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Enhancing mental health support for students through AI-powered chatbot: a systematic literature review

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ABSTRACT

Rising global mental health challenges among students are met with significant barriers to care, including stigma, cost, and limited access, which often deter help-seeking. AI-powered chatbots have consequently emerged as a promising, scalable digital intervention to bridge this treatment gap. This systematic review examines the extent to which these chatbots can enhance both access to and the quality of mental health support for students hesitant to engage with conventional services. Adhering to PRISMA guidelines, a comprehensive search of academic databases yielded 500 records; after systematic screening, 37 studies met the inclusion criteria. Data on study design, participant demographics, chatbot interventions, and outcomes were extracted and synthesized using thematic analysis. The findings indicate that chatbots significantly improve accessibility by offering 24/7, confidential, and nonjudgmental support, effectively reducing stigma and enabling early intervention. Several studies reported quantitative reductions in symptoms of depression, anxiety, and stress, while qualitative insights revealed that students particularly value features like casual interaction styles and anonymity. However, limitations persist, including a lack of profound empathy, occasional inconsistent responses, and challenges in cultural and linguistic adaptation. In conclusion, AI chatbots demonstrate strong potential as adjunctive tools in student mental health, especially for those with mild to moderate symptoms. They are best positioned not as replacements for human counselors, but as complementary components within a stepped-care model. For sustainable implementation, future development must prioritize robust ethical safeguards, greater personalization, and seamless integration with established professional services to ensure safe and effective support.



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Introduction

Student mental health is now becoming a global crisis. Recent data shows that 35% of students worldwide struggle with serious symptoms of depression or anxiety (World Health Organization, 2022). This rate is even higher than general population, largely because students face many stressors including academic pressure, financial worries, social isolation, and the challenges of early adulthood (Auerbach et al., 2018). Even more concerning, most of these students never get help. They are often held back by stigma, fears about privacy, cost, and a simple lack of available and accessible counseling service (Aguirre Velasco et al., 2025; Auger et al., 2018).

The COVID-19 pandemic made this existing problem much worse. It significantly increased levels of stress and anxiety among students, just as it forced school and universities to shut down the face-to-face mental health services (Kang et al., 2020; Suranata et al., 2021; Wang et al., 2020). Ironically, this difficult situation sped up the adoption of digital mental health tools (Giordano et al., 2022; Ifdil et al., 2020; Suranata et al., 2021). Among these new technologies, AI-powered chatbots have become a particularly promising option. They provide a unique form of support that is scalable, available 24/7, anonymous, and free from the judgment that often discourages students from seeking help (Casu et al., 2024; Fitzpatrick et al., 2017).

Early chatbots like Woebot and Wysa, which followed pre-programmed rules have already shown effectivity in reduce symptoms of depression and anxiety (Fitzpatrick et al., 2017; Inkster et al., 2018). Now, the emergence of more advanced large language models (LLMs) suggests a new generation of chatbots that can understand context and converse more naturally and potentially enhancing user engagement and perceived empathy. However, the integration of AI chatbots into student mental health services is not without significant challenges and unanswered questions.

Key concerns remain about whether these tools can truly understand complex human emotions, handle sensitive ethical issues like data privacy, or manage a student in crisis effectively (Meady et al., 2025; Warriar et al., 2023). There are also doubts about their ability to provide genuinely personalized support that grow with the user over time (Torous et al., 2018). Furthermore, many of these chatbots function as standalone tools, disconnected from a school and university broader support network. This often creates confusion about how escalate a serious problem and how they should work alongside traditional counselling services (Gaffney et al., 2019).

While previous systematic reviews have explored digital mental health tools in general, they often miss a key group: students who are hesitant or unable to seek traditional face-to-face counseling. There isn't a clear picture of how well AI chatbots actually work for this specific demographic. This population represents a critical target for innovative support solutions. The novelty of this review lies in its targeted focus on this underserved group and its synthesis of evidence not only on clinical outcomes but also on implementation factors, usability, acceptability, ethical considerations, and integration models that are crucial for real-world deployment within academic institutions.

Therefore, this systematic literature review seeks to address a pivotal question: To what extent can AI chatbots enhance access and quality of mental health support for students reluctant to engage in direct counseling? By critically appraising and synthesizing the existing evidence, this review aims to inform school counselor, university administrators, mental health professionals, and technology developers on the potential, limitations, and future directions of AI-powered support systems in bridging the mental health care for students.

