

PAPER

The Academic Intensity Use of Chatbot-Based Artificial Intelligence and Its Relation to Academic Well-Being: A Correlational Study at the University of Jordan

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ABSTRACT

In terms of artificial intelligence (AI) applications, chatbot-based AI such as ChatGPT have the potential to improve students' academic well-being and success. Despite the wide spread of chatbot-based AI development, no studies have explored their correlation with psychological constructs in the realm of education. This study aimed to measure the academic intensity use of chatbot-based AI and academic well-being among undergraduates and investigate the correlation between these constructs. The data was gathered using a self-administered web-based questionnaire, which includes the Academic Well-Being Scale and the developed academic intensity use of chatbot-based AI scale (AIUCA). The study sample consists of 340 undergraduates from the School of Educational Science. The findings revealed a moderate level of usage of chatbot-based AI and a moderate level of academic well-being among undergraduates. It also demonstrated a significant positive correlation ($r = 0.68$) between the intensity use of chatbot-based AI and academic well-being ($p < 0.01$). These results recommend decision-makers in higher education encourage students to integrate chatbot-based AI with their learning processes and activities to improve their academic well-being.

KEYWORDS

ChatGPT, academic well-being, chatbot, artificial intelligence (AI), intensity use

1 INTRODUCTION

Exploring our digital era and the massive technology revolution based on artificial intelligence (AI) applications in terms of chatbots (i.e., ChatGPT and Bards), we find that these innovations have potential capabilities that might contribute to improving and enhancing health and education, which are top priorities for countries; they represent the third and fourth goals of the sustainable

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development goals, respectively [1]. However, these technologies could have negative consequences on individual health, such as addiction, enthusiasm, or other influences; therefore, researchers should investigate their influences, intensity of use, the potential of these modern innovative tools, and how to avoid their harmful or misuse.

Spreading quality health and education requires the attention of the government, involved decision-makers, and researchers to achieve sustainable goals, including mental health, which is a crucial aspect of individual health for all citizens and is closely linked to education and students' academic achievement and success [2]. Mental health is a state of well-being where an individual recognizes their own abilities, manages everyday stresses, works productively, and contributes to their community [3]. Further, it is linked with health and has an important role in overall health [4]. Subjective well-being (SWB) is described as a comprehensive range of experiences that includes individuals' emotional reactions, contentment in specific life domains, and overall evaluations of life satisfaction [5].

In the realm of education, educators focus on domain-specific SWB, which is called academic well-being, which is defined as a student's perception of their positive and successful academic performance [6]. Academic well-being is a multi-dimensional construct that conceptualizes both its positive (i.e., perceived competences) and negative (i.e., anxiety) aspects [7–9] that impacts students' success and performance [10–11]. Students who exhibit high levels of academic well-being typically achieve good grades on exams, show an interest in learning new topics in school, find enjoyment in completing school assignments, manage their time effectively to accomplish important school tasks, and handle academic work proficiently [6]. Prior research highlighted the importance of understanding academic well-being [12–13]. However, little research has been conducted related to academic well-being [14]. This underscores the urgent need to investigate this important construct that impacts students' success and performance.

Educational researchers are always looking for modern, effective instructional methods and practices to raise the efficiency and effectiveness of the learning and instructional process in order to achieve the fourth SDG. Consequently, they are looking for and investigating effective integration of modern technology in education, such as mobile, robots, hypermedia, mobile applications, and chatbots [15–17] and studying their impact, potentials, pedagogical benefits, and consequences on students' learning processes and their psychological constructs (i.e., anxiety, stress, and motivation) [18–20]. Despite that, scholars have been evident in the pedagogical benefits and potential of innovative technology chatbots such as ChatGPT and Bards in the educational context [21–24]. There are no recent studies that investigate the students' usage of chatbot-based AI in the context of psychological constructs of academic well-being. This highlighted the importance of this study in filling the gap in the academic well-being literature and its association with chatbot-based AI. Consequently, the study aims to respond to the following questions:

- RQ1: What is the level of academic intensity use of chatbot-based AI among undergraduate in the SES?
- RQ2: What is the level of academic well-being among undergraduates in the SES?
- RQ3: Is there a statistically significant correlation between the intensity use of chatbot-based AI and academic well-being among undergraduates in the SES?

