Influence of a chatbot based on a conversational agent on the adaptability of first-year students of a Peruvian private university

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Objective: This study aims to evaluate the influence of using a chatbot-based conversational agent, named ODAbot, on the adaptability of first-year students at a private university in Peru.

Methods: The design of this study was pre-experimental with a quantitative approach. The sample consisted of 53 university students who participated in the research during March and April 2024. Participants completed pre-test and post-test questionnaires to assess their adaptability to university life before and after interacting with ODAbot. Additionally, a user experience questionnaire was used to measure satisfaction with the chatbot interaction. Data were analyzed using the Wilcoxon test to determine the statistical significance of the results.

Results: The results showed that the use of ODAbot had a significant impact on students' adaptability, especially in the social dimension ($p = 0.000$), while no significant differences were found in the institutional dimension ($p = 0.124$). The user experience was positive, with students reporting ease of navigation and understanding of the responses provided by the chatbot.

Conclusion: A notable improvement was recorded in the social dimension, promoting peer integration, as well as in the academic dimension, where students expressed greater satisfaction with the information provided. However, no significant differences were observed in the institutional dimension. Overall, the implementation of chatbots presents a promising opportunity to improve the adaptability of university students and ensure a quality educational experience.

KEYWORDS

chatbot, university adaptability, ICT in education, quality education, university life

1 Introduction

Every year, new university freshmen face academic, social, and emotional challenges as they adapt to university life. Research in this field has shown that factors such as integration into this environment, social support, optimism, and resilience are necessary to achieve academic success (Faná del Valle et al., 2022). In the context of Latin America, specifically in Peru, the adaptation of students to university life presents a considerable challenge, exacerbated by accreditation and quality assurance systems that impose strict requirements (Hernández Paz et al., 2023). This issue is closely linked to high dropout

rates, raising questions about how institutions can intervene to mitigate this problem (Seminara, 2020).

The process of university adaptation is complex, encompassing various dimensions: personal, interpersonal, academic, and institutional adaptation. Among the obstacles that hinder this process are the lack of technological resources, academic pressure, lack of social support, difficulty in managing stress, and the absence of effective study skill (Okamoto et al., 2024). This inadequate adaptation can lead students to feel overwhelmed and demotivated, increasing the risk of academic dropout (Pérez et al., 2020; Zuñiga-Vilches et al., 2020; Torres et al., 2024).

Despite the implementation of traditional strategies such as orientation, tutoring, and psychological counseling, the limitations in resources and the lack of personalized support continue to affect the effectiveness of these interventions (Guerrero-Bocanegra, 2022b). In this context, artificial intelligence (AI) technologies, such as chatbots, have emerged as a promising solution to improve university adaptation by providing personalized and accessible support at all times. AI-based chatbots can offer academic guidance, curriculum advice, task reminders, and emotional and social support resources, adapting to the individual needs of each student (Zerón, 2023). This promotes student autonomy and contributes to their academic success and overall well-being (Issn and Unibertsitatea, 2023).

Information and communication technologies, such as conversational agents, offer a solution to the current educational problem. Personalized recommendations based on students' performance, interests, and learning preferences can enhance the educational experience for students (Ogosi, 2021). These conversational assistants have the potential to transform the educational landscape by personalizing learning experiences and relieving the workload of teachers (Al-Abdullatif et al., 2023).

Unlike previous studies that have mainly focused on specific aspects such as academic performance or personalized learning, this study addresses the need for comprehensive support that impacts multiple dimensions of university adaptability. We evaluate the role of chatbots not only in academic performance but also in social integration and institutional adjustment. This is a research gap that has not been sufficiently explored in previous studies. By providing a tool that simultaneously influences various dimensions of the university experience, our approach has the potential to significantly contribute to reducing student dropout. This is particularly relevant in a context like Latin America, where the challenges of adaptation and retention in university are critical to the academic success and personal development of students (Seminara, 2020).

2 Background

The use of chatbots in education has proven to be an effective tool for optimizing the learning experience. In particular, chatbots have been observed to be useful for providing personalized academic support, improving language skills, and facilitating interaction between students and teachers (Ogosi, 2021). However, it is necessary to improve personalization and expand their application in higher education, where students face complex challenges in their adaptation process (Okonkwo and Ade-Ibijola, 2021).

Educational chatbots have also proven effective in increasing student satisfaction and improving digital competence. A study conducted by Moral-Sánchez et al. (2023), revealed that artificial intelligence chatbots in mathematics education generate high levels of satisfaction among students, improve their digital competence, and promote the integration of these technologies in social networks. These findings support the idea that chatbots can be a valuable tool for supporting the educational process and promoting student adaptability in various academic contexts (Fajardo Aguilar et al., 2023). However, their impact on the social and institutional adaptation of university students has not been thoroughly investigated, highlighting a significant gap in current research.

The implementation of a chatbot to facilitate communication between students and student service offices during emergencies, such as the COVID-19 pandemic, has proven effective in improving accessibility, perceived quality, and user satisfaction. The chatbot, developed under the RIPEC project using Dialogflow, was positively valued by students for its ability to provide quick and accurate responses, as well as for its usefulness in crisis situations. These results underscore the importance of implementing chatbot solutions in university environments to improve communication and support for students, especially in emergency contexts (Balderas et al., 2023). Although this study demonstrated the effectiveness of chatbots in crisis contexts, their application in improving comprehensive adaptation in regular university environments has not been sufficiently explored.

Additionally, various studies have emphasized the importance of the quality of interaction between students and chatbots. Research such as those by Meennapa and Paniti (2022), Merkouris et al. (2022), Paredes and Figueroa (2022), and Xinjie and Yu (2023) have highlighted that chatbots can improve usability, usefulness, information quality, and credibility, highlighting the importance of this technology in education. It has been suggested to establish Educational Technology Centers to support instructors in integrating and engaging students with chatbots, emphasizing their effectiveness and cost-efficiency in improving learning and education quality (Chaiprasurt et al., 2022; Essel et al., 2022). In other studies, the use of menu-based chatbots for educational guidance proved reliable and efficient, although the menu-based approach is not considered innovative, it was effective in solving frequently asked questions (Guerrero-Bocanegra, 2022b).

