

Telegram Bot Versus Institutional Chatbot for Supporting Part-Time University Students: A Mixed-Methods Comparative Study

Nurul Nadiah Mohd Firdaus Hum¹ & Ahmad Nazri Mansor^{2*}

¹Faculty of Applied Sciences Universiti Teknologi MARA, 40450 UiTM Shah Alam, Selangor, Malaysia

²Faculty of Information Science, Universiti Teknologi MARA,

Selangor Branch, Puncak Perdana Campus, 40150 Shah Alam, Selangor, Malaysia

^{1,2}Institute of Continuing Education and Professional Studies (iCEPS), Universiti Teknologi MARA, Shah Alam, Selangor

ARTICLE INFO

Article history:

Received 23 October 2025

Revised 10 August 2026

Accepted 25 September 2026

Online first

Published 30 September 2026

Keywords:

Chatbot

Educational Technology

Engagement

Higher Education

Part-Time Students

Telegram Bot

DOI:

10.24191/ijelhe.v21n3.21312

ABSTRACT

This study compares a Telegram bot with an institutional chatbot as digital support channels for part-time university students. A mixed-methods design combined a controlled usability study ($n = 120$), institutional usage analytics, and focus-group interviews ($n = 20$) to examine adoption, usability, engagement, and satisfaction. Institutional analytics recorded 6,818 Telegram bot users (99.4%) compared with 43 institutional chatbot users (0.6%). In the controlled study, the Telegram bot achieved a higher System Usability Scale score ($M = 82.4$, $SD = 8.6$) than the institutional chatbot ($M = 75.3$, $SD = 9.2$), $t(118) = 4.37$, $p < .001$, and generated more weekly interactions (18.6 vs 11.2). Telegram also received higher ratings for accessibility, convenience, graphical interface, responsiveness, and time spent. Accessibility correlated strongly with overall satisfaction ($r = .74$, $p < .001$), while responsiveness correlated with perceived usefulness ($r = .68$, $p < .001$). The findings indicate that low-friction mobile access and platform familiarity are central to sustained use among time-constrained learners. At the same time, institutional chatbots retain strategic value through integration with academic data, personalisation, governance, and service orchestration. A hybrid architecture that combines messaging-platform accessibility with institutionally governed intelligence offers a practical pathway to scalable student support.

^{2*}Corresponding author's e-mail address: anazri@uitm.edu.my

1. INTRODUCTION

Conversational agents have moved from experimental educational technologies to increasingly visible components of higher-education support ecosystems. Universities now deploy chatbots to answer routine questions, direct students to services, assist with learning activities, and provide support outside conventional office hours. This development is especially relevant for part-time students, whose engagement with the institution is often shaped by employment, family responsibilities, commuting, and compressed study windows. For these learners, the practical value of a support technology depends not only on the sophistication of its underlying system but also on whether the service is available when needed, easy to access on a mobile device, responsive, and embedded in communication practices that already feel familiar. Research on artificial intelligence in higher education has similarly emphasised that successful adoption depends on the fit between technical capability, pedagogical purpose, and the lived conditions in which students actually use technology (Zawacki-Richter et al., 2019; Labadze et al., 2023).

Two broad delivery models are particularly important. The first places the conversational service inside a widely used messaging platform such as Telegram. This model benefits from an already familiar interface, persistent mobile sessions, notifications, and low switching costs. The second places the service within an institutionally developed chatbot environment, which may require separate authentication or navigation but can be designed for deeper integration with academic records, institutional knowledge bases, learning analytics, and governance controls. The distinction matters because adoption is not purely technical. Research on the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology has long shown that ease of use, usefulness, facilitating conditions, and effort expectations shape technology use (Davis, 1989; Venkatesh et al., 2003). In mobile learning, convenience and access are similarly central, particularly when learning and support occur across fragmented time and locations (Crompton & Burke, 2018).

