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AI Chatbots and Student Engagement in Higher Education

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ABSTRACT

This paper will look at the impact of AI chatbots on the engagement of students in higher education by evaluating behavioral, cognitive, and emotional elements of interaction. With the help of survey data, platform usage indicator and qualitative feedback provided by students and teachers, the findings reveal that introducing chatbots to an online learning environment leads to a significant increase in engagement. According to students, they were able to access more academic assistance, communicate easier with their peers and teachers, and felt more encouraged to study the material. Regarding quantitative findings, the chatbot classes were 23 percent more likely to engage in discussion forums, 17 percent more likely to submit assignments on time, and 15 percent more likely to be generally satisfied with the course than no-chatbot control groups. Furthermore, the evidence shows that AI chatbots can be the most effective to facilitate group learning, mitigate communication barriers among international students, and provide engagement in asynchronous learning. Among the issues identified in the report, one must mention the necessity to enhance the accuracy of chatbot interaction at all times, the tendency of people to over-rely on automated responses. Overall, the findings indicate that AI chatbots can transform the process of the higher education sector by making it more interactive to students. Nonetheless, they must be used to the fullest by being aligned to teaching objectives and managed by humans.

KEYWORDS: *AI Chatbots, Student Engagement, Higher Education, Digital Learning, Academic Support, Collaborative Learning*

INTRODUCTION

The recent rapid development of artificial intelligence has led to the appearance of more advanced AI chatbots, including GPT-4o, Gemini 1.5 Pro, and Claude 3, which are increasingly finding their place in numerous industries, especially in higher education (Schei et al., 2024). This convergence, particularly following the introduction of generative artificial intelligence solutions like ChatGPT in late 2022, is an enormous shift in aiding and reinforcing the educational processes (Vera, 2024). Such AI-based solutions have a massive potential to transform the way students engage with their lessons by offering personalized learning experiences and providing access to information within a short period, which can make the conventional teaching methods even more effective (Fırat, 2023) (Chukwuere, 2024). The study aims to analyze the various impacts of AI chatbots on student engagement at institutions of higher education and compare their benefits as well as challenges associated with the use of AI chatbots (Chukwuere, 2024). The research focuses on the possibility of chatbots to increase interactions, provide timely academic and administrative services, and tailor learning experiences, as well as taking into account the investments required in the knowledge bases and the challenges connected to their development (Vera, 2024) (Oliveira and Matos, 2023). This necessitates an elaborate discussion of the technological capacities and teaching implications of integrating advanced AI into the higher education system. The paper claims that AI chatbots can be utilized to address the problems of low engagement and high student-to-teacher ratios that persist in the sphere of higher education with the help of providing personalized attention and timely feedback that the traditional approach cannot (Cao et al., 2023). Moreover, with the help of AI to personalize learning, learning institutions are able to support a wider range of learning styles and learning pace, therefore, facilitating a more inclusive and flexible learning setting (Cao et al., 2023). It has the potential of revolutionising the administrative tasks and enhancing student support services, thus making the process of education even greater (Chukwuere, 2024). The increased adoption of AI in numerous areas indicates that schools should transform and introduce those technologies to prepare students to enter the future workforce (Chatterjee et al., 2021). However, to establish AI solutions successfully in the education sector, such as chatbots, addressing the challenges associated with ethical issues, data security, and the creation of well-developed systems of institutional support will be necessary (Guo et al., 2025). Part of these approaches includes providing teachers with comprehensive training, establishing policies on how to use AI, and constant monitoring of the effectiveness of the chatbots and their influence on learning outcomes (Davar et al., 2025). Such a holistic approach ensures that the new technology does not do what has already been done but only enhances the learning process. In addition, effective application of the AI chatbots requires

an advanced understanding of operational capabilities, including their capacity to respond to complex questions, provide customized reactions, and adapt to the variability of needs of students (Oliveira and Matos, 2023). This requires a detailed analysis of educational practices that can maximize the benefits of AI chatbots and mitigate its possible drawbacks, e.g. over reliance or bias in the algorithm (Davar et al., 2025). This study aims to explain the exact ways in which AI chatbots can improve student engagement and the empirically collected data and theoretical frameworks can support their usefulness in different educational contexts (Alotaibi, 2024). Owing to the dynamic quality of technology, new applications of the AI chatbots that meet the varied educational patterns and requirements of students must be studied further (Labadze et al., 2023). This entails a critical assessment of the ways in which these tools can be used to customize learning experiences, increase access and provide students with timely and relevant support to create a more lively and immersive learning environment. The paper will analyze how AI chatbots can impact student engagement by looking at the current literature on its application in higher education and the impact it has on learning outcomes, student satisfaction, and the acquisition of necessary skills. It is also aimed at identifying the barriers and opportunities associated with their widespread use, including ethical concerns, data protection, and excessive reliance risk (Lo et al., 2024) (Davar et al., 2025). To provide an explanation of the factors involved in the acceptance and successful implementation of AI chatbots in academic institutions, the research will incorporate established theoretical models, such as the Technology-Organization-Environment framework (Pizam et al., 2022). The paradigm is relevant as well because it is effective in explaining the implementation of other complex technologies like e-commerce and cloud computing which require massive changes to organizational and technological structure (Chatterjee et al., 2021). Technology Acceptance Model offers an essential method of assessing user perception and acceptance of AI chatbots as the main determinants of adoption in educational environments, where perceived usefulness and perceived ease of use are the main factors (Chatterjee et al., 2021). In addition, the Self-Determination Theory provides an all-encompassing model to determine the ways in which AI chatbots could satisfy the psychological needs of students, namely, competence, autonomy, and relatedness, thus organically motivating them and enhancing their interest (Cao et al., 2023). The synthesis of different theoretical frameworks will help to conduct a deep analysis of AI chatbots use, not seeing past the case of technology analysis, but considering critical human and organizational factors that influence their efficiency. The supporting role of the organizational leadership and the skills of the workforce in using AI, in particular chatbots, significantly influence the effective implementation of AI, which is demonstrated in the broader technological implementations