Moreover, chatbots have been found to outperform academics in terms of availability, response time, knowledge, and response quality in the context of academic tutoring (Ortiz Hernández et al., 2022). However, some negative effects of chatbot use in education have also been identified. For example, the lack of human interaction may limit the development of students' social and emotional skills, and excessive reliance on technology may hinder their ability to develop critical thinking, problem-solving, and teamwork skills (Nee et al., 2023; Carrasco, 2023). Additionally, it has been noted that chatbots lack the ability to establish an emotional connection and provide personalized support as a human professor would, which can have a neutral or negative impact on the educational experience (Guerrero-Bocanegra, 2022a; Rubio et al., 2022). Despite these advances, the impact of chatbots on the social and institutional adaptation of university students has not yet been thoroughly addressed.

In recent years, various studies have explored the use of chatbots in education, focusing on areas such as academic performance or administrative efficiency. For example, Aloqayli and Abdelhafez (2023) analyzed the effectiveness of chatbots in university

administrative processes, finding that these systems facilitate interaction between students and institutions. Similarly, Roberto and Chamba (2024) and Yildiz Durak and Onan (2024) have focused on the technological adoption of chatbots and their usefulness in personalizing learning.

However, these studies have not thoroughly examined the impact of chatbots on the comprehensive adaptability of students, which includes not only the academic realm but also social and institutional dimensions. The ability of students to socially integrate into the university environment and interact with institutional structures is crucial for their success and retention in the university. Mosleh et al. (2024) found that students with higher emotional intelligence benefit more from chatbots in academic terms, but their study did not explore how these tools can support social and institutional adaptation, leaving a significant gap in the literature.

Additionally, while research such as that of Hasan et al. (2024) and Reyes-Moreno et al. (2023) has addressed the use of AI, including ChatGPT, to personalize learning, none of these studies have evaluated how chatbots can simultaneously influence the three key dimensions of university adaptability: social, academic, and institutional. This gap is significant because students' comprehensive adaptation is a determining factor in reducing dropout rates and increasing academic success.

The general objective of this study is to evaluate the influence of a chatbot-based conversational agent on the adaptability indicators of freshmen at a private Peruvian university. To achieve this objective, the following specific goals were set: (1) to identify the adaptability indicators of freshmen, (2) to develop a chatbot-based conversational agent that provides information and guidance to students about university life, and (3) to improve the adaptability of freshmen through the use of this conversational agent.

This study seeks to close this gap by evaluating the impact of ODAbot on the comprehensive adaptability of first-year students at a private Peruvian university. Unlike previous studies, this work addresses how chatbots can influence all dimensions of university adaptation, providing accessible and personalized support that improves students' social, academic, and institutional integration. The hypothesis is that ODAbot will facilitate a smoother transition to university life, helping to mitigate the barriers students face in their comprehensive adaptation.

This study is particularly relevant in contexts with limited resources, such as many universities in Peru and other parts of Latin America, where innovative strategies that can be implemented on a large scale without overburdening human resources are required. By investigating the simultaneous impact of the chatbot on the three dimensions of adaptability, this work not only contributes to the existing literature but also offers practical solutions to improve the university experience in resource-limited settings.

3 Materials and methods

3.1 Methodology

Data collection was carried out through the application of pre-test and post-test questionnaires to the students participating in the study, which assessed their adaptability before and after interacting with the ODAbot chatbot. The questionnaires were adapted to measure three main dimensions of adaptability: social, academic, and institutional.

A sample of 53 university students was selected based on convenience sampling due to accessibility limitations. While this sample size may seem limited, it is consistent with other studies that have explored similar educational technologies in small-scale settings. For example, Hew et al. (2022) conducted two case studies using sample sizes of 29 and 38 students, respectively, to investigate the effectiveness of chatbots in online learning environments. Despite the small sample sizes, their study provided valuable insights into student engagement and perceptions, demonstrating that small samples can be sufficient for exploratory studies when data collection methods and analyses are robust (Hew et al., 2022). Additionally, a power analysis (Cohen,1962; Cohen, 1988; Cohen,1992) indicated that a moderate to large effect size ($d = 0.72$) can be detected with this sample, ensuring sufficient power to observe significant differences in adaptability. The results provide valuable preliminary insights for future research with larger samples.

3.2 Participants

A total of 53 university students from a private university in Peru participated in the research during March and April 2024. Of these participants, 71.6% were women and 28.4% were men, with a mean age of 17.96 years (SD = 1.65). The students were enrolled in six different degree programs: Architecture, Nursing, Environmental Engineering, Systems Engineering, Psychology, and Business Administration, with a variable number of participants in each program. The basic information of the participants is presented in Table 1. Data collection was carried out through a pre-test and post-test questionnaire, ensuring consent and anonymity of responses. At the end of the study, all students completed questionnaires related to their experience and satisfaction with the use of the chatbot.

3.3 Creation of ODAbot

The creation of ODAbot was carried out following a SCRUM-based methodology, allowing for iterative and flexible development through sprints (Estrada-Velasco et al., 2019), as shown in Figure 1.

TABLE 1 Means and standard deviations by career.

School	N	Age		Gender	
		Mean	SD	Mean	SD
Architecture	8	17.25	0.89	0.63	0.52
Nursing	15	18.73	2.05	0.80	0.41
Environmental Engineering	6	17.83	1.33	0.83	0.41
Systems Engineering	8	18.50	2.07	0.38	0.52
Marketing	11	17.27	1.01	0.82	0.40
Psychology	5	17.60	1.34	0.80	0.45
Total	53	17.96	1.65	0.72	0.45

Gender: a value close to 0 indicates more men, while a value close to 1 indicates more women.