1.1 Problem Statement

Institutional chatbots can offer authoritative information, integration with university systems, and a controlled environment for data governance, yet these advantages do not guarantee student uptake. A technically capable chatbot may remain peripheral if students must deliberately locate it, repeatedly authenticate, learn a new interface, or wait for responses that feel slower than established messaging channels. Conversely, messaging-platform bots can reach users immediately because they live in a familiar communication environment. However, they may offer shallower institutional integration and raise additional questions about privacy, data control, and long-term platform dependence. Previous reviews of educational chatbots identify usability, personalisation, conversational quality, accessibility, and evaluation quality as recurring concerns (Okonkwo & Ade-Ibijola, 2021; Wollny et al., 2021; Kuhail et al., 2023). Less frequently examined is the direct comparison between a familiar messaging-based bot and an institutionally controlled chatbot for a student population whose support needs are highly time-sensitive.

The present study addresses this gap by comparing a Telegram bot and an institutional chatbot used to support part-time university students. The comparison treats adoption, usability, engagement, and satisfaction as related but distinct outcomes. Adoption indicates whether students actually enter and use a channel at scale; usability concerns the perceived ease and quality of interacting with the system; engagement reflects repeated behavioural interaction; and satisfaction captures students' evaluations of the interface and service experience. Considering these outcomes together provides a more realistic basis for institutional decision-making than assessing conversational accuracy or technical functionality alone.

1.2 Research Objectives and Questions

The study had three objectives: (i) to compare adoption, usability, engagement, and satisfaction between the Telegram bot and the institutional chatbot; (ii) to examine satisfaction-related dimensions, specifically graphical user interface (GUI), accessibility, responsiveness, and time spent; and (iii) to derive design implications for the future development of institutional chatbot services. These objectives were operationalised through three research questions: RQ1: How do the two platforms differ in adoption, usability, and engagement? RQ2: How do students evaluate the two platforms across key satisfaction dimensions, and how are accessibility and responsiveness associated with broader evaluations? RQ3: What design implications follow from the comparative evidence for an institution seeking both high accessibility and deeper digital-service integration?

2. LITERATURE REVIEW

2.1 Educational Chatbots and Student Support

Educational chatbots range from rule-based question-answer services to adaptive, AI-enabled conversational agents. Earlier work demonstrated the feasibility of educational question-answering chatbots and highlighted the importance of curated domain knowledge and response quality (Palasundram et al., 2019). Subsequent reviews show that chatbots have been used for teaching, tutoring, administrative support, information retrieval, mentoring, and learner engagement, but they also reveal persistent weaknesses in evaluation design, personalisation, transparency, and sustained use (Okonkwo & Ade-Ibijola, 2021; Wollny et al., 2021; Kuhail et al., 2023). More recent research has expanded attention from whether chatbots can answer questions to how they support self-regulation, social presence, and ongoing learning relationships (Hew et al., 2023; Huang & Hew, 2025). These developments reinforce a critical point for student-support design: conversational intelligence is only one layer of service quality. The surrounding access channel, response experience, and institutional context shape whether users encounter and trust that intelligence in the first place.

The growth of generative AI has further raised expectations that institutional agents will provide adaptive, natural interactions. However, the literature cautions against equating conversational fluency with educational or institutional effectiveness. Generative systems can introduce uncertainty, bias, and factual errors, and therefore require human oversight, appropriate data boundaries, and clear governance (Kasneci et al., 2023; Tlili et al., 2023). Systematic reviews likewise argue that institutions should align chatbot design with defined educational objectives and evaluate outcomes that matter to students rather than relying only on technical metrics (Labadze et al., 2023). For university support services, this means the strongest architecture may not be the one with the most sophisticated interface in isolation, but the one that combines reliable institutional information, usable access, appropriate human escalation, and a transparent governance model.

2.2 Messaging Platforms, Mobility, and Familiarity

Mobile instant messaging offers educational affordances directly relevant to part-time learners. Tang and Hew (2017) identified temporal flexibility, ease of use, low cost, and multimodality among the major affordances of mobile instant messaging in education. Their later work also showed that mobile instant messaging can facilitate social presence in higher-education communication (Tang & Hew, 2020). Research on Telegram similarly reports that university students value the platform for instructional interaction, rapid communication, and the ability to participate through an interface already embedded in their daily mobile routines (Aladsani, 2021). These characteristics reduce the distance between an emerging need and seeking help. A student can ask a question without first shifting into a separate institutional environment, remembering another pathway, or learning an unfamiliar interaction pattern.