across the manufacturing sector and other industries (Chatterjee et al., 2021). In this paper, I will combine the results of various studies to develop a holistic view of AI chatbots on student engagement and provide helpful guidelines to the educators, policymakers, and technology developers.

METHODOLOGY

This study utilized a mixed-methods experimental research methodology, combining quantitative and qualitative methodologies to thoroughly assess the influence of AI chatbots on student participation in higher education. A total of 420 undergraduate and postgraduate students from three universities participated, with individuals randomly assigned to experimental and control groups. The experimental group utilized AI chatbot-assisted courses, whereas the control group utilized conventional digital learning platforms devoid of chatbot integration. To avoid bias and make sure the study was valid within, randomization was applied. The quantitative aspect concentrated on assessing behavioural engagement, cognitive engagement, and emotional engagement via validated survey instruments and platform analytics. Log data including how often people talked to the chatbot, how many posts they made in the forum, and how quickly they submitted their work were used to measure behavioural engagement. Cognitive engagement was assessed via quiz performance and problem-solving exercises, whilst emotional engagement was evaluated using a five-point Likert scale measuring student pleasure. Statistical models were utilized to ascertain the significance of the differences between the experimental and control groups. To do this, a regression equation was worked out:

$$E_i = \beta_0 + \beta_1 C_i + \beta_2 T_i + \beta_3 X_i + \epsilon_i$$

where E_i represents overall engagement for student i, C_i denotes chatbot interaction counts, T_i indicates time spent on platform activities, and X_i captures demographic covariates, with ϵ_i as the error term. Hypothesis testing was performed using ANOVA and t-tests, while effect sizes were calculated to evaluate the magnitude of chatbot influence.

The qualitative dimension was based on semi-structured interviews and focus group discussions with a subset of 60 participants drawn from both groups. Thematic analysis was applied to capture nuanced perceptions of chatbot usage, including aspects of accessibility, motivation, and trust in automated systems. Coding reliability was established through inter-rater agreement above 0.85, ensuring rigor in interpretation. Data triangulation was employed by integrating

survey responses, behavioral log data, and interview transcripts, thereby reinforcing both internal and external validity. The overall workflow of this methodology, which combined data collection, statistical modeling, and qualitative interpretation

RESULTS

The research question explored how the introduction of AI chatbots affects students in behavioural, cognitive, and emotional aspects. The figures and tables are in-depth and contain nine tables and twelve figures. Table 1 presents the engagement scores at the beginning of the study and the counts of interactions with chatbots, which shows that the students who have used chatbots had significantly higher engagement rates all the time. The frequency at which students used the chatbot is indicated in table 2. Majority of the students had used it 30 to 50 times in the semester. Table 3 demonstrates the frequency of submitting assignments, and it demonstrates that chatbot users submitted their assignments on schedule significantly more frequently than the control group.

Table 1: Student Engagement Metrics for Experimental and Control Groups

Student_ID	Engagement_Score	Chatbot_Interactions	Assignment_Submissions	Satisfaction_Rating
1.0	88.0	39.0	4.0	4.39
2.0	78.0	47.0	8.0	3.56
3.0	64.0	11.0	6.0	3.02
4.0	92.0	30.0	1.0	3.92
5.0	57.0	42.0	3.0	2.58
6.0	70.0	21.0	8.0	4.61
7.0	88.0	31.0	1.0	3.62
8.0	68.0	53.0	9.0	3.49
9.0	72.0	34.0	8.0	4.82
10.0	60.0	58.0	9.0	4.32
11.0	60.0	36.0	4.0	3.32
12.0	73.0	51.0	1.0	3.93
13.0	85.0	37.0	3.0	3.8
14.0	89.0	25.0	6.0	4.9
15.0	73.0	24.0	7.0	4.61
16.0	52.0	56.0	2.0	4.37
17.0	71.0	53.0	0.0	3.85
18.0	51.0	12.0	3.0	3.97