FIGURE 1
Engineering design based on the agile SCRUM methodology.
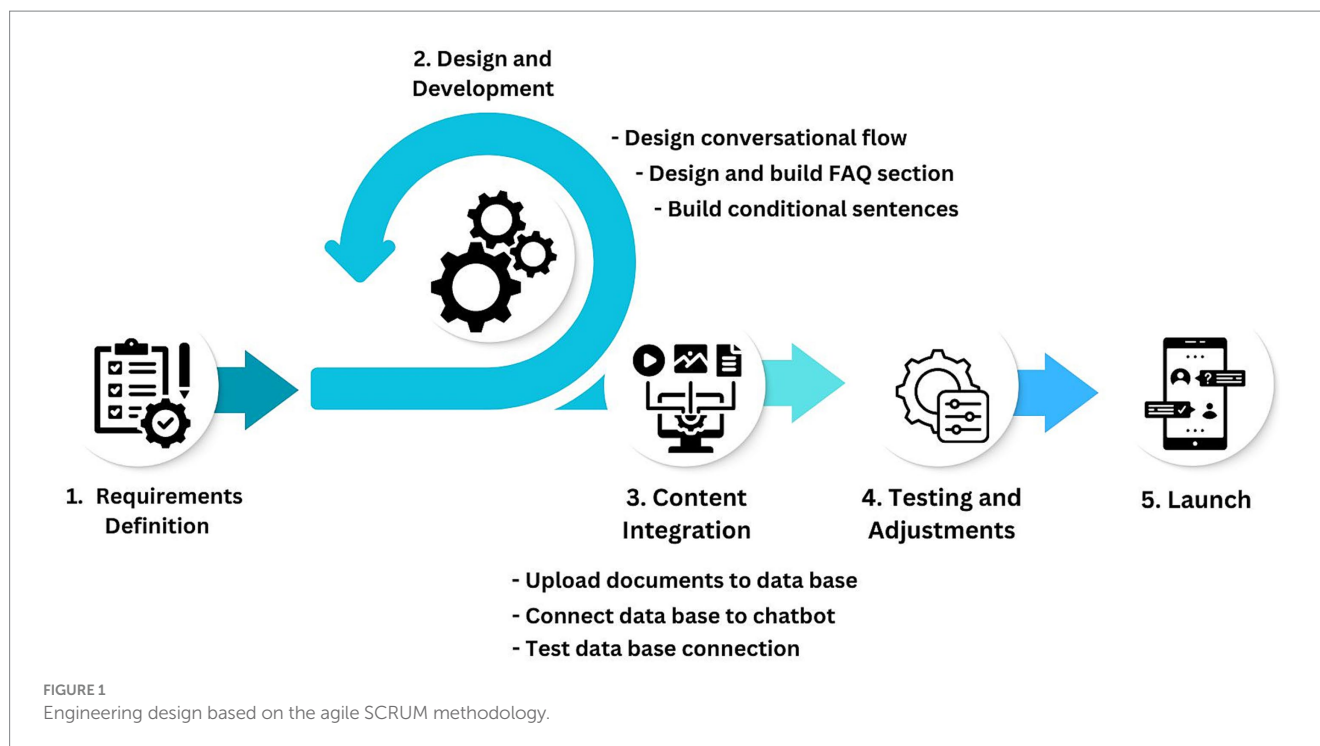
During the creation process, a collaborative approach was established between the chatbot developer and representatives from the university's academic and student welfare areas. Regular meetings were held to gather relevant information about services, schedules, tutor and psychologist contacts, as well as events and activities scheduled in the professional schools. This interaction allowed the collected content to be adapted into a specific format, which was used to populate the ODAbot database. Options were created within Voiceflow that allowed ODAbot to capture user messages and lead them through a selection process, where artificial intelligence would help identify if the input was a question and provide an appropriate response using the information stored in the database. A loop was also implemented to allow users to continue asking questions without interruption.

During the first sprint, the focus was on implementing student schedules in the ODAbot chatbot. Information was requested from the relevant department, and functions were developed for users to identify themselves by their major and group. ODAbot would ask for and recognize this data to provide the corresponding schedules. If the response was not valid, the user was prompted to enter a valid university major again.

In the second sprint, work was done on information about university events. Information on extracurricular and university extension activities was collected and digitized to feed ODAbot's database. The chatbot was programmed to answer questions about these events, searching the corresponding documents and providing appropriate responses.

In the third sprint, student referrals were addressed. Solutions were implemented for ODAbot to capture messages from students needing psychological attention and provide them with contacts of tutors or psychologists, or direct links to conversations with them. The data flow design steps developed in each sprint are shown in Figure 2.

Additionally, extensive testing of ODAbot was conducted before its official implementation. These tests covered aspects of functionality, usability, and responses to various questions and scenarios, both automated and manual with real users. The results obtained during the tests were analyzed in detail, leading to adjustments in the conversation flow, responses, and integrated content to ensure an effective final deployment. Subsequently, a Twilio account, the platform used for the chatbot's publication, was linked by inserting the Voiceflow webhook code and associating a mobile number for communication with users.

Once the necessary tests and adjustments were completed, ODAbot was finally published for use by first-year university students. This implementation process was carried out to provide personalized and accessible support to students, offering academic guidance, emotional and social counseling, and support resources tailored to the individual needs of each student. The creation and launch of ODAbot represented a promising opportunity to improve university students' adaptability and enhance their university experience.

3.4 Implementation of ODAbot

The traditional process followed by the university for the adaptability of first-year students begins with a general induction, where they are informed about university services and benefits, as well as available resources for financial, academic, social, and psychological support. During this stage, they are guided on the areas and places where they can seek help, with their academic tutor being the main point of contact, often introduced in the first class. In this initial meeting, they are provided with information about the schedules and classrooms assigned for the semester, thereby laying the foundation for their university experience.