This convenience should not be interpreted as evidence that messaging platforms are universally superior. The same affordances can generate information overload, boundary concerns, and dependence on external infrastructure (Tang & Hew, 2017). The strategic question is therefore not simply whether a university should use Telegram or an institutional chatbot. A more productive question is which messaging-platform features drive high adoption, which institutional functions require a controlled environment, and how to combine the two without fragmenting the student experience. This study contributes empirical evidence to that design problem by contrasting a high-familiarity messaging channel with a dedicated institutional chatbot serving the same broad support purpose.

2.3 Usability, Engagement, and Satisfaction as Linked Outcomes

Usability is a necessary condition for sustained digital engagement. The System Usability Scale (SUS) is a widely used, concise, standardised measure of perceived usability across technologies (Bangor et al., 2008; Lewis, 2018). Although usability and adoption are related, they are not identical. A system may receive acceptable usability ratings from those who try it, yet still fail to attract a substantial share of the intended population. Conversely, a familiar platform can attract users rapidly but still requires careful design to maintain satisfaction. This distinction matters in institutional analytics because user counts capture reach, while SUS scores capture the experience of those who interact with the system.

Student engagement provides a second lens. Kahu and Nelson (2018) conceptualise engagement as emerging at an educational interface where student characteristics and institutional conditions interact. In a digital support context, that interface includes availability, responsiveness, perceived usefulness, and the effort required to obtain help. Social-presence research likewise suggests that people respond not only to functional performance but to whether an interaction feels immediate, intelligible, and appropriately responsive (Kim et al., 2022; Ebadi & Amini, 2024). The present study therefore treats weekly interactions and satisfaction ratings as indicators of how effectively each platform converts access into repeated use and positive experience.

2.4 Conceptual Framing

The comparative framework used here combines three complementary perspectives. First, technology-acceptance theory explains why low effort and perceived usefulness are likely to influence adoption and continued use (Davis, 1989; Venkatesh et al., 2003). Second, usability research provides a standardised basis for comparing the interaction quality of the two platforms (Bangor et al., 2008; Lewis, 2018). Third, research on mobile learning and engagement explains why channel familiarity, availability, and responsiveness may matter disproportionately to students who study alongside other commitments (Crompton & Burke, 2018; Kahu & Nelson, 2018). These perspectives serve as interpretive lenses rather than a formally tested structural model. The central proposition is that a support channel creates value when institutional capability is delivered through an interaction pathway that students can easily reach and use with confidence.

3. METHODOLOGY

3.1 Research Design

A mixed-methods comparative design evaluated the Telegram bot and the institutional chatbot. The design combined three evidence streams: a controlled usability study with 120 participants, institutional usage analytics, and focus group interviews with 20 participants. The quantitative component assessed adoption, usability, engagement, and satisfaction, while the qualitative component provided interpretive context for students' experiences of access, responsiveness, familiarity, and the perceived future role of institutional chatbot services. The evidence streams were considered together at the interpretation stage so that platform-level usage patterns could be read alongside standardised usability measures and participant perspectives.

Table 1 Study design, data sources, and outcome measures

Component	Sample/data source	Measures or analytic focus
Controlled usability study	n = 120	System Usability Scale (SUS); satisfaction dimensions; comparative tests
Institutional analytics	Telegram: 6,818 users; institutional chatbot: 43 users	Adoption counts; platform share; weekly interactions
Focus-group interviews	n = 20	Thematic interpretation of access, familiarity, responsiveness, and future design needs

3.2 Measures

Perceived usability was assessed using the System Usability Scale. SUS produces a score from 0 to 100 and is widely used as a technology-agnostic measure of perceived usability (Bangor et al., 2008; Lewis, 2018). Weekly interaction counts represented engagement. The study assessed satisfaction across four dimensions: GUI, accessibility, responsiveness, and time spent. The study also examined accessibility and convenience ratings on a five-point scale and reported correlational relationships between accessibility and overall satisfaction, and between responsiveness and perceived usefulness. Taken together, these measures allowed the analysis to distinguish reach, repeated interaction, interface quality, and perceived service value.