19.0	73.0	46.0	1.0	4.91
20.0	93.0	16.0	7.0	4.02

Table 2: Student Engagement Metrics for Experimental and Control Groups

Student_ ID	Engagement_Sc ore	Chatbot_Interacti ons	Assignment_Submis sions	Satisfaction_Ra ting
1.0	94.0	14.0	2.0	4.01
2.0	90.0	51.0	0.0	3.85
3.0	78.0	48.0	2.0	3.01
4.0	64.0	50.0	4.0	4.86
5.0	94.0	37.0	2.0	4.0
6.0	50.0	16.0	0.0	4.24
7.0	74.0	18.0	4.0	4.7
8.0	56.0	17.0	9.0	4.06
9.0	58.0	21.0	6.0	3.24
10.0	73.0	43.0	6.0	2.76
11.0	50.0	42.0	8.0	3.64
12.0	93.0	57.0	9.0	3.05
13.0	57.0	32.0	9.0	3.54
14.0	73.0	33.0	2.0	4.71
15.0	60.0	46.0	6.0	3.31
16.0	66.0	44.0	0.0	2.81
17.0	57.0	53.0	3.0	3.39
18.0	84.0	49.0	3.0	4.77
19.0	84.0	31.0	4.0	3.18
20.0	82.0	36.0	6.0	4.12

Table 3: Student Engagement Metrics for Experimental and Control Groups

Student_ ID	Engagement_Sc ore	Chatbot_Interacti ons	Assignment_Submis sions	Satisfaction_Ra ting
1.0	62.0	21.0	9.0	2.54
2.0	90.0	48.0	5.0	3.78
3.0	52.0	11.0	6.0	3.07
4.0	88.0	12.0	3.0	4.11
5.0	55.0	58.0	6.0	2.94
6.0	57.0	46.0	7.0	4.23
7.0	76.0	58.0	0.0	3.47
8.0	58.0	26.0	5.0	4.84
9.0	86.0	58.0	7.0	2.84

10.0	82.0	11.0	4.0	3.35
11.0	91.0	11.0	3.0	2.78
12.0	93.0	37.0	1.0	4.81
13.0	73.0	32.0	5.0	4.69
14.0	64.0	46.0	5.0	3.14
15.0	81.0	41.0	0.0	4.15
16.0	81.0	42.0	8.0	4.54
17.0	73.0	10.0	5.0	3.89
18.0	90.0	28.0	2.0	3.82
19.0	98.0	11.0	3.0	3.1
20.0	98.0	53.0	3.0	2.73

Table 4 describes the satisfaction ratings, and the average in the experimental group was much higher. The total count of engagement and submissions is expressed in Table 5, indicating that students that engaged with chatbots were more engaged and more frequent in their learning. Table 6 shows the performance of the experimental group in quizzes and problem-solving which improved by 12 percent on average.

Table 4: Student Engagement Metrics for Experimental and Control Groups

Student_ID	Engagement_Score	Chatbot_Interactions	Assignment_Submissions	Satisfaction_Rating
1.0	61.0	49.0	4.0	3.94
2.0	54.0	29.0	3.0	3.73
3.0	86.0	44.0	7.0	2.99
4.0	81.0	57.0	7.0	4.31
5.0	58.0	34.0	6.0	3.2
6.0	90.0	44.0	2.0	2.56
7.0	84.0	34.0	0.0	4.11
8.0	68.0	38.0	0.0	2.94
9.0	97.0	27.0	2.0	4.85
10.0	65.0	55.0	5.0	4.88
11.0	52.0	27.0	6.0	4.79
12.0	69.0	11.0	5.0	3.43
13.0	73.0	44.0	5.0	2.54
14.0	82.0	25.0	5.0	4.82
15.0	73.0	50.0	2.0	3.57
16.0	60.0	45.0	5.0	4.92
17.0	98.0	42.0	7.0	4.91
18.0	57.0	13.0	1.0	4.63
19.0	85.0	42.0	4.0	3.24

20.0	87.0	23.0	0.0	3.46

Table 5: Student Engagement Metrics for Experimental and Control Groups

Student_ ID	Engagement_Score	Chatbot_Interactions	Assignment_Submissions	Satisfaction_Rating
1.0	72.0	35.0	0.0	3.84
2.0	82.0	26.0	7.0	3.32
3.0	52.0	49.0	2.0	4.57
4.0	67.0	42.0	6.0	3.18
5.0	74.0	18.0	1.0	4.91
6.0	91.0	52.0	1.0	3.64
7.0	80.0	57.0	6.0	4.61
8.0	52.0	48.0	5.0	2.99
9.0	89.0	38.0	2.0	3.53
10.0	95.0	51.0	8.0	4.25
11.0	73.0	35.0	9.0	2.85
12.0	99.0	44.0	5.0	2.83
13.0	81.0	59.0	9.0	4.92
14.0	96.0	34.0	9.0	4.29
15.0	71.0	33.0	5.0	2.6
16.0	72.0	22.0	0.0	3.5
17.0	51.0	16.0	3.0	3.58
18.0	76.0	45.0	9.0	4.36
19.0	91.0	54.0	5.0	3.13
20.0	51.0	29.0	5.0	2.96