FIGURE 2
Data flow.
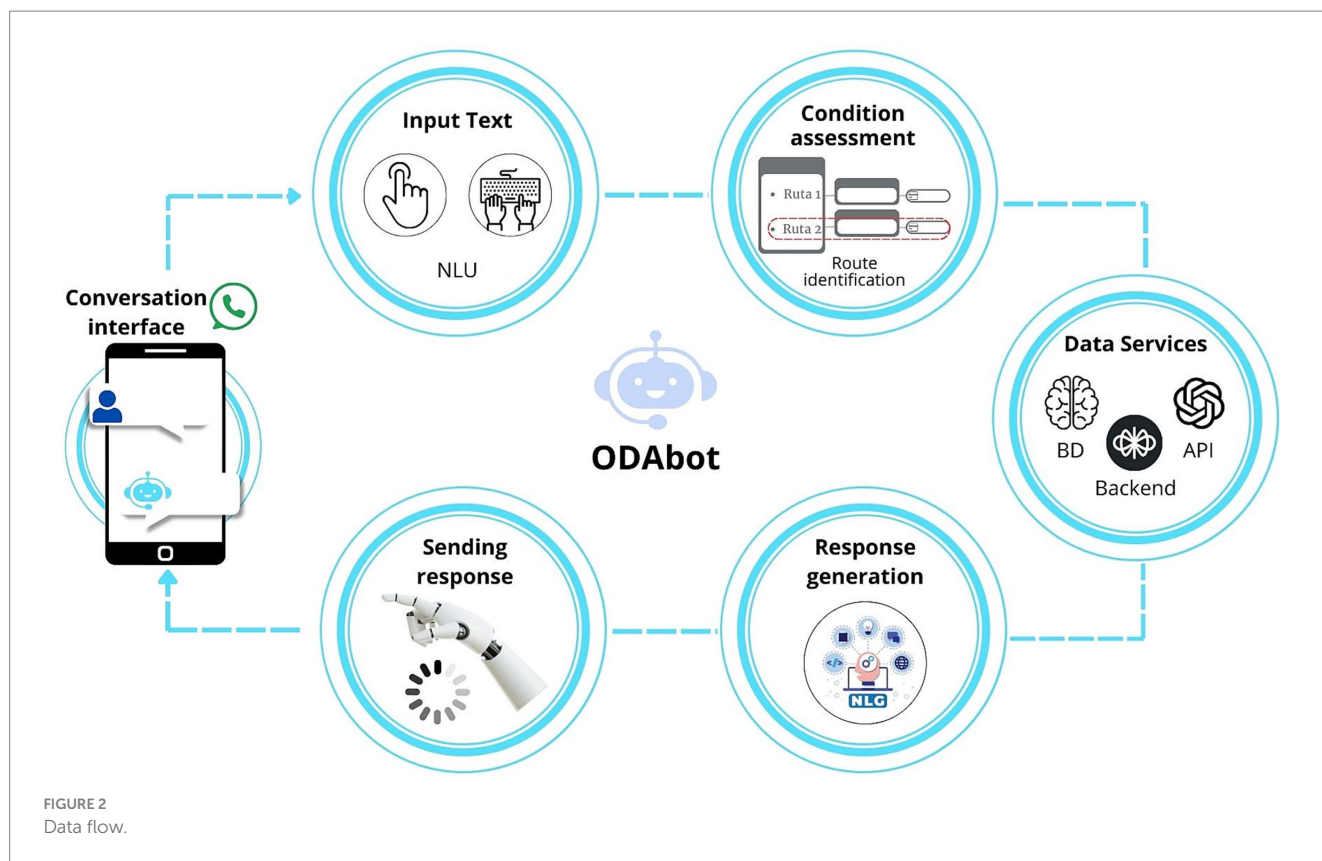
The process of adapting to university life with ODAbot began when all first-year students at the private university in Peru participating in this study were initially instructed on the use of ODAbot, following a zoom induction where they were explained how to access and use it. Subsequently, they were given access to ODAbot through a QR code shared in first-year WhatsApp groups, and officially printed on a banner with instructions, located at the university entrance. ODAbot offered them detailed information on student schedules, university events, and student referrals, catering to the social, institutional, and academic needs of the students. Through friendly conversational interactions, students could obtain answers to their queries and concerns, thereby facilitating their adaptation to the university environment and providing them with guidance quickly and effectively. Students completed a questionnaire before and after interacting with ODAbot to assess the chatbot's influence on their adaptability to university life. The students' experience with ODAbot was evaluated through a user experience questionnaire, revealing a positive and satisfactory response from the participants involved in the interaction with the chatbot.

3.5 Evaluation of the effect of ODAbot

This study focused on analyzing how the use of ODAbot influenced the adaptability of first-year students to university life at a Peruvian university. Additionally, student satisfaction with the user experience while interacting with ODAbot was assessed through surveys, considering ease of navigation, comprehension of responses, usefulness of information, and overall perception of the interaction.

3.6 Instrument development

The instrument used to assess students' adaptability was adapted from previous studies that have investigated university life adaptation. Specifically, the University Life Adaptation Questionnaire (CAVU), originally developed by Rodríguez-Ayan and Sotelo (2014), was used as a basis. This instrument has been widely validated in educational contexts to measure student adaptation factors across three main dimensions: social, academic, and institutional.

For this study, the questionnaire was adapted to the specific context of a private university in the northeastern region of Peru. Adjustments were made to the language and items to reflect the conditions and characteristics of university life in that institution. This adaptation process was evaluated through expert judgment, ensuring the content validity of the instrument (Cronbach's $\alpha = 0.95$).