1.1 Chatbot-based artificial intelligence

Artificial intelligence chatbots are computer-based programs (software) that facilitate communication through natural language via text or speech. They are an AI language model such as ChatGPT. It has widely spread attention in the educational field and offers pedagogical benefits [21–26]. They provide tutoring, personalized learning support, research assistance, and interactive activities aligned with course material, enhancing student engagement. Chatbots contribute to information retrieval, answer specific questions, and support various tasks such as coding, mathematical calculations, and statistical analysis. Chatbots offer interactive learning experiences similar to one-on-one interactions with teachers and play a crucial role in skill enhancement. They also serve as motivators through regular reminders and notifications, enabling personalized learning experiences that provide for individual learning paces [27–29]. Therefore, chatbot-based AI application technology plays a vital role in enhancing the construction of a flexible learning environment that could contribute to prompt university students' performance and their motivation, which contributes to human well-being.

1.2 Academic well-being

Subjective well-being is described as a comprehensive range of experiences that includes people's emotional reactions, contentment in specific life domains, and overall assessments of life satisfaction [5]. SWB indicates an individual's perception or feelings about the overall quality of their life or a specific aspect, according to the perspective of that person [30]. It refers to all types of healthy and successful humanoid functioning [31]. SWB is divided into two primary categories: general well-being and specific well-being (such as academic or work-related). Recently, there has been a growing emphasis on developing specific measures of well-being in particular domains instead of depending on general well-being measures [32].

In the realm of education, domain-specific measures of SWB are essential tools for students' mental health. Several self-report scales have been developed to measure the SWB of K–12 students [32]. For college students, SWB [33] developed and validated a self-report rating questionnaire called the college student subjective well-being questionnaire (CSSWQ). Later, [34] developed a version of the CSSWQ that is composed of: a) satisfaction, b) efficacy, c) connectedness, and d) gratitude, which are all related to school; they were derived and adapted from general life satisfaction, self-efficacy, gratitude, and social connectedness scales. Subsequently, CSSWQ was validated by researchers, such as [32]. Additionally, the scale has been translated into multiple languages, including Iranian, Chinese, and Indonesian, for use in different countries [32, 35, 36].

Previous studies in educational literature that addressed the measurement of well-being levels among university students have shown different results. These differences can be attributed to variations in the targeted demographic, environment, and diverse measurement scales. For example, in Jordan, a study conducted by [37] among students at the University of Jordan revealed that they experienced a moderate level of psychological well-being. While in Australia [38], revealing low levels of psychological well-being among undergraduates. In contrast, in a semi-rural area of the UK, a cross-sectional study by [39] found a high level of well-being among

undergraduate nurses. This encourages university administrations to evaluate the academic well-being of undergraduates at their institution, since the well-being of students is crucial for the learning process and is integral to it [2].

1.3 Chatbot-based artificial intelligence and well-being in the context of education

Literature makes evident the effects of academic students' well-being on their academic performance and achievements [39–40], and proof's that it's affected by the physical learning environments [41]. Specifically, in higher education, the students' experiences are influenced by the instructional and learning environment, practice, and experiences [42] that impact students' well-being and their capability to be effective citizens [43]. Consequently, instructors and educators should prioritize the enhancement of students' well-being. Academic well-being is influenced by several factors, such as school conditions and various aspects of the physical environment, including the school building, learning spaces, curriculum, schedules, and school services [44–45]. Hence, these factors could be enhanced using the potential of technology, such as the integration of AI technologies.

Enhancing academic well-being among students depends on the context and culture of the school, [46] stresses that to encourage educators to boost academic well-being, they should first assess the specific contributions of their university contexts and adapt initiatives that align with supportive systems, taking into account the unique context of their school systems and how it may impact students' well-being. Other researchers illustrate the vital impact of the instructor-student relationship, specific teaching practices, such as assistance techniques, and institutional factors (i.e., learning environments) [47–49]. Further, [50] found that learning experiences fostering connection, flexibility, and purposeful learning contribute to boosting overall student well-being, as highlighted by the role of course design and delivery on academic well-being.

