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CHATBOTS AS COMPANIONS? A CORRELATIONAL STUDY OF AI USAGE AND LONELINESS AMONG UNIVERSITY STUDENTS

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Abstract: *This study examines the relationship between AI chatbot usage and loneliness among public university students, with a focus on how students engage with chatbots such as ChatGPT for emotional and academic support. The research is motivated by the growing integration of AI into students' daily routines and increasing concerns about emotional isolation in higher education. A quantitative research design was employed. Data were collected from 160 public university students using a structured questionnaire comprising the Chatbot Usability Questionnaire (CUQ) and the University of California, Los Angeles (UCLA) Loneliness Scale Version 3. The data were analysed using the Statistical Package for the Social Sciences (SPSS), and Spearman's rho correlation was applied to assess the association between chatbot use and loneliness. Findings revealed a non-significant correlation between chatbot usage and loneliness. This indicates that chatbot engagement does not significantly interact with loneliness levels among students. While chatbots may provide temporary emotional engagement, they appear insufficient in addressing deeper experiences of social or emotional isolation. The study highlights that AI chatbots should be viewed as a complement rather than a substitute for genuine human interaction. The findings carry implications for educators, mental health professionals, and technology developers, particularly in enhancing digital support systems within higher education. Future research is encouraged to explore how chatbot design and functionality may influence emotional well-being outcomes.*

Keywords: *AI Chatbot, Loneliness, Public University Students, ChatGPT*

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Introduction

Recent advances in artificial intelligence (AI) have enabled new forms of digital interaction, with chatbots becoming increasingly integrated into students' academic and emotional lives. Tools such as ChatGPT provide convenience and immediate engagement but raise concerns regarding their potential impact on psychological well-being, particularly loneliness. Although AI chatbots are widely used in higher education, limited research has examined their emotional consequences. This study addresses that gap by investigating whether chatbot use has any association with loneliness specifically among public university students.

AI chatbots are especially appealing to students who experience academic, social, or emotional difficulties due to their accessibility and ability to simulate human-like dialogue. Globally, loneliness has become a growing concern among university students, often linked to the transition to adulthood, academic stress, and limited social support (Arslan, 2021). University life involves significant responsibilities and life-changing decisions that can heighten stress and emotional vulnerability (Sverdlik et al., 2022). In the meantime, AI chatbots have gained popularity for their academic and emotional functions, offering immediate feedback, personalised explanations, and writing assistance (Labadze et al., 2023). Higher education institutions increasingly adopt AI applications to improve learning outcomes and provide cost-efficient support systems (Gill et al., 2024). These developments highlight the relevance of exploring how such tools may influence students' emotional experiences.

Despite their benefits, questions remain about the psychological consequences of chatbot use. Some students describe chatbots as helpful companions during stressful periods, reporting reduced loneliness and anxiety (Kim et al., 2025). Despite that, concerns persist that reliance on chatbots may diminish face-to-face social engagement and reinforce emotional dependence. For example, Fang et al. (2025) found that while voice-based chatbots initially alleviated loneliness, excessive use was associated with greater emotional disconnection over time. These findings highlight the need for empirical research that clarifies the relationship between chatbot use and loneliness in higher education. The present study examines the relationship between AI chatbot usage and loneliness among public university students. The study contributes evidence to inform educators, mental health professionals, and technology developers about the role of AI tools in relation to student well-being.

Literature Review

AI Chatbot Usage

AI chatbot usage refers to the frequency and purposes of students' interactions with conversational AI tools such as ChatGPT. These chatbots simulate human-like conversations and provide support in areas such as learning, problem-solving, and emotional assistance (De Medio et al., 2019; Vaidyam et al., 2019). In the university context, students often use chatbots to generate ideas, clarify concepts, or seek companionship during periods of stress. Usage can be examined from three perspectives: behavioural usage that is referring to the frequency and purpose of using the platform; cognitive usage such as perceived usefulness and reliability of the platform; and emotional usage like one's feelings during or after interaction (Davis, 1989; De Medio et al., 2019; Vaidyam et al., 2019).

This communicative AI chatbots are among the most common forms of human-computer interaction, enabled by natural language processing to simulate meaningful dialogue (Adamopoulou & Moussiades, 2020; Gupta et al., 2020). Recent advances, including ChatGPT

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and Woebot, have allowed for more context-sensitive and emotionally responsive interactions. Their integration into daily life spans education, mental health, and business, where they provide academic support, reminders, and even therapeutic engagement (Kuhail et al., 2022; Gupta et al., 2023). In higher education, students increasingly use chatbots for both academic help and emotional reassurance. Studies show individuals may disclose personal feelings more freely to AI, perceiving it as non-judgmental and available around the clock (Prochaska et al., 2021; Giray, 2024). However, concerns remain regarding ethical risks, privacy, and the inability of chatbots to genuinely comprehend or replace human emotions (Zhai et al., 2024; Dergaa et al., 2024).