3.7 Survey

This questionnaire consists of eleven items divided into three dimensions: social, institutional, and academic, which include Friendship, Study Circle, Communication, Recreational Activities, Free Time, Research and University Extension, University Administrative Areas, Student Welfare, Subject Information, General Concepts, and Problem Solving. These university students were evaluated on the aforementioned aspects. The same anonymous survey was conducted before and after interacting with ODAbot.

3.8 Statistical analysis

All statistical analysis was performed using SPSS 26 software. Measurement data were expressed as mean and standard deviation (SD), and significance was assessed using the Wilcoxon paired sample test. Usability and user experience data were evaluated using the CUQ tool to measure user satisfaction when interacting with ODAbot. In this study, $p < 0.05$ indicated that the difference was statistically significant.

4 Results

4.1 Mean and standard deviation

An analysis of the mean and standard deviation of the pre-test and post-test responses was conducted in relation to the three dimensions considered for student adaptability: social, institutional, and academic. The results indicate that the post-test responses exhibit a higher mean compared to the pre-test responses, suggesting that the post-test responses are greater. This implies that the post-test results had a positive impact on student adaptability, see Table 2.

4.2 Comparison of adaptability by dimension

4.2.1 Social dimension

A significant improvement in students' social adaptability was observed, with a p-value of 0.000, indicating that ODAbot had a notable impact on facilitating social interactions and peer support. This finding highlights the chatbot's effectiveness in promoting social integration, a key factor in successful adaptation to university life.

4.2.2 Academic dimension

While there was an improvement in academic adaptability with a p-value of 0.044, it did not reach the same level of significance as the social dimension. This suggests that although ODAbot provided valuable support in managing academic tasks and offering academic information, its influence was more limited compared to its social impact (Table 3).

4.2.3 Institutional dimension

No significant differences were found in the institutional dimension ($p = 0.124$). This may indicate that ODAbot's functionalities related to institutional information, such as guidance on administrative procedures and institutional resources, were less effective in improving students' perceptions of their institutional adaptation. This result suggests that specific adjustments in the chatbot's content or interaction style may be needed to better address this dimension (Table 4).

4.3 Usability and user experience survey for ODAbot

To achieve this, the CUQ (Chatbot Usability Questionnaire) was used, a tool specifically designed to measure the usability of chatbots.

TABLE 2 Means and standard deviations of instrument responses separated by adaptability dimensions.

Dimensions	N	Pre test		Post test	
		Mean	SD	Mean	SD
Social	265	3.87	0.85	4.38	0.70
Institutional	159	3.91	0.86	4.13	0.72
Academic	159	4.13	0.85	4.40	0.63
Total	583	3.95	0.86	4.32	0.70

TABLE 3 Kolmogorov–Smirnov normality test.

	Pre − Post
Z	53
p	0.001

TABLE 4 Wilcoxon test per dimension.

Dimensions	Z	p
Social	53	0.000
Institutional	53	0.124
Academic	53	0.044
Adaptability	53	0.000

As detailed in Tables 5, 6, the results of the usability and user experience survey for ODAbot revealed a significant improvement in student satisfaction. Users agreed with 63% of the questions related to positive aspects and 47% of the questions related to negative aspects. This indicates that the overall experience with ODAbot was positive. Students who interacted with ODAbot reported a positive experience in terms of ease of navigation, comprehension of responses, usefulness of the provided information, and error-handling capability. This demonstrates that ODAbot was effective in providing support to students and meeting their needs.

4.4 Additional findings from the ODAbot implementation and testing process

During the development process of ODAbot, multiple sprints based on the SCRUM methodology were implemented to ensure that the chatbot adequately addressed students' needs across different dimensions. In the pre-implementation testing phases, functionality, usability, and responsiveness in various scenarios were evaluated. These trials allowed for significant adjustments in the conversation flow and integrated content, ensuring that ODAbot was effective in its final deployment.

5 Discussion

In the current context where artificial intelligence is transforming the academic environment, adaptation to university life remains a challenge affecting student monitoring programs, increasing compliance time with requirements that are increasingly demanding and necessary for accreditation in teaching quality (SINEACE, 2016;

TABLE 5 Positive aspect questions.

No	Item	% de acuerdo
1	The chatbot's personality was realistic and appealing.	64.0
2	The chatbot was welcoming during the initial setup.	62.0
3	The chatbot explained its scope and purpose well.	62.0
4	The chatbot was easy to navigate.	66.0
5	The chatbot understood me well.	65.0
6	The chatbot's responses were helpful, appropriate, and informative.	65.0
7	The chatbot handled any errors or mistakes well.	59.0
8	The chatbot handled any errors or mistakes well.	63.0
Average percentage agreement		**63.0**

TABLE 6 Negative aspect questions.

No	Item	% de acuerdo
1	The chatbot seemed too robotic.	55.0
2	The chatbot seemed unfriendly.	49.0
3	The chatbot did not give any indication of its purpose.	48.0
4	It would be easy to get confused when using the chatbot.	48.0
5	The chatbot did not recognize many of my inputs.	53.0
6	The chatbot's responses were irrelevant.	47.0
7	The chatbot seemed incapable of handling any errors.	47.0
8	The chatbot was too complex.	47.0
Average percentage agreement		**49.0**

Hernández Paz et al., 2023). This study evaluated whether the use of ODAbot had a significant influence on the adaptability of first-cycle students at a particular university in Peru. The results of the Wilcoxon test showed that ODAbot did have a significant influence on two out of the three dimensions of adaptability assessed through the pre and post-test questionnaire. This supports the initial hypothesis posed, indicating the significant impact ODAbot had on the adaptation process to university life among first-cycle students in the university's six professional careers. Of the three dimensions evaluated (social, institutional, and academic), the social dimension showed a higher degree of significance ($p = 0.000$) compared to the academic dimension ($p = 0.44$). However, no significant difference was found in the institutional dimension ($p = 0.124$), thus rejecting the hypothesis proposed.

The results evaluated from the CUQ (Chatbot User Experience Questionnaire) indicate that students had a positive experience interacting with ODAbot. The interaction between the chatbot and students was easy to follow and understand, contributing to a satisfactory user experience.