Furthermore, a previous study indicates that instruction, pedagogics, assessment practices, the adoption of innovative learning environments in the 21st century, and integrating innovative technologies into schools contribute to academic well-being [51–52].

Notably, innovative technologies such as AI applications, including chatbots such as Bard and ChatGPT, have the potential to support these factors that influence academic well-being, such as instruction, pedagogics, and assessment practices as well as establish flexible learning environments that foster self-regulated and self-paced learning. This potential of chatbot-based AI could enhance academic well-being among students. Findings of recent studies highlight the pedagogical benefits of ChatGPT in several disciplines and academic majors; it has the potential to improve multiple facets of learning, including writing and research skills, personalized education, learner autonomy, motivation, and engagement. Moreover, it can be beneficial in medical education and aid in clinical decision-making [53]. For instance, a study by [54] demonstrated ChatGPT's ability to improve statistical reasoning and foster positive attitudes towards statistics. Another study [25] highlighted its support for counseling and mental health undergraduates, aiding them in developing essential counseling skills, therapeutic conditions, and counseling behaviors and dispositions. However, prior research had not explored the connection between chatbot-based AI and student well-being.

Hence, we reviewed relevant studies that involved innovative technology and any component of academic well-being, such as satisfaction and confidence.

For example, results by [55] revealed a positive and significant association between smartphone use and subjective well-being among rural farmers in China. Findings of an experimental study [56] suggest that the implementation of a mobile chatbot for learning has the potential to improve learning achievement and self-efficacy among nurse students from a university in northern Taiwan. Similarly, [57] conducted an experimental study that demonstrated that the implementation of AI-based chatbots could enhance performance, self-efficacy, and motivation among university students in Taiwan. Also, [58] conducted an experimental study that revealed that using ChatGPT significantly improved students' self-efficacy and motivation in the context of programming.

A mixed-methods study conducted by [59] revealed that undergraduates reported little use of the chatbot compared to graduates in the context of self-regulated learning. In Jordan, specifically at the University of Jordan [25] a quantitative investigation was conducted that found undergraduates have a positive attitude towards employing ChatGPT as an educational tool. Additionally, the researchers [26] accomplished another quantitative study that revealed most undergraduates enrolled in the counseling and mental health program considered ChatGPT a valuable learning tool, attributing its effectiveness to supporting various primary counseling skills and therapeutic conditions. Further, [37] conducted a study among students at the University of Jordan that identified a positive correlation between perceived self-efficacy and psychological well-being among the participants.

The findings from previous studies mentioned above underscore the significance of academic well-being in students' success and their dependency on the learning environment and cultural context, as well as the educational advantages associated with chatbot-based AI in supporting students' self-efficacy, motivation, and academic performance, which are crucial factors that influence academic well-being. Despite these, there is no study measuring undergraduate academic intensity use of chatbot-based AI and examining whether this academic use correlates with academic well-being. Thus, the significance of our study is that it addresses the existing gap in this area.

2 STUDY METHODOLOGY

2.1 Study design, participant, and procedures

This study employed a quantitative research methodology and a correlational research design to investigate the association between the intensity use of chatbot-based AI and academic well-being. A web-based questionnaire was used to collect the study data during the last month of the Fall semester of the academic year 2023–2024, involving participants from the University of Jordan, a prominent Jordanian public university that is ranked among the top 400 universities worldwide according to the QS World University Rankings 2025. Before conducting the study, research ethical approval was obtained from the university's administration, and informed consent was obtained from study participants. Subsequently, a statistical analysis of Pearson correlation (r) was conducted to examine the relationship among the study variables (i.e., academic intensity uses of chatbot-based AI and academic well-being). r is an appropriate statistic to investigate the association between variables [60].