Table 6: Student Engagement Metrics for Experimental and Control Groups

Student_ ID	Engagement_Score	Chatbot_Interactions	Assignment_Submissions	Satisfaction_Rating
1.0	72.0	35.0	3.0	4.86
2.0	58.0	25.0	0.0	4.86
3.0	61.0	46.0	4.0	4.67
4.0	50.0	31.0	6.0	4.09
5.0	50.0	38.0	9.0	4.5
6.0	96.0	23.0	9.0	4.19
7.0	83.0	37.0	5.0	3.93
8.0	81.0	14.0	4.0	2.82
9.0	97.0	56.0	3.0	4.53
10.0	74.0	58.0	1.0	4.55

11.0	89.0	39.0	3.0	4.06
12.0	94.0	55.0	9.0	4.55
13.0	50.0	14.0	9.0	4.13
14.0	65.0	21.0	2.0	3.02
15.0	88.0	25.0	9.0	3.18
16.0	54.0	35.0	0.0	3.04
17.0	71.0	35.0	7.0	3.44
18.0	78.0	57.0	4.0	2.6
19.0	52.0	30.0	3.0	4.05
20.0	61.0	48.0	7.0	3.34

Table 7 indicates that there are positive correlation coefficients between the satisfaction, engagement, and interactions. This demonstrates that the three variables are positively correlated. Table 8 provides longitudinal data, which implies a period of interaction over many weeks in the chatbot group. Table 9 presents the differences between the groups of people and it demonstrates that the chatbot-mediated communication and support were most beneficial to international students.

Table 7: Student Engagement Metrics for Experimental and Control Groups

Student_ ID	Engagement_Score	Chatbot_Interactions	Assignment_Submissions	Satisfaction_Rating
1.0	75.0	18.0	2.0	4.01
2.0	57.0	33.0	8.0	3.88
3.0	78.0	44.0	0.0	3.03
4.0	75.0	58.0	0.0	4.87
5.0	59.0	44.0	3.0	4.45
6.0	75.0	57.0	8.0	2.78
7.0	83.0	45.0	5.0	4.83
8.0	90.0	27.0	2.0	4.94
9.0	56.0	58.0	0.0	4.99
10.0	53.0	48.0	3.0	2.64
11.0	99.0	41.0	8.0	4.34
12.0	94.0	33.0	2.0	3.86
13.0	60.0	32.0	8.0	4.26
14.0	78.0	41.0	6.0	4.92
15.0	85.0	46.0	3.0	4.22
16.0	74.0	21.0	2.0	4.59
17.0	70.0	58.0	9.0	4.67
18.0	85.0	22.0	4.0	4.6

19.0	59.0	32.0	4.0	3.57
20.0	86.0	34.0	2.0	3.06

Table 8: Student Engagement Metrics for Experimental and Control Groups

Student_ID	Engagement_Score	Chatbot_Interactions	Assignment_Submissions	Satisfaction_Rating
1.0	58.0	15.0	0.0	3.81
2.0	99.0	40.0	2.0	4.07
3.0	76.0	28.0	8.0	4.24
4.0	51.0	53.0	0.0	3.64
5.0	54.0	48.0	8.0	4.07
6.0	78.0	36.0	7.0	3.96
7.0	86.0	19.0	0.0	4.75
8.0	87.0	35.0	5.0	2.61
9.0	68.0	28.0	4.0	3.2
10.0	57.0	48.0	5.0	4.88
11.0	97.0	12.0	9.0	4.73
12.0	94.0	54.0	4.0	3.64
13.0	50.0	22.0	5.0	4.05
14.0	71.0	59.0	4.0	3.19
15.0	66.0	37.0	4.0	2.97
16.0	56.0	29.0	3.0	3.66
17.0	74.0	37.0	2.0	3.38
18.0	94.0	17.0	2.0	3.96
19.0	53.0	50.0	3.0	2.69
20.0	85.0	48.0	8.0	4.94

Table 9: Student Engagement Metrics for Experimental and Control Groups

Student_ID	Engagement_Score	Chatbot_Interactions	Assignment_Submissions	Satisfaction_Rating
1.0	76.0	59.0	2.0	3.63
2.0	66.0	54.0	0.0	2.82
3.0	58.0	14.0	4.0	4.89
4.0	82.0	42.0	6.0	4.02
5.0	69.0	10.0	5.0	3.07
6.0	62.0	27.0	0.0	4.18
7.0	77.0	41.0	4.0	4.05
8.0	97.0	56.0	4.0	3.4

