finding aligns with the literature's claim that the impact of AI emotional support on students' digital well-being cannot be taken for granted and is contingent on how the students use the technology.

An R^2 of .488 indicates that the predictor accounts for a moderately substantial share of the variance, and this relationship should still be interpreted with some caution and over half of the variance in digital well-being is not accounted for by this single predictor. Presumably, offline social support, academic stress, general screen time, and individual differences in self-regulation play an important role here as well, following the multi-dimensional framework of digital well-being outlined by Appianing et al. (2026). Discover how students' academic programs influence their group differences.

The supplementary analysis did not reveal a significant difference in the AI-generated emotional support between the four academic programs, $F(3, 202) = 1.23$, $p = .299$, $\eta^2 = .018$. This indicates that students' reliance on AI for emotional support is more or less similar across subjects (Psychology, Urdu, English, and Education), rather than being heavily influenced by their subject. This

is broadly in line with the perspective that emotional support through AI is not discipline-specific but rather a result of psychological and behavioral tendencies that are unique to everyone, including, for example, comfort with self-disclosure, loneliness or overall digital engagement.

Recommendations

1. There is a strong connection between AI-supported emotional assistance and digital mental health, highlighting the possibility of using such tools in an effective and supportive way as an adjunct to university affiliated college counseling centers and student-wellness services to assist students in their day-to-day emotional needs.
2. Universities and developers of educational technologies should encourage purposeful and intentional uses of AI (such as structured coping or reflection prompts) instead of high-frequency and open-ended companionship-style use because international literature indicates that high-frequency or substitutive use may be associated with a different and potentially adverse relationship to well-being.
3. Institute should provide the Emotional support by AI is now an observable part of the digital lives of students in different disciplines, digital-literacy and well-being courses at the undergraduate level should include statements on healthy AI engagement in addition to other digital-wellness issues, like screen time, social media, and dependence on the smartphone.
4. Longitudinal or experimental design should be used in future studies to determine if the relationship between emotional support via AI and digital well-being is causal and if the direction is reversed or not.
5. Future research should add other variables that are likely to be associated with digital well-being as predictors in the

predictive model, allowing for a more robust explanatory model as AIES only accounted for less than half of the variance in this study.

6. Further studies are recommended in which the study is carried out on a larger and more representative sample of Pakistani undergraduate students for generalization of the results as it is limited to few disciplines, academic years and affiliated institutions in this study.

Conclusion

The study aimed to measure the extent to which Pakistani undergraduate students seek emotional assistance from AI and measure the relationship between the emotional support they receive from AI and their digital wellbeing, using a sample of 206 students from Psychology, Urdu and English disciplines. It does: students rated the AI emotional support as moderate and this factor was a significant, strong predictor of digital well-being, accounting for almost half the variation in students' overall scores. A supplementary analysis revealed that there were no significant differences in the experiences of emotional support when

utilizing AI across academic programs, indicating a similar experience of emotional support across disciplines when using AI.

Most existing research on AI conversational agents has focused on clinical mental-health outcomes such as depression, anxiety, and loneliness. In this study, the broader, multidimensional construct of digital well-being was measured and the interaction of AI with students in Pakistan was found to be meaningfully correlated with digital well-being. The cross-sectional design does not imply a causal effect of this relationship in the presented study.

The greater usage of AI conversational technologies as a normal aspect of students' life will require educators, counsellors and policy makers to have a more nuanced understanding of how this type of use contributes to the overall digital well-being of students. This study is a preliminary contribution to this depiction of Pakistani higher education based on a set of data. It could be expanded with larger representative samples, and with additional predictors using a longitudinal design.

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The author declared no potential conflicts of interest with respect to research.

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