3.3 Quantitative and Qualitative Analysis

Institutional analytics were summarised descriptively to compare the number and proportion of users selecting each platform. In the controlled study, independent-samples t-tests compared platform outcomes where reported. Internal consistency of the satisfaction scale was evaluated using Cronbach's alpha. Pearson correlations examined relationships between accessibility and overall satisfaction and between responsiveness and perceived usefulness. Statistical significance was interpreted using the p-values reported in the source study. The focus-group material was analysed thematically and used to contextualise the quantitative patterns rather than to estimate the prevalence of qualitative views. Because the institutional usage counts are observational, the adoption comparison is interpreted as evidence of realised uptake under the existing service conditions, not as a randomised causal effect of platform type.

3.4 Ethical Considerations

The study procedures included obtaining informed consent and anonymising data. Reporting in the present manuscript is limited to aggregate statistics and does not disclose participant-identifying information. The analysis also distinguishes student-facing usability outcomes from institutional design implications, so recommendations on data integration, personalisation, and governance are not treated as permission to expand data collection without appropriate oversight. Any future implementation of adaptive or integrated chatbot functions should apply institutional privacy, security, consent, and data-minimisation requirements.

4. RESULTS AND DISCUSSION

4.1 Adoption and Reach

The clearest difference between the platforms was in institutional adoption. Usage analytics recorded 6,818 Telegram-bot users, representing 99.4% of the combined observed usage, compared with 43 institutional-chatbot users, representing 0.6%. The ratio indicates that the Telegram bot was not merely preferred by a modest margin; it was the overwhelmingly dominant access channel under the conditions in which the services were offered. This difference matters because it shows the practical significance of channel choice. Even a well-designed institutional service has limited impact if students do not reach it, while a familiar communication environment can substantially lower the threshold for initial use.

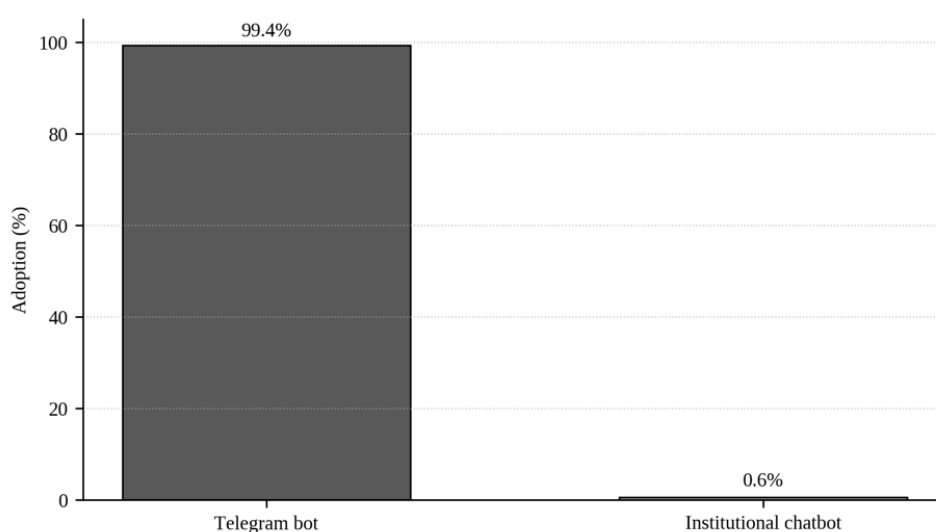


Figure 1 Comparative adoption rates of the Telegram bot and institutional chatbot among part-time students
Source: Author's own data (2026)

The adoption results align with mobile instant messaging research emphasising temporal convenience, user familiarity, and low access friction (Tang & Hew, 2017; Aladsani, 2021). It also aligns with technology acceptance theory: when the effort required to initiate an interaction is low, and the channel fits existing routines, behavioural uptake is more likely (Davis, 1989; Venkatesh et al., 2003). For part-time students, this effect matters more because support interactions often occur between work, family, commuting, and study commitments. In such circumstances, a service that is technically available but separated from the student's normal mobile environment may be less accessible in practice than its formal availability suggests.

4.2 Usability and Engagement

The controlled usability study showed a statistically significant difference in SUS scores. The Telegram bot achieved a mean SUS score of 82.4 (SD = 8.6), while the institutional chatbot achieved 75.3 (SD = 9.2), $t(118) = 4.37$, $p < .001$. Both scores indicate usable systems, but the Telegram result falls in a stronger usability range and is 7.1 points higher than the institutional chatbot. In practical terms, the comparison suggests that the institutional chatbot was not unusable; rather, the Telegram bot delivered a more fluent and comfortable interaction experience. This distinction matters for improvement strategy because it suggests the institutional chatbot needs refinement rather than wholesale rejection.