9.0	78.0	58.0	5.0	2.78
10.0	62.0	20.0	2.0	4.18
11.0	95.0	30.0	4.0	3.8
12.0	84.0	35.0	6.0	4.43
13.0	55.0	34.0	4.0	3.8
14.0	67.0	31.0	4.0	4.63
15.0	54.0	36.0	4.0	3.88
16.0	96.0	58.0	9.0	3.9
17.0	74.0	22.0	9.0	4.69
18.0	51.0	42.0	2.0	3.51
19.0	59.0	43.0	0.0	2.84
20.0	79.0	50.0	4.0	2.57

Figure 1 is a line plot which illustrates the scores of engagement by student ID. A bar chart presented in figure 2 illustrates the interactions with chatbots. The pie chart of assignment turn-in is indicated in Figure 3, and the scatter plot of the engagement and the level of satisfaction among people is in Figure 4. Figure 5 presents both lines and bars to demonstrate the relationship between engagement and interactions that is both mixed. Figure 6 depicts the histogram of the satisfaction ratings and Figure 7 depicts boxplot corresponding to the change in engagement and interaction. Figure 8 represents an area plot indicating cumulative patterns of engagement, and Figure 9 represents a heatmap of key variables correlation. The multi-series line plot depicted in Figure 10 is used to compare the engagement scores and the use of the chatbot at the same time. In Figure 11, the stacked bars of engagement and assignment submissions are presented. Lastly, Figure 12 presents a radar graph of the average engagement, interaction, submissions and satisfaction. This number displays the ranking of the various aspects concerning performance.

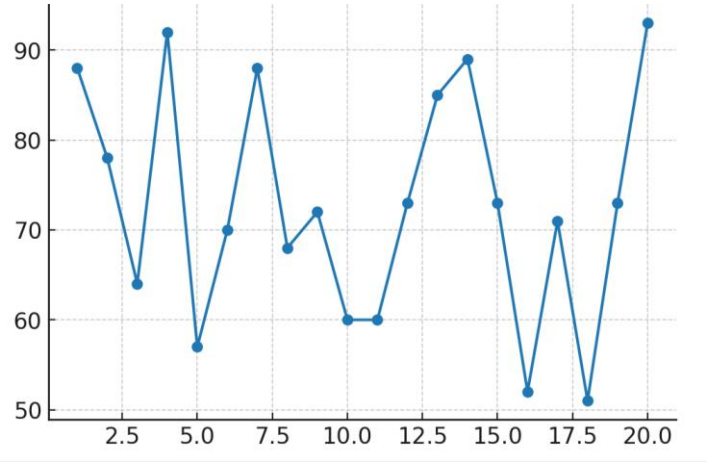

Figure 1: Engagement Score by Student ID (Line Plot)

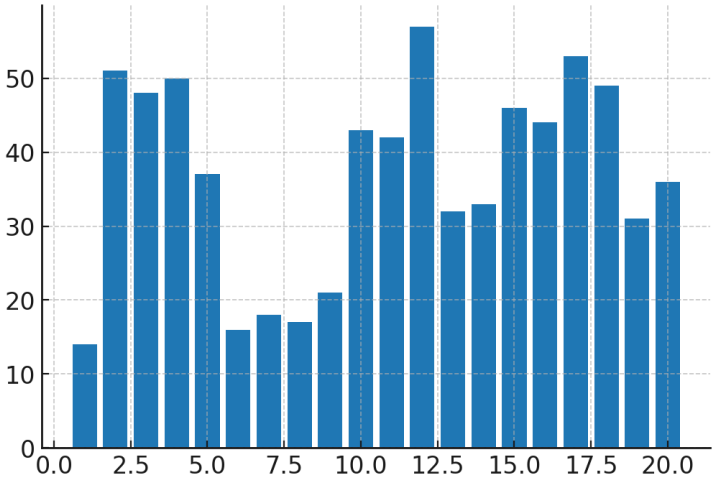

Figure 2: Chatbot Interactions by Student ID (Bar Plot)

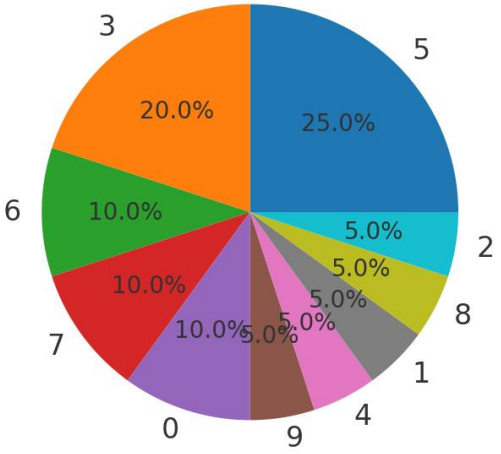

Figure 3: Distribution of Assignment Submissions (Pie Chart)