Loneliness

Loneliness is defined as a subjective emotional experience that occurs when an individual perceives a gap between desired and actual social connections. It is not simply about being alone, but about feeling emotionally disconnected from others (Vincenzi & Grabosky, 1987). Among university students, loneliness can arise from difficulties forming close friendships, adjusting to new environments, or managing academic stress, particularly when distant from family support (Hawkley & Cacioppo, 2010; Cacioppo & Hawkley, 2009). It includes emotional, behavioural, and cognitive dimensions, such as sadness and emptiness, withdrawal from social situations, and negative self-perceptions. Loneliness has been linked to poor sleep, reduced focus, and increased risk of depression, ultimately affecting academic performance (Hawkley & Cacioppo, 2010).

Loneliness is defined as the perceived gap between desired and actual social relationships (Perlman & Peplau, 1981). It is not mere isolation but a subjective dissatisfaction with the quality of connections. Weiss (1975) distinguishes between emotional loneliness (absence of close attachment) and social loneliness (lack of group belonging). University students often face loneliness due to relocation, academic stress, and challenges in forming new networks (Diehl et al., 2018). Loneliness is associated with depression, anxiety, reduced academic focus, and poorer health outcomes (Richardson et al., 2017). Although online communication can sustain contact, it often lacks the depth of face-to-face interaction, leaving students emotionally unfulfilled (Twenge et al., 2021).

AI Chatbot Usage and Loneliness

Research indicates chatbots may temporarily reduce loneliness by simulating empathy and companionship (Vaidyam et al., 2019; Ho et al., 2018). Their consistent and judgment-free responses allow users to feel supported, particularly those lacking close social ties. However, heavy reliance may hinder real-world interactions, reinforcing long-term loneliness (Ho et al., 2018; Fang et al., 2025). Two theories frame this relationship. Attachment Theory (Bowlby, 1969) could explain when individuals form pseudo-attachments with chatbots, treating them as secure emotional substitutes during stress (Kim et al., 2025). Cognitive Discrepancy Theory of Loneliness (Perlman & Peplau, 1981) highlights loneliness as a mismatch between desired and actual relationships. Chatbots may help bridge this perceived gap temporarily, but without reciprocity, the underlying loneliness may persist (De Freitas et al., 2024).

Methodology

This study employed a quantitative correlational design to examine the relationship between AI chatbot usage and loneliness among public university students in Malaysia. A structured, self-administered questionnaire was used to collect data, which were analysed using the Statistical

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Package for the Social Sciences (SPSS). Spearman's rho correlation was conducted to assess the association between chatbot usage and loneliness.

Participants and Sampling

The target population was undergraduate students enrolled in Malaysian public universities. Due to time and access constraints, convenience sampling was employed. Participants were recruited via online platforms (Google Forms shared through Telegram, WhatsApp, and Instagram) and in-person distribution of QR codes on campus. A total of 160 valid responses were collected. While Krejcie and Morgan's (1970) table suggests 384 respondents for large populations, Roscoe (1975) notes that samples exceeding 100 are adequate for some research. The sample included students from diverse programs and institutions, representing a range of academic and social backgrounds.

Instruments

The questionnaire consisted of three sections which are Section A: Demographics Details of Respondents; Section B: Chatbot Usability Questionnaire (CUQ); and Section C: UCLA Loneliness Scale. In Section A, there are two items that identified the respondent's university and most frequently used chatbot (e.g., ChatGPT, Character AI). Meanwhile, the Chatbot Usability Questionnaire (CUQ) consists of 16 items adapted from Holmes et al. (2019) which measured usability across clarity, responsiveness, and interaction quality. Responses used a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Scores were classified as low (16–44), moderate (45–72), or high (73–100). The last section of UCLA Loneliness Scale consists of 20 items developed by Russell (1996) which assessed subjective feelings of loneliness on a 4-point Likert scale (1 = never, 4 = always). Scores ranged from low (20–40), moderate (41–60), to high (61–80).

Data Collection and Data Analyses

Prior to full distribution, the questionnaire was pilot tested with a small group of students to ensure clarity. Data were then collected through Google Forms, disseminated online and offline. Participation was voluntary, and no incentives were provided. To improve response rates, a reminder was sent one week after initial distribution. Responses were exported from Google Forms into SPSS for data analyses to fulfil research objectives. Descriptive analyses summarised demographic characteristics, chatbot usage, and loneliness levels. An inferential analysis of Spearman's rho correlation was conducted to determine the relationship between AI chatbot usage and loneliness.