This study was the first to directly measure the influence of a chatbot on the adaptability to university life of students and evaluate student satisfaction through their user experience. ODAbot provides quality information to students, avoiding predefined and robotic responses in favor of friendly conversations with precise and current information.

Research conducted by Meennapa and Paniti (2022), Merkouris et al. (2022), and Xinjie and Yu (2023) supports the idea that chatbots can enhance efficiency and student satisfaction in terms of usability, usefulness, quality of information, and credibility. Additionally, other studies such as Ortiz Hernández et al. (2022) have demonstrated that chatbots can outperform academics in terms of availability, response time, knowledge, and quality of response in the context of academic tutoring. These findings underscore the importance of chatbot technology in sustainable education.

Secondly, the engineering design utilized was based on the SCRUM agile methodology, known for delivering functional results quickly. SCRUM methodology was adapted to streamline the creation process of a customized chatbot, focusing specifically on sprints (Sassa et al., 2023). Each sprint covered different dimensions providing precise and personalized information for students in each of the six professional careers. This information and data flow from each sprint encompassed the following: social dimension, institutional dimension, and academic dimension, facilitating communication between students and student services, as supported by the study of Balderas et al. (2023), demonstrating effectiveness in improving accessibility, perceived quality, and user satisfaction.

5.1 Implications and contributions to theory and practice

The findings of this study have significant implications for both theory and practice. Theoretically, they contribute to the field of education and technology by providing empirical evidence on the effectiveness of chatbots in enhancing the adaptability of university students. Our study contributes significantly by incorporating a conversational agent based on a chatbot into university life adaptability, representing a novel approach in the field of education. Unlike traditional focuses on subjects like mathematics (Moral-Sánchez et al., 2023), where AI in mathematical education generates high levels of student satisfaction by enhancing their digital competence and encouraging more frequent use of these technologies, our study emphasizes the broader impact of artificial intelligence tools. It is crucial for educational institutions to be aware of how students utilize these AI tools, as their frequent use may impact the quality of the educational experience by potentially limiting the development of social and emotional skills in students, as noted in Guerrero-Bocanegra (2022a).

This study expands the understanding of how chatbots can influence not only academic aspects but also critical social dimensions essential for university success. The results suggest that the integration of personalized technological tools, such as ODAbot, can be a key component in theoretical models of university adaptation, especially in environments where human support may be limited.

These negative aspects are highlighted in the studies of Carrasco (2023) and Nee et al. (2023). Furthermore, it has been observed that chatbots lack the ability to establish emotional connections and

provide personalized support similar to what a human teacher can offer. This sentiment was demonstrated in sentiment analyses conducted by Rubio et al. (2022), where results ranged from neutral to negative in student interactions.

In practical terms, this study offers valuable lessons for the implementation of chatbots in educational contexts. The findings highlight the importance of continuously updating information and the need for close collaboration with academic units to ensure the relevance and accuracy of the data provided by chatbots. Additionally, the use of agile methodologies such as SCRUM emerges as an effective approach for the continuous development and improvement of these tools, allowing for rapid adaptation to the changing needs of students. Educational institutions can utilize these insights to enhance their student support strategies, potentially reducing dropout rates and improving the overall student experience.

For future research, it is recommended to explore more advanced configurations of chatbots that incorporate more sophisticated artificial intelligence and machine learning capabilities to enhance response personalization and integration with other university services. Furthermore, studies with more robust experimental designs, such as randomized controlled trials, could provide greater internal validity and allow for a more precise evaluation of the impact of chatbots on university adaptation.

6 Conclusion

Our study demonstrates that integrating a conversational agent based on a chatbot in the university context could be an effective solution to enhance students' adaptability. These artificial intelligence programs and natural language processing can provide personalized support that is always available for academic guidance, emotional and social counseling, and support resources. Moreover, they can be tailored to the individual needs of each student, promoting autonomy and active participation in the educational process. The proper use of these technologies can increase student retention, reduce dropout rates, and enhance the reputation and financial success of universities. It is important to consider limitations and factors such as socioeconomic backgrounds and potential response biases from participants. Overall, implementing conversational agents based on chatbots represents a promising opportunity to improve university students' adaptability and ensure a quality educational experience.

6.1 Limitations of the study

One of the primary limitations of this study was the lack of updated and specific information from each professional school for integration into the chatbot, which affected the effectiveness of ODAbot in the institutional dimension. Additionally, the pre-experimental design without a control group limits the ability to establish a clear causal relationship between the use of ODAbot and the observed improvements in student adaptability. Moreover, the sample size and its composition, specific to a single private institution,

may restrict the generalization of the results to other student populations or educational contexts.

6.2 Directions for future research

For future investigations, it is recommended to utilize more robust experimental designs, such as randomized controlled trials, which would allow for a more precise evaluation of the impact of chatbots on university adaptability and provide stronger evidence of the effectiveness of these tools. It would also be beneficial to expand the study to different contexts and types of educational institutions, including public universities and other regions, to assess the applicability of the findings across various scenarios. Additionally, future research could explore the integration of more advanced artificial intelligence and machine learning capabilities, enabling more effective personalization of interactions and the automated updating of relevant information for each professional school.

6.3 Recommendations for stakeholders

For educational institutions, it is recommended to establish closer collaborations between chatbot developers and academic departments to ensure that the information available on technological platforms is current and relevant to students. Universities should consider implementing strategies for continuous content updating and validation within chatbots, which could include direct integration with the institution's academic management systems.