The study population was the 1966 undergraduate students (8.6% male and 91.4% female) who enrolled in the SES during the Fall semester, 2023–2024. The intentional selection of the University of Jordan over other institutions was based on its ability to

attract students from diverse segments of Jordanian society and various geographical regions. For the study, a sample of 340 individuals was randomly chosen, considered both representative and adequate for conducting the Pr analysis. Researchers ensured the required sample size using Thompson's equation [61]. The study sample consisted of 340 participants from the study population, ensuring sufficiency for Pr analysis. Additionally, a pilot sample of 45 participants was included from the study population and outside the study sample and used to ensure the psychometric properties of the study tool. Table 1 presents the participants' demographic data.

Table 1. Participants' demographic data

No	Characteristics		F	P
1	Gender	Female	308	90.6%
		Male	32	9.4%
2	GPA	Excellent	67	19.7%
		Very good	174	51.2%
		Good	87	25.6%
		Less than good	12	3.5%
3	School Year	First	120	35.3%
		Second	64	18.8%
		Third	59	17.4%
		Fourth	97	28.5%
4	Majors	Classroom teacher	90	26.5%
		Library and information science	51	15.0%
		Early childhood education	60	17.6%
		Counseling and mental health	69	20.3%
		Special education	70	20.6%

Note: GPA: Grade Point Average.

2.2 Study instruments

A questionnaire was utilized to gather study data. It was distributed online anonymously among study participants and contained three parts: a) demographic data about the study sample; b) the developed academic intensity uses of a chatbot-based AI scale; and c) the CSSWQ, which was translated from the English version into the Arabic version. Both scales were checked for validity and reliability using a pilot sample.

The college student subjective well-being questionnaire: The CSSWQ, developed by [34], was used to gather data about the academic well-being of the targeted students. This is a specific domain well-being measure for college students that is designed to measure the well-being of young adults. It consisted of 16 items that were distributed over four subscales: 1) academic satisfaction, 2) academic efficacy, 3) school connectedness, and 4) college gratitude. The CSSWQ adopted a Likert scale of 7, ranging from one: strongly disagree to seven: strongly agree. The CSSWQ's total score range is between 16 and 112, representing participants' academic well-being,

with a higher score indicating greater well-being. This measure demonstrated validity and high strong latent construct reliability [32–34].

The CSSWQ was translated from English to Arabic, which is the native language in Jordan. Further, to ensure the psychometric properties of the CSSWQ Arabic version, it was reviewed by a panel of 10 academic specialists in measurement and evaluation, psychological counseling, clinical psychology, psychology, English language curriculum and teaching methods, and Arabic language curriculum and teaching methods and instructional technology to ensure its content validity. It was also administered to a pilot sample composed of 45 students selected randomly from the study population who were excluded from the study sample, revealing that the Pr coefficients for the CSSWQ ranged from 0.38 to 0.74 and were all statistically significant ($P < 0.05$). Additionally, Cronbach's coefficient was 0.899, affirming the reliability and validity of the CSSWQ [62].

The academic intensity use of chatbot-based artificial intelligence: The AIUCA was developed by researchers based on existing literature and prior measurements [18, 63, 64]. Its purpose was to assess the AIUCA. It is a self-report measure comprising nine items, The AIUCA scale prompted respondents to answer queries concerning their intensive academic use of chatbot-based AI in their learning processes, such as, “The use of chatbot-based AI applications (i.e., ChatGPT) for educational purposes is part of my daily activities.” The AIUCA adopted a 5-point Likert scale, ranging from 1: strongly disagree to 5: strongly agree. Scores on the AIUCA ranged between 9 and 45, reflecting participants' levels of AIUCA, with a higher score indicating more intensity of academic use by respondents.

Researchers ensured the AIUCA psychometric properties. First, the content validity of the scale was ensured by a panel of 10 academic specialists in behavioral psychology, clinical psychology, psychological counseling, measurement and evaluation, and educational technology. Second, the AIUCA was administering to a pilot sample consisting of 45 students selected randomly from the study population and excluded from the study sample. The results revealed that the Pr coefficients for the AIUCA ranged from 0.36 to 0.83 and were all statistically significant ($P < 0.05$). Additionally, Cronbach's coefficient was 0.844, affirming that the AIUCA is a reliable and valid measure for this study [62].