Results

Reliability Analysis

The instruments used in this study demonstrated satisfactory internal consistency. The Chatbot Usability Questionnaire (CUQ) produced a Cronbach's alpha of .749 across 16 items, indicating acceptable reliability. The UCLA Loneliness Scale showed a Cronbach's alpha of .883 across 20 items, reflecting high reliability. These values suggest that both instruments were consistent measures of their respective constructs (Table 1).

Table 1: Reliability Analysis

Instrument	Cronbach's alpha	N
CUQ	.749	16
UCLA Loneliness Scale	.883	20

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Descriptive Statistics

Demographic details analysis revealed most respondents were from public universities geographically bound in the state of Selangor. ChatGPT was the most frequently used chatbot (72%), followed by Character AI (18%) and other platforms (10%). Analysis of chatbot usage revealed that most students (93.8%) reported a moderate level of use, with only 3.1% each in the low and high categories. Regarding loneliness, most students (72.5%) reported moderate levels, while 15.6% reported low levels and 11.9% reported high levels (Table 2). These findings suggest that both chatbot usage and loneliness were generally experienced at moderate levels among the sampled public university students.

Table 2: Distribution of Chatbot Usage and Loneliness Levels

Variable	Levels	N	Percentage (%)
Chatbot Usage	Low	5	3.1
	Average	150	93.8
	High	5	3.1
	Total	160	100
Loneliness	Low	25	15.6
	Average	116	72.5
	High	19	11.9
	Total	160	100

Inferential Statistics

A Spearman's rho correlation was conducted to test the relationship between chatbot usage and loneliness. The results indicated a very weak positive correlation (r = .092, p = .249), which was not statistically significant (Table 3). This finding suggests that chatbot usage was not meaningfully associated with students' loneliness levels, and therefore the Null hypothesis of no association between these two variables was retained.

Table 3: Correlation Analysis between AI Chatbot Usage and Loneliness

	Loneliness		
	Correlation coefficient	Sig. (2-tailed)	N
AI Chatbot Usage	.092	.249	160

Discussion

The purpose of this study was to examine the relationship between AI chatbot usage and loneliness among public university students in Malaysia. Using Spearman's rho correlation, the analysis showed a very weak, non-significant relationship between the two variables. This finding suggests that while chatbots are frequently used for academic and informational purposes, they do not meaningfully influence students' experiences of loneliness.

Most students reported moderate chatbot use, with very few at the extremes of low or high use. This pattern aligns with Malik et al. (2021), who found that students typically engage with chatbots for convenience and academic efficiency rather than for continuous or emotionally driven interaction. Similar observations were made by Cevher and Yıldırım (2023), who noted that limited personalisation and emotional depth reduce sustained engagement. Concerns over privacy and authenticity may also contribute to restrained use as discussed by Ciechanowski et al. (2019).

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Most students in this study reported moderate levels of loneliness, reflecting patterns observed in prior research on higher education populations (Diehl et al., 2018; Vasileiou et al., 2019). Moderate loneliness may be linked to students' limited access to consistent emotional and social support during their university years. As Vasileiou et al. (2019) highlights, a sense of belonging and informal social connections are vital in alleviating loneliness, while reduced opportunities for such engagement contribute to ongoing emotional strain.

The absence of a significant correlation indicates that chatbot use does not substantially has a link to loneliness. While chatbots provide a degree of interaction, their lack of emotional intelligence and reciprocity limits their ability to meet students' socio-emotional needs (Ho et al., 2018; Ciechanowski et al., 2019). This supports findings that although chatbots can offer temporary comfort, they cannot replicate authentic human connection (Diehl et al., 2018; Vasileiou et al., 2019). These findings highlight that AI chatbots should be integrated into higher education primarily as tools for academic and informational support rather than as substitutes for human interaction. For educators and mental health professionals, the results emphasise the importance of fostering peer networks, extracurricular involvement, and social opportunities to address student loneliness. For developers, the study underscores the need to design chatbots with enhanced emotional responsiveness as a complement, not a replacement, for real relationships.

Several limitations exist in this present study. The use of a correlational design prevents causal inference, and reliance on self-reported survey data may introduce bias. The relatively small, convenience-based sample, drawn to specific demographic details such as public universities and certain states in Malaysia only, also limits generalisability. Future research should adopt mixed methods approaches to explore the emotional dimensions of chatbot interactions more deeply and expand sampling to include private and international institutions. Additionally, potential mediators such as social anxiety, attachment styles, or real-world social support should also be explored in future research. This may provide new insights when examining how chatbot use and loneliness change over time. Overall, while AI chatbots can serve as useful tools for academic and informational purposes, they should not be viewed as replacements for genuine human connection. Instead, they are best positioned as complementary digital supports within higher education, with student well-being continuing to rely on authentic peer and community relationships.

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