Method

Review Protocol and Guidelines

This systematic literature was conducted by following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline to ensure a comprehensive and transparent reporting process.

Search Strategy

A comprehensive search was conducted in March 2025 across three major electronic databases including Semantic Scholar, PubMed, and Scopus. The search strategy was designed to capture studies at the intersection of AI chatbots, student populations, and mental health. Systematic search conducting on the literature has been published in 2020 – 2025 by using several key terms and Boolean operators including “AI chatbot OR conversational agent OR digital counselor) AND (student OR university OR school OR adolescent) AND (mental health OR depression OR anxiety OR stress OR well-being)”.

Eligibility Criteria

Studies were selected based on the following pre-defined criteria. (1) population are students in secondary, high school, or university settings, (2) intervention are AI-powered chatbots, including both rule-based systems and those utilizing large language models (LLMs), (3) the outcomes are measures accessibility, usability, efficacy, or mental health outcomes (e.g., symptoms of depression, anxiety, stress), (4) focus on students who demonstrated reluctance or faced barriers to accessing traditional, face-to-face counseling, (5) the studies are empirical studies including experimental, quasi experimental, qualitative, and mixed-method designs, as well as systematic reviews. Studies were excluded if they were case reports, editorials, or opinion pieces, if they did not focus on a student population, or if the intervention lacked an AI-driven component.

Study Selection Process

The initial database search yielded 500 records. After removing 120 duplicates, the titles and abstracts of 380 articles were screened for relevance. This screening excluded 305 records that did not meet the inclusion criteria. The full texts of the remaining 75 articles were thoroughly assessed for eligibility, resulting in the exclusion of 38 studies that did not fully meet the criteria upon closer examination. A total of 37 studies were included in the final synthesis. The entire selection process is detailed in a PRISMA flow diagram (Figure 1).

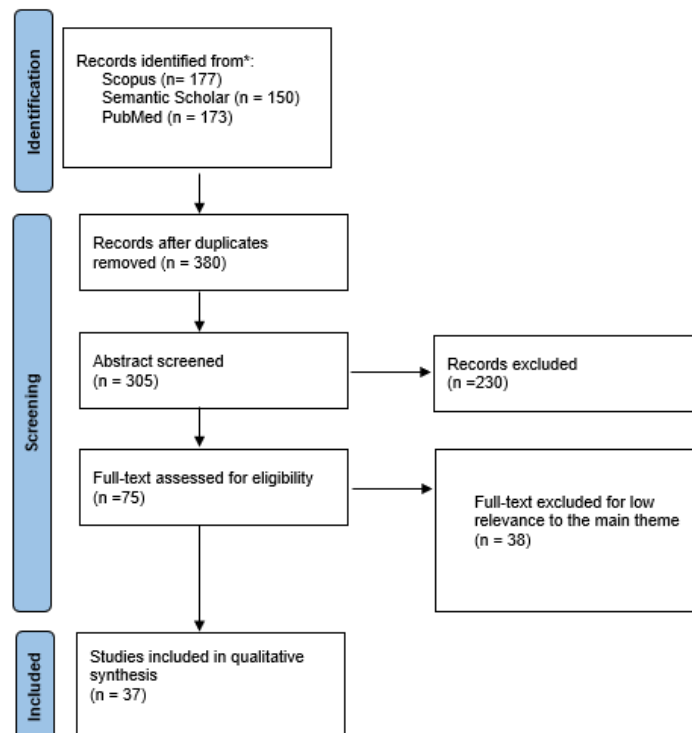


Figure 1. Study Selection Process

Data Extraction and Synthesis

A standardized data extraction form was used to collect key information from each included study, including study design, participant characteristics, chatbot type and features, primary outcomes, and significant findings. Given the heterogeneity of the study designs and outcomes, a thematic synthesis approach was employed. This analysis identified four primary thematic domains that structured our findings are (1) enhancing accessibility to support, (2) perceived quality and effectiveness of chatbot-delivered support, (3) user experience, engagement, and acceptance, and (4) impact on help-seeking behaviors.

Results and Discussions

The 37 included study encompassed a range of designs, populations, chatbot technologies, and outcome measures, as summarized in Table 1. Briefly, interventional and experimental designs were most common. Participant cohorts were typically composed university students aged 17 – 25, with sample sizes varying widely from 15 to 298. The reviewed chatbots were predominantly LLM-based (n = 16) or custom-built for research purposes (n = 11). The most frequently assessed outcomes were improvements in mental health symptoms (n = 20) and qualitative or quantitative measures of user experience (n = 22).