In conclusion, this study demonstrates the potential of chatbots as a valuable tool for enhancing the adaptability of university students, highlighting their strengths in the social and academic dimensions, and providing a solid foundation for future technological implementations and methodological adjustments. With continuous improvement and strategic integration into educational systems, chatbots can play a key role in reducing dropout rates and enhancing the student experience in higher education.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the [patients/ participants OR patients/participants legal guardian/ next of kin] was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

YM: Writing – original draft, Methodology, Writing – review & editing, Investigation, Project administration. CN: Writing – original draft, Software, Writing – review & editing, Investigation, Visualization. NC: Writing – review & editing, Supervision, Validation. YP: Writing – review & editing, Supervision, Validation.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Al-Abdullatif, A., Al-Dokhny, A., and Drwish, A. (2023). Implementing the Bashayer chatbot in Saudi higher education: measuring the influence on students' motivation and learning strategies. *Front. Psychol.* 14:1129070. doi: 10.3389/fpsyg.2023.1129070

Aloqayli, A., and Abdelhafez, H. (2023). Intelligent Chatbot for admission in higher education. *Int. J. Inf. Educ. Technol.* 13, 1348–1357. doi: 10.18178/ijiet.2023.13.9.1937

Balderas, A., García-Mena, R. F., Huerta, M., Mora, N., and Dodero, J. M. (2023). Chatbot for communicating with university students in emergency situation. *Heliyon* 9:e19517. doi: 10.1016/j.heliyon.2023.e19517

Carrasco, A. (2023). Reinventando la enseñanza de la Historia Moderna en Secundaria: la utilización de ChatGPT para potenciar el aprendizaje y la innovación docente. *Studia Historica: Historia Moderna* 45, 101–145. doi: 10.14201/shhmo2023451101146

Chaiprasurt, C., Amornchewin, R., and Kunpitak, P. (2022). Using motivation to improve learning achievement with a chatbot in blended learning. *World J. Educ. Technol.* 14, 1133–1151. doi: 10.18844/wjet.v14i4.6592

Cohen, J. (1962). The statistical power of abnormal-social psychological research: a review. *J. Abnorm. Soc. Psychol.* 65, 145–153. doi: 10.1037/h0045186

Cohen, J. (1988). Statistical power analysis for the behavioral sciences: Routledge.

Cohen, J. (1992). A power primer. *Psychol. Bull.* 112, 155–159. doi: 10.1037/0033-2909.112.1.155

Essel, H., Vlachopoulos, D., Tachie-Menson, A., Johnson, E. E., and Baah, P. K. (2022). The impact of a virtual teaching assistant (chatbot) on students' learning in Ghanaian higher education. *Int. J. Educ. Technol. High. Educ.* 19:57. doi: 10.1186/s41239-022-00362-6

Estrada-Velasco, M. V., Núñez-Villacis, J. A., Saltos-Chávez, P. R., and Cunuhay-Cuchipe, W. C. (2019). Revisión Sistemática de la Metodología Scrum para el Desarrollo de Software Revisión Sistemática de la Metodología Scrum para el Desarrollo de Software Systematic review of the SCRUM methodology for software development. *Revisão Sistemática da Metodologia* 7, 438–447. Available at: https://dialnet.unirioja.es/servlet/articulo?codigo=8384028

Fajardo Aguilar, G. M., Ayala Gavilanes, D. C., Arroba Freire, E. M., and López Quincha, M. (2023). Inteligencia Artificial y la Educación Universitaria: Una revisión sistemática. *Magazine de las Ciencias: Revista de Investigación e Innovación* 8, 109–131. doi: 10.33262/rmc.v8i1.2935

Faná del Valle, A., De la Rosa, D., and Ibanez-Ayuso, M. (2022). 'Análisis bibliométrico de la producción científica sobre la adaptación a la vida universitaria. *Hum. Rev.* 11, 1–14. doi: 10.37467/revhuman.v11.4031

Guerrero-Bocanegra, B. (2022a). Análisis de la dimensión social en las interacciones de los foros de acogida de la UNED y sus implicaciones para el diseño de un chatbot de orientación educativa. *Revista Electrónica Educare* 27, 1–25. doi: 10.15359/ree.27-1.15844

Guerrero-Bocanegra, B. (2022b). Chatbot para la orientación educativa de los nuevos estudiantes de grado en la uned, 616–618.

Hasan, N., Polin, J. A., Ahmmed, M. R., Sakib, M. M., Jahin, M. F., and Rahman, M. M. (2024). A novel approach to analyzing the impact of AI, ChatGPT, and chatbot on education using machine learning algorithms. *Bull. Electr. Eng. Inform.* 13, 2951–2958. doi: 10.11591/eei.v13i4.7158

Hernández Paz, A. A., Cancino Cancino, V. E., Tamez González, G., and Leyva Cordero, O. (2023). Evaluación y acreditación para el aseguramiento de la calidad de la educación superior en México. *Revista Venezolana de Gerencia* 28, 693–712. doi: 10.52080/rvgluz.28.102.16

Hew, K. F., Huang, W., Du, J., and Jia, C. (2022). Using chatbots to support student goal setting and social presence in fully online activities: learner engagement and perceptions. *J. Comput. High. Educ.* 35, 40–68. doi: 10.1007/s12528-022-09338-x

Issn, R., and Unibertsitatea, E. H. (2023). Integración de la Inteligencia Artificial en la Educación superior: Desafíos y oportunidades Integration of Artificial Intelligence in

the Higher Education: Challenges and Opportunities Abstract. Revista Eléctronica Trnasformar de Centro Transformar SpA, 17–34.