2.3 Data analysis

To address the initial and second research questions, descriptive statistics such as means and standard deviations were extracted. Furthermore, a Pr test was conducted to investigate the third research question, aiming to determine whether the academic intensity use of chatbot-based AI displays a significant correlation with the independent variable of academic well-being.

The researcher confirmed the essential prerequisite assumptions for conducting Pr [60]. The two independent variables were measured on a continuous scale. Normality was assessed using the Kolmogorov-Smirnov test at a significance level of 0.05, with results indicating that the data were normally distributed. This suggests that academic well-being is linearly related to the intensity use of Chatbot [64]. Additionally, heteroscedasticity was assessed and confirmed as the residual plots displayed consistent variance across all levels of the independent variables [66]. Lastly, the absence of significant outliers was verified using boxplots and Z-scores. These findings confirmed that the initial assumptions for correlation were met. The statistical analyses for the study were performed using SPSS software.

3 RESULTS AND DISCUSSION

The level of academic intensity uses of chatbot-based AI among undergraduates: To answer the first question, “RQ1: What is the level of academic intensity use of chatbot-based AI among undergraduates in the SES?” The researcher computed the means and standard deviations for the academic intensity use of chatbot-based artificial intelligence.

Table 2 presents descriptive data on students’ responses to the AIUCA scale. These data indicated that all items achieved a moderate level, except for item (2), “I feel a loss of connection if I cannot use chatbot-based AI applications for a short period of time,” which showed a low level. This indicates that students have limited dependency on chatbot-based AI; they do not rely on a single tool for their learning. The overall mean score was 3.29, indicating that students moderately use chatbot-based AI in their learning processes and academic activities. This indicates that there is room for increased adoption and integration of chatbot-based AI in academic settings. This result aligns with the one reported by [59], indicating little usage of chatbots among students in the context of self-regulated learning. Moreover, it is consistent with the findings of [25], which were conducted at the University of Jordan and highlighted a positive attitude among undergraduates toward incorporating ChatGPT as a learning tool. Additionally, it is in line with the outcomes of another study by [26] within the same University, revealing that a significant number of counseling and mental health majors utilized ChatGPT in their learning and perceived its utility as an effective pedagogical tool. Therefore, educators within the SES at the University of Jordan should encourage the undergraduates and instructors to effectively integrate chatbot-based AI into learning and teaching processes; further, they should offer workshops and provide support to sustain a balanced use of these beneficial AI technologies among students, ensuring they are used correctly and not solely relied upon in their learning. Additionally, it suggests developing more focused initiatives to promote the benefits and ease of using these technologies, ultimately enhancing students’ academic experiences.

Table 2. Descriptive statistics for AIUCA scale

Item	SD	M	Level
1. I use chatbot-based AI applications (i.e., ChatGPT) for educational purposes.	1.21	3.64	Moderate
2. I feel a loss of connection if I cannot use chatbot-based AI applications for a short period of time.	1.40	2.31	Low
3. I feel like I belong to the community of chatbot-based AI applications users.	1.25	3.60	Moderate
4. I would feel regretful if chatbot-based AI applications were discontinued.	1.29	3.31	Moderate
5. I feel comfortable using chatbot-based AI applications for educational purposes.	1.16	3.55	Moderate
6. I enjoy learning through using chatbot-based AI applications.	1.23	3.43	Moderate
7. I am proud to share that I use chatbot-based AI applications for educational purposes.	1.16	3.67	Moderate
8. The use of chatbot-based AI applications for educational purposes is part of my daily activities.	1.73	3.51	Moderate
9. I rely on chatbot-based AI applications for studying and learning.	1.57	2.58	Moderate
Total	0.90	3.29	Moderate

Notes: M: Mean, SD: standard deviation.

The level of academic well-being among the undergraduates: To address the second question, “RQ2: What is the level of academic well-being among undergraduates in the SES?” The researcher calculated the means and standard deviations for the college student subjective well-being questionnaire.