Behavioural engagement followed the same direction. Telegram users recorded 18.6 weekly interactions, compared with 11.2 for institutional chatbot users. The higher interaction volume is consistent with the proposition that lower access effort encourages repeated use, although the observed data do not establish causality. Accessibility and convenience ratings also favoured Telegram. Mean accessibility was 4.52 for Telegram and 3.91 for the institutional chatbot, while mean convenience was 4.44 and 3.88, respectively. These results link the large adoption difference to the user-experience data: the more widely used platform was also rated as easier to reach and more convenient to incorporate into daily routines.

Table 2 Comparative quantitative outcomes for the Telegram bot and institutional chatbot

Outcome	Telegram bot	Institutional chatbot	Interpretation
Adoption	6,818 users (99.4%)	43 users (0.6%)	Marked advantage in realised institutional uptake
SUS	M = 82.4, SD = 8.6	M = 75.3, SD = 9.2	Telegram significantly higher, $t(118) = 4.37$, $p < .001$
Weekly interactions	18.6	11.2	Higher recurring engagement on Telegram
Accessibility	M = 4.52	M = 3.91	Higher perceived ease of access on Telegram
Convenience	M = 4.44	M = 3.88	Higher perceived convenience on Telegram

4.3 Satisfaction Dimensions and Correlational Evidence

Satisfaction favoured Telegram across all four reported dimensions. GUI satisfaction was 88% for Telegram and 75% for the institutional chatbot; accessibility was 90% and 78%; responsiveness was 86% and 72%; and satisfaction with time spent was 84% and 70%. Independent-samples t-tests indicated statistically significant differences across the satisfaction comparisons ($p < .01$). The satisfaction scale demonstrated excellent internal consistency (Cronbach's alpha = .91), supporting the interpretation that the dimensions formed a coherent evaluation of the user experience.

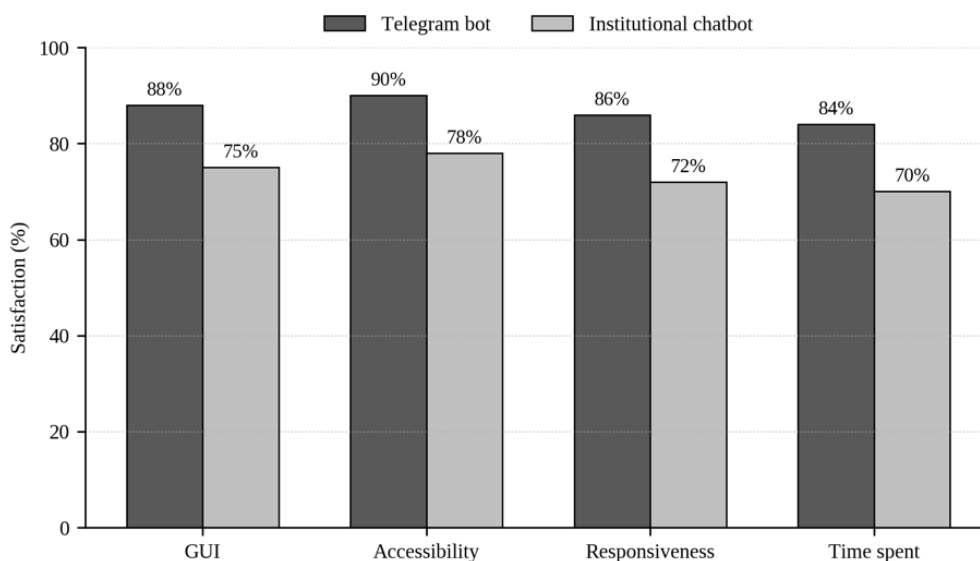


Figure 2 Comparison of user satisfaction dimensions for the Telegram bot and institutional chatbot
Source: Author's own data (2026)

The correlational results add explanatory depth. Accessibility was strongly associated with overall satisfaction ($r = .74$, $p < .001$), while responsiveness was strongly associated with perceived usefulness ($r = .68$, $p < .001$). These relationships reinforce a broader conclusion from usability and technology acceptance research: students do not evaluate support tools solely according to what the system can theoretically do. They evaluate the service as experienced—how quickly they can access it, whether the interface requires unnecessary effort, and whether the system responds in ways that help them complete a task. The results, therefore, position accessibility and responsiveness as core design requirements rather than secondary interface preferences.