Table 1. Characteristic of Included Studies (n = 37)

Author/Year	Country	Study Design	Sample (n, age, education)	Chatbot Type	Outcomes Measured	Key Findings
Reyes-Portillo et al., 2025	USA	Intervention design	n=50, mean age 22.1, 80% female, college	AI-powered, human-like	Feasibility, acceptability, symptom reduction	Feasible, reduced depression/anxiety
(De Nieva et al., n.d.)	Philippines	Descriptive	n=25, senior high school	Woebot (commercial empathy-focused)	User experience, design suggestions	Students valued empathy; improvements suggested
(Wifaqul, 2025)	Indonesia	Qualitative	n=15, university (semester 5)	LLM (ChatGPT implied)	Accessibility, empathy, perception	Improved access, but empathy limited
(Gabrielli et al., 2021)	Italy	Mixed-methods	n=71, mean age 20.6, 68% female, first-year university	Atena (custom, JS-based)	Engagement, effectiveness, mindfulness	Positive engagement; reduced stress/anxiety
(Legaspi Jr. et al., n.d.)	Philippines	Experimental	Students (NR), COVID-19 context	Wysa (commercial chatbot)	Usability, effectiveness	Usable, helpful during pandemic
(De la Puente et al., 2025)	Spain	Experimental	n=47, age 19–26, university	AI-powered CBT chatbot	Stress/anxiety reduction, usability	Effective in reducing symptoms
Kim et al., 2025	Korea	Mixed-methods	n=176, mean age 22.6, 50% male, university	Social chatbot	Loneliness, social anxiety, UX	Reduced loneliness/anxiety; positive UX
Dabou et al., 2025	UAE	Cross-sectional	n=298, health sciences students	Multiple (ChatGPT, Bard, Snapchat)	Usage patterns, predictors	High adoption, varied user satisfaction
Afrisia et al., 2024	Indonesia	Intervention design	University students (NR)	LSTM-based chatbot	Technical performance, user response	High technical accuracy, moderate usability
Oghenekaro & Okoro, 2024	Nigeria	Mixed-methods	Students (NR)	ReactJS custom chatbot (Dido)	Engagement, MH pre/post, qual. insights	Moderate mental health gains
Fu & Liu, 2024	China	Descriptive (review)	International students (no data)	ChatGPT (LLM), CBT-based	Efficacy, challenges, ethics	Summarized efficacy and risks
Gumilang et al., 2024	Indonesia	Intervention design	n=58, undergraduates	LLM, Indonesian-trained	Technical accuracy, acceptability	Good accuracy, accepted by users
Mariyana et al., 2025	Indonesia	Intervention design	Students (NR)	Naïve Bayes, Gemini API	Stress detection, accuracy	Technically effective in detecting stress
Rath, 2025	Malaysia	Mixed-methods	n=67, dental students (year 4/5)	ChatGPT (LLM)	DASS-21, mentoring support	Moderate reduction in stress
Grové, 2021	Australia	Qualitative (co-design)	n=40, age 15–17,	Co-designed,	Co-design process, UX, challenges	Students appreciated involvement