Meennapa, R., and Paniti, N. (2022). Automated information retrieval and services of graduate school using chatbot system. *Int. J. Electr. Comput. Eng.* 12, 5330–5338. doi: 10.11591/ijece.v12i5.pp5330-5338

Merkouris, S. S., Loram, G., Abdelrazek, M., Rodda, S. N., Ibrahim, A., Bonti, A., et al. (2022). Improving the user experience of a gambling support and education website using a chatbot. *Univ. Access Inf. Soc.* 23, 213–225. doi: 10.1007/s10209-022-00932-5

Moral-Sánchez, S., Rey, F., and Cebrián-de-la-Serna, M. (2023, 2023). Analysis of artificial intelligence chatbots and satisfaction for learning in mathematics education. *Int. J. Educ. Res. Innov.* 20, 1–14. doi: 10.46661/ijeri.8196

Mosleh, S. M., Alsaadi, F. A., Alnaqbi, F. K., Alkhzaimi, M. A., Alnaqbi, S. W., and Alsereidi, W. M. (2024). Examining the association between emotional intelligence and chatbot utilization in education: a cross-sectional examination of undergraduate students in the UAE. *Heliyon* 10:e31952. doi: 10.1016/j.heliyon.2024.e31952

Nee, C. K., Rahman, M. H. A., Yahaya, N., Ibrahim, N. H., Razak, R. A., and Sugino, C. (2023). Exploring the trend and potential distribution of Chatbot in education: a systematic review. *Int. J. Inf. Educ. Technol.* 13, 516–525. doi: 10.18178/ijiet.2023.13.3.1834

Ogosi, J., (2021). Chatbot del proceso de aprendizaje universitario: Una revisión sistemática. *Alpha Centauri* 2, 29–43. doi: 10.47422/ac.v2i2.33

Okamoto, A. M. T., Hernández, K. M. C., and Guevara, S. G. V. (2024). Adaptación universitaria en estudiantes de primer año de una universidad pública de Ica-Perú. *Scielo*. doi: 10.1590/SciELOPreprints.8092

Okonkwo, C., and Ade-Ibijola, A. (2021). Chatbots applications in education: a systematic review. *Comput. Educ.* 2:100033. doi: 10.1016/j.caeai.2021.100033

Ortiz Hernández, G., Galindo Monfil, A. R., Martínez Herrera, B. M., and Gálvez Vázquez, M. Á. (2022). Chatbots como Apoyo a Tutorías Académicas en la Licenciatura en Sistemas Computacionales Administrativos de la Universidad Veracruzana Región Xalapa. *Interconectando Saberes* 14, 55–64. doi: 10.25009/is.v0i14.2760

Paredes, L., and Figueroa, R. (2022). Chatbot basado en una versión ligera del modelo BERT para resolver inquietudes relacionadas con matrículas y homologaciones en la Universidad Nacional de Loja. *CEDAMAZ* 12, 174–182. doi: 10.54753/cedamaz.v12i2.1686

Pérez, A. B. D., Quispe, F. M. P., Aguilar, O. A. G., and Cortez, L. C. C. (2020). Transición secundaria-universidad y la adaptación a la vida universitaria. *Revista de Ciencias Sociales* 26, 244–258.

Reyes-Moreno, E. R., Londoño-Gallego, J. A., Andrade-Martelo, I. C., Villar-Vega, H. F., and Castro-Maldonado, J. J. (2023). ChatGPT in education: a bibliometric approach to the integration of Chatbot systems in educational processes. *Aibi, Revista de Investigacion Administracion e Ingenierias* 11, 143–155. doi: 10.15649/2346030X.3245

Roberto, W., and Chamba, M. (2024) 'REFORZANDO la EDUCACIÓN con INTELIGENCIA artificial: IMPLEMENTACIÓN de un CHATBOT Como COMPAÑERO reinforcing education with artificial intelligence: Implementation of an CHATBOT as an educational'. Revista Científica Multidisciplinaria SAPIENTIAE.

Rodríguez-Ayan, M., and Sotelo, M. (2014) 'Cuestionario de Adaptación a la Vida Universitaria (CAVU)'. Available at: https://www.redalyc.org/pdf/3334/333432764006.pdf.

Rubio, J., Neira-Peña, T., Molina, D., and Vidal-Silva, C. (2022). Proyecto UBOT: asistente virtual para entornos virtuales de aprendizaje. *Información tecnológica* 33, 85–92. doi: 10.4067/s0718-07642022000400085

Sassa, A., Alves de Almeida, I., Pereira, T., and Silva de Oliveira, M. (2023). A systematic literature review. *Int. J. Adv. Comput. Sci. Appl.* 14, 282–307.

Seminara, M. (2020). La deserción universitaria: resiliencia como posibilidad de logro. *Revista Digital Universitaria* 21. doi: 10.22201/cuaieed.16076079e.2020.21.5.11

SINEACE (2016) Modelo de Acreditación para Programas de Estudios de Educación Superior Universitaria., Sistema Nacional de Evaluación, Acreditación y Certificación de la Calidad Educativa.

Torres, H. O. V., Morales, J. C. A., Rodriguez, W. J. M., and Mejía, J. E. C. (2024). Modelo de clasificación para la deserción estudiantil en las universidades públicas del Perú | Classification model for student dropout in public universities in Peru. *Revista de Ciencias Sociales* 30, 452–469.

Xinjie, D., and Yu, Z. (2023). A Meta-analysis and systematic review of the effect of Chatbot technology use in sustainable education. *Sustainability (Switzerland)* 15:2940. doi: 10.3390/su15042940

Yildiz Durak, H., and Onan, A. (2024). Predicting the use of chatbot systems in education: a comparative approach using PLS-SEM and machine learning algorithms. *Curr. Psychol.* 43, 23656–23674. doi: 10.1007/s12144-024-06072-8

Zerón, A. (2023). Inteligencia artificial y charlas robotizadas por ChatGPT. *Revista de la Asociación Dental Mexicana* 80, 66–69. doi: 10.35366/110644

Zuñiga-Vilches, M., Vergara-Morales, J., Pérez-Villalobos, M. V., and Díaz-Mujica, A. (2020). Escritos de Psicología cognitive-motivational factors related to adjustment to university life of Chilean students Factores cognitivo-motivacionales relacionados con el ajuste a la Vida universitaria de estudiantes chilenos. *Escritos de psicologia* 13, 71–79. doi: 10.24310/espsiescpsi.v13i2.12411