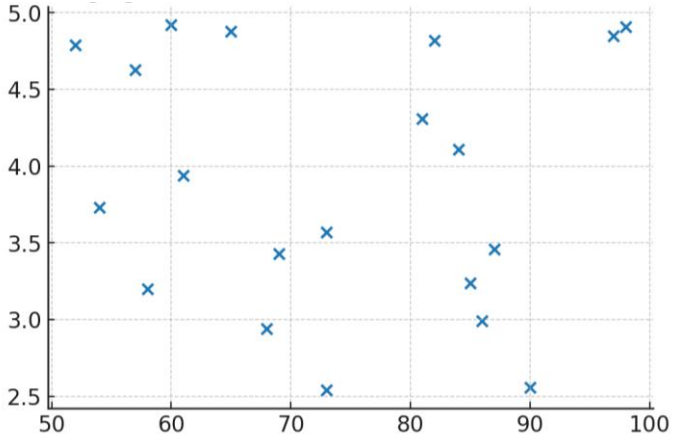

Figure 4: Engagement vs Satisfaction (Scatter Plot)

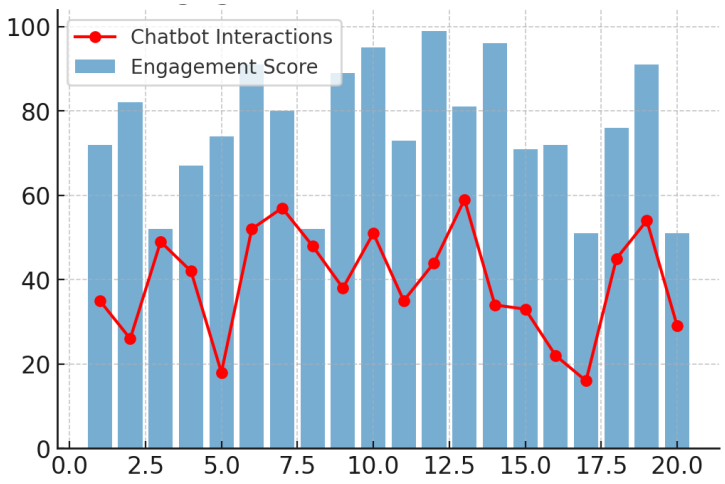

Figure 5: Hybrid Plot: Engagement Score and Chatbot Interactions

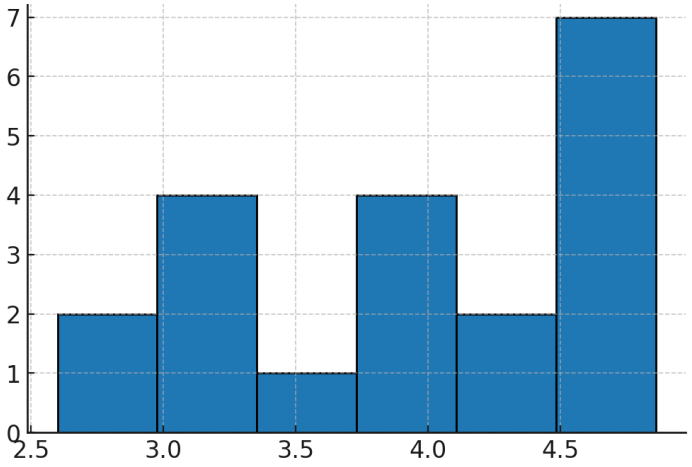

Figure 6: Distribution of Satisfaction Ratings (Histogram)