Author/Year	Country	Study Design	Sample (n, age, education)	Chatbot Type	Outcomes Measured	Key Findings
Liu et al., 2022	China	RCT	secondary students n=83, mean 23.1, 55% female, university	hybrid AI+rule Custom chatbot	PHQ-9, GAD-7, alliance, satisfaction	Significant reduction in depression/anxiety
Dzaky et al., 2024	Indonesia	Experimental	~193 students	DNN-BERT, IndoBERT	Accuracy, adaptability	High technical accuracy
Thunuguntla et al., 2025	India	Design unclear	Students (NR)	NLP, sentiment analysis	Emotional support, resilience	Promising but design unclear
Ong et al., 2023	Philippines	Intervention design	Students (NR)	Storytelling chatbot	Well-being, user feedback	Increased well-being, narrative engagement
Hidayat et al., 2023	Indonesia	Intervention design	n=20 students, 1 psychologist	Dialogflow NLP chatbot	Anxiety detection, accessibility	Early detection tool, accessible
Mustafa et al., 2024	Sudan	Qualitative	n=20, mean age 21.4, 55% female	Telegram-based, WHO guide	Acceptance, usability, limitations	Accepted by students, limited depth
Asimolowo, n.d.	Nigeria	Descriptive	High school students	NLP chatbot	Accessibility, stigma	Improved accessibility, reduced stigma
Mag Eiry et al., n.d.	Malaysia	Intervention design	Students (NR)	Speech Emotion Recognition, Watson API	Mood analysis, feedback	Detected mood, moderate acceptance
Kelana et al., 2024	Indonesia	Mixed-methods	n=5, undergraduates	Casual design, emoji use	Perception, satisfaction	Emoji/casual style enhanced trust
Sia et al., 2021	Philippines	Intervention design	n=25, senior high school	Abot (custom chatbot)	Well-being, acceptability	Well accepted by students
Mahmud & Porntrakoon, 2023	Thailand	Case study	University students (NR)	AI chatbot	Preferences, privacy	Students valued privacy, mixed preferences
Ong et al., 2021	Philippines	Descriptive	Tertiary students	Storytelling, PERMA model	Resilience, well-being	Improved resilience & engagement
Rao et al., 2025	India	Design unclear	Students (NR)	NLP, Spotify/Twilio API	Mood, accessibility	Mixed results, preliminary
Reichenpfaender et al., 2025	Switzerland	Qualitative	Swiss students & counselors	User-centered design	Opportunities, risks	Identified risks, requirements
Crasto et al., 2021	India	Intervention design	Students (NR)	CareBot, ML + NLP	Support, accessibility	Usable, accessible
Nurhafiyah & Marcos, 2023	Indonesia	Intervention design	n=15, university	Certainty Factor (expert system)	Diagnosis, user acceptance	Useful for early diagnosis
Lee & Andaya, 2023	Philippines	Experimental	Individuals (NR)	Inworld AI (commercial)	Anxiety/depression reduction	Effective for mild symptoms

Author/Year	Country	Study Design	Sample (n, age, education)	Chatbot Type	Outcomes Measured	Key Findings
Anita et al., 2024	Indonesia	Literature review	Students (no primary data)	NLP, AI counselor aid	Efficiency, ethics	Discussed counselor-AI synergy
Ramdhan et al., 2025	Indonesia	Qualitative	High school students (NR)	AI chatbot, digital counseling	Ethics, transformation	Highlighted ethical issues
Safitri, 2022	Indonesia	Qualitative	Adolescents (NR)	SACU chatbot	Comfort, counselor linkage	Increased willingness to seek help
Alyana & Ismail, 2025	Indonesia	Qualitative	n=54, undergraduates	Empathy-sensitive chatbot	Empathy, trust, motivation	Chatbot perceived supportive
Ken & Ramdhani, 2012	Indonesia	Experimental	n=91, class XI high school	Web chatbot	Depression literacy	Improved knowledge of depression

Thematic Finding

Enhanced Accessibility and Reduced Barriers

A predominant finding across the literature is the significant role AI chatbots play in enhancing accessibility to mental health support. Their 24/7 availability, ease of use, and perceived non-judgmental nature were frequently reported to reduce stigma and logistical barriers, particularly for students reluctant to seek traditional help (Abd-Alrazaq et al., 2019; Fitzpatrick et al., 2017). The anonymity and confidentiality offered by these tools were especially valued in contexts with high cultural stigma or limited resources. Furthermore, their scalability presents a potent solution for reaching large student populations, including those in remote or underserved areas. However, this increased accessibility is not without potential drawbacks. Several studies cautioned against over-reliance on technology, noting that students with higher distress levels might use chatbots more frequently without necessarily experiencing commensurate benefits. A critical consensus emerged that chatbots should be positioned as a supplement to, not a replacement for, essential human support where it is needed.

Quality and Limitations of AI-Delivered Support

The reviewed studies presented a nuanced picture of the quality of support provided by AI chatbots. On one hand, they were consistently recognized as effective tools for delivering informational support and preliminary, low-level emotional engagement (Inkster et al., 2018). On the other hand, a significant limitation revolves around their perceived lack of deep, human-like empathy and contextual understanding. Users commonly reported frustrations with inconsistent, inappropriate, or overly generic responses that led to superficial engagement. Technical challenges in natural language processing, particularly in handling complex, crisis, or culturally nuanced conversations, were noted as a primary barrier to efficacy. Underpinning these functional limitations are serious concerns regarding data privacy and ethical governance, which were highlighted as critical issues requiring urgent attention in future development and deployment.