4.4 Interpretation of Qualitative Evidence

The qualitative component contextualised the numerical differences and highlighted three recurring interpretive emphases. First, platform familiarity reduced the psychological and procedural effort of seeking support. Students did not need to learn a new communication environment before asking a question. Second, mobile accessibility and immediacy were particularly salient for learners managing their studies alongside other obligations. A support interaction that could be initiated quickly better fit fragmented study schedules. Third, participants recognised that the institutional chatbot could become more valuable if it evolved beyond a stand-alone question-answer interface toward adaptive, data-informed support. These qualitative emphases align with the quantitative pattern without implying that every participant held the same view.

4.5 Why familiarity matters, but is insufficient.

The evidence supports a strong platform-familiarity effect, but familiarity should not be treated as the only design objective. Messaging platforms can reduce friction because students already understand their interfaces' conventions and are already logged in on mobile devices. Studies of Telegram and other mobile instant-messaging environments similarly report high interactional value and immediacy (Aladsani, 2021; Tang & Hew, 2020). However, a university service must also satisfy requirements that external messaging platforms are not designed to meet by default, including authoritative identity, integration with academic systems, transparent use of institutional data, auditability, accessibility standards, and service continuity. The strongest institutional strategy is therefore unlikely to be a simple substitution in which one channel permanently displaces the other.

This point becomes more important as conversational systems become adaptive. Modern educational chatbots increasingly incorporate personalisation, social-presence strategies, and generative AI capabilities (Hew et al., 2023; Huang & Hew, 2025; Labadze et al., 2023). These features can improve relevance, but they also deepen the need for governance and high-quality institutional data. Generative systems in particular require careful oversight because fluent responses can still be incomplete or inaccurate (Kasneci et al., 2023; Tlili et al., 2023). The institutional chatbot therefore offers strategic advantages not fully reflected in current adoption numbers: it can serve as the governed intelligence layer that coordinates university-specific information, student context, escalation rules, and analytics.

4.6 A Hybrid Service Architecture

The findings suggest a hybrid architecture that deliberately separates accessibility and institutional intelligence, then reconnects them. Telegram or another familiar mobile channel can serve as a low-friction access layer for routine interactions, notifications, and initial support. The institutionally governed chatbot can serve as the service and intelligence layer, maintaining the authoritative knowledge base, personalisation rules, academic system connections, identity controls, and escalation pathways. Where policy and technical architecture permit, the same underlying service logic can be exposed through multiple channels, ensuring students receive consistent answers without being forced into a single interface. Such an approach treats channel choice as a usability decision while keeping institutional data and service governance within controlled systems.

Table 3 Design implications for an institutionally governed hybrid chatbot service

Design priority	Evidence from the study	Recommended institutional response
Low-friction access	99.4% observed adoption on Telegram; higher accessibility and convenience	Offer mobile-first entry points and minimise repeated navigation or authentication friction
Usability	Higher SUS for Telegram	Benchmark institutional interfaces against familiar messaging conventions and test iteratively with students
Responsiveness	86% vs. 72% satisfaction; $r = .68$ with perceived usefulness	Set response-time targets, provide clear fall-back behaviour, and escalate unresolved cases to human support
Personalization	Qualitative pathway toward adaptive support	Integrate only institutionally approved data required for relevant, contextual assistance.
Governance	Institutional chatbot advantage	Maintain authoritative knowledge, logging, privacy controls, accessibility, and auditability within institutional systems.
Channel consistency	Students value familiar access while the institution needs integration	Use a shared service/knowledge layer so answers and policies remain consistent across channels

4.7 Implications for Part-time Student Support

For part-time students, the most important implication is that convenience is not a superficial preference. It is an issue of equity and participation. Students with constrained time can be disproportionately affected by small frictions: an extra login, a difficult-to-find link, a desktop-oriented interface, or a slow response can be enough to postpone or abandon a help-seeking attempt. Mobile learning research has consistently shown the value of flexible access across time and place (Crompton & Burke, 2018), while engagement theory emphasises the interaction between student circumstances and institutional conditions (Kahu & Nelson, 2018). Designing around these realities can make institutional support more inclusive without lowering academic or governance standards.