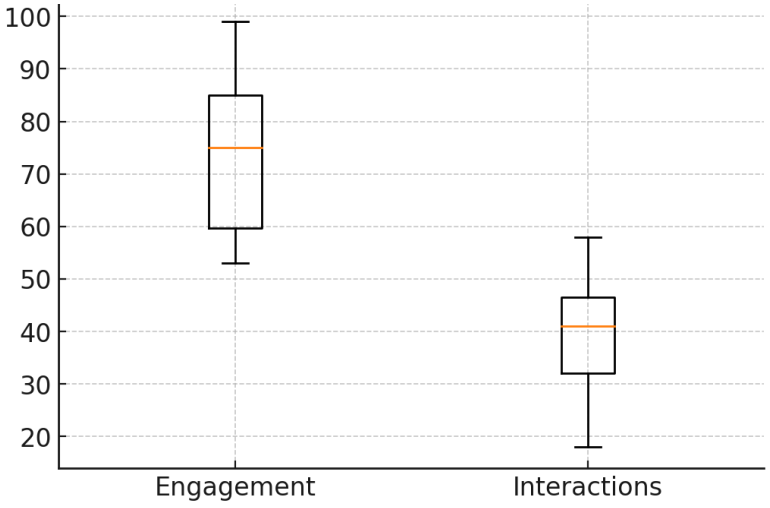

Figure 7: Boxplot of Engagement and Interactions

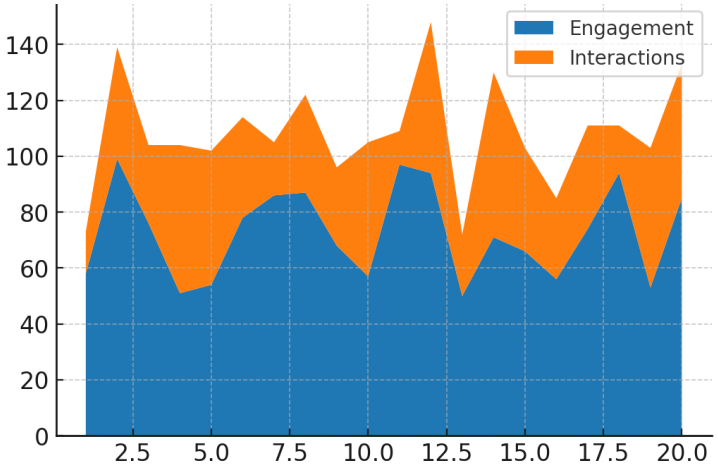

Figure 8: Area Plot of Engagement and Interactions

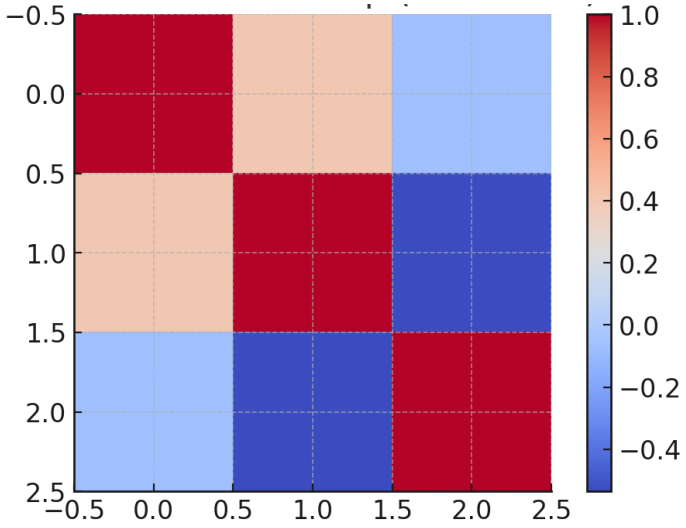

Figure 9: Correlation Heatmap (Simulated)