User experience emerged as a crucial determinant of chatbot effectiveness. Overall satisfaction was reported as moderate to high, driven predominantly by appreciation for their convenience, accessibility, and the unique ability to confide without fear of social judgment (Chaudhry & Debi, 2024; Park et al., 2023). Features such as casual, conversational language, the use of emojis, and responsive interfaces were associated with higher engagement, especially among younger demographics. Conversely, experiences of emotional disconnection, neutral or dismissive responses, and a lack of perceived empathy were key factors that reduced user motivation and trust. Synthesizing these findings, students largely viewed chatbots as a valuable adjunct or a non-threatening first step in the help-seeking pathway, but overwhelmingly rejected the notion that they could substitute human counselors. Recommendations for improvement centered on enhancing emotional intelligence, deepening personalization, and ensuring seamless integration with human support systems.

Impact on Help-Seeking Behavior

Perhaps the most promising finding pertains to the role of chatbots in facilitating early intervention among traditionally hard-to-reach students. Evidence suggests they effectively lower the barrier to initial help-seeking

for those deterred by stigma, cost, or accessibility, making them particularly suitable for individuals with mild to moderate symptoms (Gaffney et al., 2019). However, the evidence on long-term outcomes remains limited. It is unclear if chatbot use sustains engagement or effectively translates into increased use of professional services for those who need them. This underscores the necessity for robust triage and referral mechanisms embedded within chatbot interactions. The literature strongly emphasizes that their greatest potential is realized not in isolation, but when integrated within a broader, coherent ecosystem of student mental health support, ensuring at-risk students are safely escalated to appropriate care.

Discussion

This systematic review synthesizes growing evidence indicating that AI-powered chatbots hold significant potential for enhancing mental health support, particularly for students who are reluctant to access traditional face-to-face services. Their primary value lies in their ability to increase accessibility, reduce perceived stigma, and provide a conduit for early intervention by offering scalable, anonymous, and immediately available support (Abd-Alrazaq et al., 2019; Gaffney et al., 2019).

These findings corroborate broader literature on digital mental health interventions, which underscores the importance of scalable and low-cost solutions to address the global treatment gap (Laranjo et al., 2018). However, this review identifies a key nuance within the student population: their particularly positive responsiveness to features like casual, emoji-facilitated interactions. This suggests that chatbot design aligning with generational communication norms may be a critical factor for engagement in this demographic, a consideration less prominent in reviews of general adult populations.

Despite these promising applications, it is crucial to acknowledge their inherent limitations. Current chatbot technology cannot replicate the profound empathy, complex ethical judgment, and nuanced crisis management capabilities of a human counselor (Meadi et al., 2025; Spyska, 2025). Persistent technical challenges in natural language processing, especially across diverse cultural and linguistic contexts, can lead to misunderstandings and limit efficacy. Furthermore, the issue of data privacy and security presents a critical ethical challenge. Without transparent protocols and robust safeguards, student trust is easily undermined, potentially causing harm and disengagement. The development and strict enforcement of comprehensive ethical frameworks and regulatory oversight are therefore urgently needed.

For practice, these findings suggest that chatbots are best integrated into university mental health systems as a foundational element of a stepped-care model, serving as an initial point of contact rather than a replacement for specialized human support. University administrators and health services can strategically deploy these tools to engage hard-to-reach students. Involving students in the co-design process is also recommended to enhance usability and acceptance.

Future research should address several identified gaps. Longitudinal studies are necessary to evaluate the sustained impact of chatbot interactions on mental health outcomes. Advances in artificial emotional intelligence could markedly improve their therapeutic authenticity. Finally, given the current bias towards research in high-income countries, expanding studies into low- and middle-income contexts is essential to ensure these technologies reduce, rather than exacerbate, global health inequities.

Conclusions

AI-powered chatbots hold strong potential to complement traditional student mental health services by enhancing accessibility and reducing barriers to care. They are particularly effective for mild to moderate concerns, offering a confidential and approachable entry point into support systems. However, their limitations in empathy, cultural adaptation, and crisis management underscore the importance of integration with human counseling services. Moving forward, ethical safeguards, personalization, and rigorous long-term evaluations will be vital for maximizing their contribution to global student mental health.

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