The results also suggest that institutions should evaluate digital student-support services using a balanced set of metrics. Adoption counts reveal whether a service reaches the intended population; SUS and satisfaction measures reveal whether the interaction is usable; recurring interaction indicates whether students continue to engage; and qualitative evidence explains why. A chatbot that performs well on only one dimension should not automatically be judged successful. For example, a dedicated institutional chatbot may be accurate but invisible, while a messaging bot may be popular but insufficiently integrated for complex cases. A balanced evaluation framework helps institutions identify whether the next investment should target access, interface design, data integration, response quality, or human escalation.

4.8 Limitations and Future Research

Several limitations should guide interpretation. First, institutional adoption analytics are observational and reflect the service conditions under which the two platforms were available; they do not constitute randomised evidence that platform type alone caused the adoption gap. Second, self-reported usability and satisfaction measures are valuable indicators of perceived experience. However, future studies should complement them with task completion, response accuracy, time to resolution, and longitudinal retention metrics. Third, the study focuses on part-time university students, a population for whom mobile convenience is especially important; replication with full-time students, postgraduate learners, and different institutional settings would clarify the findings' generalizability. Fourth, future analyses should examine whether age, programme, digital literacy, employment intensity, and prior messaging-platform use moderate adoption and satisfaction.

Future research should also test the proposed hybrid architecture directly. A useful next step would be to compare three conditions: a messaging-platform interface, a stand-alone institutional interface, and a shared institutional chatbot service exposed through both channels. Such a design could determine whether the benefits observed here arise primarily from interface familiarity, notification affordances, authentication persistence, response speed, or other channel-specific factors. Longitudinal research should examine whether early adoption translates into sustained use and whether adaptive personalisation improves resolution quality without increasing privacy concerns. Finally, qualitative work should explore when students prefer automated support, when they expect a human response, and how transparency about AI use shapes trust.

5. CONCLUSION

This study demonstrates that the channel through which digital support is delivered can materially shape student uptake and experience. Among part-time university students, the Telegram bot achieved much higher institutional adoption than the dedicated chatbot and performed better on SUS, weekly engagement, accessibility, convenience, and four satisfaction dimensions. Strong relationships between accessibility and overall satisfaction, and between responsiveness and perceived usefulness, indicate that students' judgments are closely tied to the effort required and the immediacy of obtaining support. These findings position platform familiarity and mobile accessibility as central design considerations, not optional enhancements.

The results do not imply that universities should abandon institutional chatbots. Dedicated institutional systems retain important advantages in academic data integration, personalisation, governance, auditability, and service orchestration. A more sustainable direction is a hybrid model: preserve the low-friction accessibility of familiar messaging environments while placing institutional knowledge, intelligence, data controls, and escalation within a governed service layer. For higher education institutions seeking scalable support for time-constrained learners, the strategic objective should therefore be to make institutional intelligence as easy to reach as the communication tools students already use.

6. ACKNOWLEDGEMENTS

The author acknowledges the host institution for institutional support. Identifying institutional details are withheld in the review manuscript to preserve double-blind peer review.

7. FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

8. AUTHORS' CONTRIBUTIONS

The sole author contributed to conceptualisation, methodology, investigation and data collection, formal analysis, interpretation, and writing - original draft, review and editing.

9. CONFLICT OF INTEREST DECLARATION

The author declares no conflict of interest and certifies that the manuscript is original, has not been published previously, and is not under consideration for publication elsewhere.

10. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

During the preparation of this work, the author used OpenAI ChatGPT in order to improve readability and language quality. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

11. REFERENCES

- Aladsani, H. K. (2021). University students' use and perceptions of Telegram to promote effective educational interactions: A qualitative study. *International Journal of Emerging Technologies in Learning*, 16(9), 182–197. <https://doi.org/10.3991/ijet.v16i09.19281>
- Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An empirical evaluation of the System Usability Scale. *International Journal of Human–Computer Interaction*, 24(6), 574–594. <https://doi.org/10.1080/10447310802205776>
- Crompton, H., & Burke, D. (2018). The use of mobile learning in higher education: A systematic review. *Computers & Education*, 123, 53–64. <https://doi.org/10.1016/j.compedu.2018.04.007>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Ebadi, S., & Amini, A. (2024). Examining the roles of social presence and human-likeness on Iranian EFL learners' motivation using artificial intelligence technology: A case of CSIEC chatbot. *Interactive Learning Environments*, 32(2), 655–673. <https://doi.org/10.1080/10494820.2022.2096638>
- Hew, K. F., Huang, W., Du, J., & Jia, C. (2023). Using chatbots to support student goal setting and social presence in fully online activities: Learner engagement and perceptions. *Journal of Computing in Higher Education*, 35(1), 40–68. <https://doi.org/10.1007/s12528-022-09338-x>
- Huang, W., & Hew, K. F. (2025). Facilitating online self-regulated learning and social presence using chatbots: Evidence-based design principles. *IEEE Transactions on Learning Technologies*, 18, 56–71. <https://doi.org/10.1109/TLT.2024.3523199>
- Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: Understanding the mechanisms of student success. *Higher Education Research & Development*, 37(1), 58–71. <https://doi.org/10.1080/07294360.2017.1344197>
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, Article 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kim, J., Merrill, K., Jr., X., K., & Sellnow, D. D. (2022). Embracing AI-based education: Perceived social presence of human teachers and expectations about machine teachers in online education. *Human-Machine Communication*, 4, 169–185. <https://doi.org/10.30658/hmc.4.9>

Kuhail, M. A., Alturki, N., Alramlawi, S., & Alhejori, K. (2023). Interacting with educational chatbots: A systematic review. *Education and Information Technologies*, 28, 973–1018. <https://doi.org/10.1007/s10639-022-11177-3>

Labadze, L., Grigolia, M., & Machaidze, L. (2023). Role of AI chatbots in education: Systematic literature review. *International Journal of Educational Technology in Higher Education*, 20, Article 56. <https://doi.org/10.1186/s41239-023-00426-1>

Lewis, J. R. (2018). The System Usability Scale: Past, present, and future. *International Journal of Human–Computer Interaction*, 34(7), 577–590. <https://doi.org/10.1080/10447318.2018.1455307>

Okonkwo, C. W., & Ade-Ibijola, A. (2021). Chatbot applications in education: A systematic review. *Computers and Education: Artificial Intelligence*, 2, Article 100033. <https://doi.org/10.1016/j.caeai.2021.100033>

Palasundram, K., Mohd Sharef, N., Nasharuddin, N. A., Kasmiran, K. A., & Azman, A. (2019). Sequence-to-sequence model performance for education chatbot. *International Journal of Emerging Technologies in Learning*, 14(24), 56–68. <https://doi.org/10.3991/ijet.v14i24.12187>

Smutny, P., & Schreiberova, P. (2020). Chatbots for learning: A review of educational chatbots for Facebook Messenger. *Computers & Education*, 151, Article 103862. <https://doi.org/10.1016/j.compedu.2020.103862>

Tang, Y., & Hew, K. F. (2017). Is mobile instant messaging (MIM) useful in education? Examining its technological, pedagogical, and social affordances. *Educational Research Review*, 21, 85–104. <https://doi.org/10.1016/j.edurev.2017.05.001>

Tang, Y., & Hew, K. F. (2020). Does mobile instant messaging facilitate social presence in online communication? A two-stage study of higher education students. *International Journal of Educational Technology in Higher Education*, 17, Article 15. <https://doi.org/10.1186/s41239-020-00188-0>

Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10, Article 15. <https://doi.org/10.1186/s40561-023-00237-x>

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>

Wollny, S., Schneider, J., Di Mitri, D., Weidlich, J., Rittberger, M., & Drachsler, H. (2021). Are we there yet? A systematic literature review on chatbots in education. *Frontiers in Artificial Intelligence*, 4, Article 654924. <https://doi.org/10.3389/frai.2021.654924>

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators? *International Journal of Educational Technology in Higher Education*, 16, Article 39. <https://doi.org/10.1186/s41239-019-0171-0>



© 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY-NC-ND) license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).