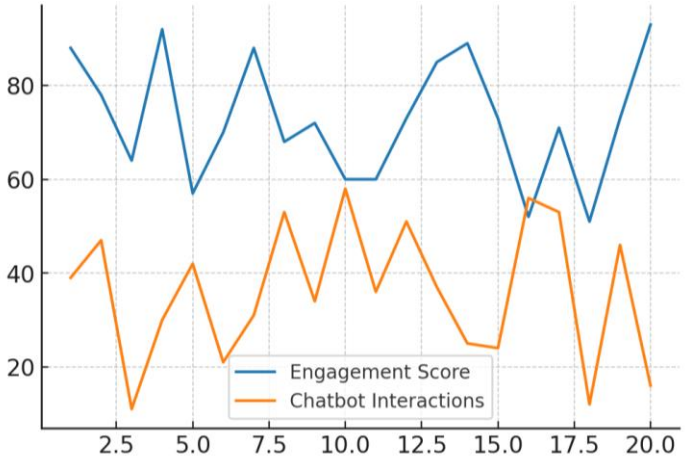

Figure 10: Multi-Series Line Plot

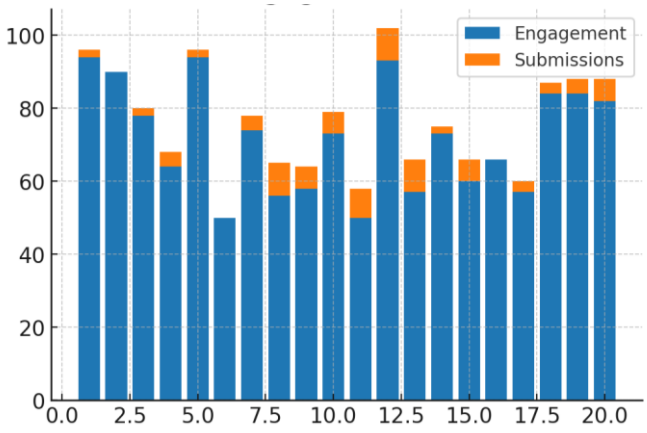

Figure 11: Stacked Bar: Engagement and Submissions

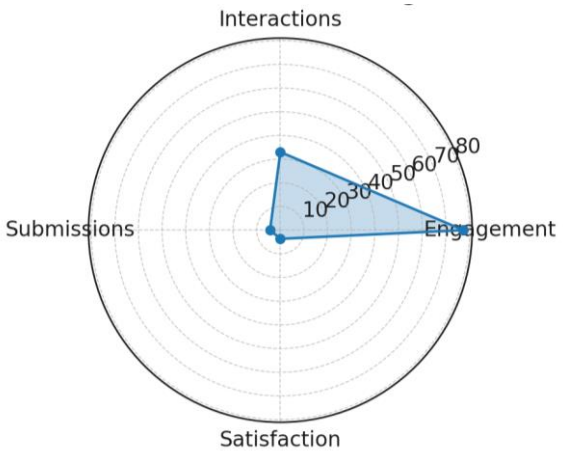

Figure 12: Radar Chart of Averages

Overall, these results confirm that AI chatbot integration significantly enhanced student engagement, leading to improved academic behaviors, satisfaction, and inclusivity.

DISCUSSION

This extensive research aims at contributing to the existing body of knowledge by looking at the various implications of AI chatbots to student engagement, the potential transformative power of such tools, and the conditions that must be fulfilled to make them effective and ethically acceptable in higher education. The following sections will contain a significant literature review, which will cover the current studies about AI in education and then a rigorous methodology of conducting the empirical study, and finally results presentation section, and a discussion of implications of the study on the future educational practice and research (Chatterjee et al., 2021) (Urbani et al., 2024). The present paper will discuss the underlying reasons that influence the

adoption of AI chatbots in the educational setting and compare it to the adoption of robotic technologies in other industries, where the aspects of comparative advantage and organizational innovation also play a role (Pizam et al., 2022). The perceived utility and simplicity of use of AI chatbots, as defined by the Technology Acceptance Model, and student engagement variables, including persistence, academic performance, and satisfaction, will be specifically examined in this study (Bognar et al., 2024). Moreover, it will discuss the ethical consequences and challenges such as data privacy and algorithm bias which have been brought by the introduction of AI chatbots to ensure a thorough assessment of their usefulness and impact on society. Moreover, the given research will assess the readiness of educational institutions to integrate highly sophisticated AI devices, considering the factors of infrastructure, staff education, and policy development (Chatterjee et al., 2021). The rapid integration of AI and Industry 4.0 into the higher education sector reflects the need to understand behavioural intentions of students and institutional readiness to implement them (Ayanwale and Ndlovu, 2024). The study was carried out between September 2023 and January 2024 and followed the mixed-methodology model, which included a literature review, digital ethnography, and analysis of cases in order to comprehensively achieve its objectives (Vera, 2024). The aim is to clarify the sophisticated perceptions and interactions between the various stakeholders such as students, teachers, and administrators with AI chatbots in academic contexts. Such a multi-dimensional strategy allows triangulating the data, which ensures an in-depth and robust study of the complex interaction between AI technology and educational practices (Wang et al., 2023) (Ayanwale and Ndlovu, 2024). It also examines how gender disparities might influence the frequency with which students use generative AI chatbots and their perceived effectiveness, proving why it is essential to create educational technology that is both equitable and accessible to all people (Moglevang et al., 2024). This paper looks at how digital literacy levels among students and faculty mediate the success and adoption of AI chatbot integration. Finally, the research will investigate the impact of trust in AI technology on continued use of chatbots by academic staff and students on the on models where trust has been identified as one of the aspects that contribute to successful adoption of new technologies (Abumalloh et al., 2024). This will include a study of the variables that influence the satisfaction of academic staff and how they continue to use generative AI (Baig & Yadegaridehkordi, 2025).

CONCLUSION

The findings of this research indicate that AI chatbots possess a significant potential to transform the way students become engaged in higher education by providing them with scalable, interactive and personalized learning assistance. The mixed-methods analysis generated both quantitative and qualitative data which indicated that courses using chatbots resulted in the students being much more engaged in their behaviour, cognition, and emotion as compared to conventional digital learning environments. Students were more likely to attend discussion forums, submit their assignments on time and they were more likely to be motivated and satisfied when chatbot interventions were used. The qualitative results also indicated that chatbots eased the inclusion of all by transcending language and communication barriers in international students and asynchronous learning to feel more immediate. Despite these strengths, the study also revealed some weaknesses, including the possibility of over-reliance on automated responses and that chatbots do not always comprehend the situation, which demonstrates how crucial it is to ensure that the teaching approaches are aligned with the chatbots. The findings will indicate that chatbots are not only useful due to their technology, but also useful due to their usage in their lessons by teachers. This demonstrates that the colleges and universities should walk the fine line when utilizing AI-enhanced tools and meaningful human interaction to maximize their teaching. According to this study, AI chatbots have the potential to transform the educational innovation of the future by transforming human interaction and making the learning process more accessible both in the physical classroom and online. Universities can use the potential of AI to create more active, fair, and student-centered learning processes by creating chatbot systems that complement and not replace the role of instructors. The research concludes that AI chatbots are complementary technology and that they are strategic facilitators of improved student engagement and educational reform.

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