As shown in Table 3, the overall mean of the students’ academic well-being scale was 4.72 out of 7.0, showing a moderate level of psychological, emotional, and social health relating to their educational environment and experiences. It revealed a need for improvements and enhancements in their psychological and academic well-being. A moderate level suggests that students are, to some extent, satisfied with their academic experiences and moderately believe in their academic abilities and confidence. They felt impartially connected to their school community and had a reasonable level of school gratitude.

High levels of academic well-being are crucial for sustaining student motivation and performance. The results highlight the importance of enhancing supportive academic environments that foster academic well-being. This result should prompt the administration of SES to take effective measures to boost the level of academic well-being among students. Also, it aligns with the results of a study by [37], indicating a moderate level of well-being among University of Jordan students. However, it contrasts with other studies, such as those conducted by [38] and [39], which reported low and high levels of well-being. Respectively, these contradictory results could be attributed to the different learning environments in which the study was conducted. The study encourages decision-makers at SES to incorporate strategies and instructional practices that support students’ well-being by addressing the specific needs and concerns within each component of it (i.e., satisfaction, efficacy, connectedness, and their gratitude to the school).

Table 3. Descriptive statistics of the CSSWQ scale

Item	SD	M	Level
1	2.02	5.06	High
2	1.90	4.53	Moderate
3	1.85	4.75	Moderate
4	1.90	5.73	High
5	2.03	4.65	Moderate
6	1.95	4.63	Moderate
7	1.86	4.76	Moderate
8	1.84	5.50	High
9	1.93	4.64	Moderate
10	2.00	4.64	Moderate
11	1.89	4.79	Moderate
12	1.96	5.03	High
13	2.19	2.96	Low
14	1.99	4.40	Moderate
15	1.94	4.80	Moderate
16	2.28	4.74	Moderate
Total	1.25	4.72	Moderate

Notes: M: Mean, SD: standard deviation.

Relationships between the academic intensity use of chatbot-based AI and academic well-being: Addressing the third query about whether there is a significant correlation between the academic intensity use of chatbot-based AI and academic well-being among undergraduate students in the SES, a Pearson correlational analysis was conducted between the academic intensity use of chatbot-based AI and the academic well-being construct. The results uncovered a positive association between the academic intensity use of chatbot-based AI and academic well-being ($p < 0.01$). Furthermore, the Pearson coefficient between academic intensity use of chatbot-based AI and academic well-being was significant ($r = 0.68$) and has a moderate strength [67].

This implies that an increase in the academic intensity use of chatbot-based AI applications corresponds to an increase in students' academic well-being. However, no studies have been identified to investigate the relationship between these pivotal variables. This highlighted an urgent need to investigate the link between the academic intensity use of chatbot-based AI and the academic well-being of undergraduates. Nevertheless, [55] uncovered a positive and significant connection between smartphone use and SWB. Other research indicated that the integration of mobile chatbots with learning has the ability to improve student achievements and self-efficacy [56]. Similarly, the incorporation of AI-based chatbots has been shown to enhance students' achievement, self-efficacy, and motivation [57]. An additional study [58] has highlighted that ChatGPT significantly improves students' self-efficacy and motivation in the context of programming. These above-mentioned constructs that were impacted by using chatbot-based AI could affect the academic well-being of students, where the academic well-being measure encompasses satisfaction, efficacy, connectedness, and gratitude that relate to school [34].

This could contribute to the abilities of chatbot-based AI in supporting academic satisfaction and efficacy, both of which form aspects of students' well-being. ChatGPT, for instance, incorporates diverse pedagogical features that actively enhance the learning process. This technology offers a secure, self-regulated learning environment, supports students learning needs, and effectively responds to their inquiries. A key role played by this technology is in fostering student engagement and interactivity through discussions, thereby boosting their intrinsic motivation, as indicated by previous research [68]. Additionally, the chatbot's functionalities provide personalized examples, explanations, and virtual training that align with individual learners' capacities, promoting self-directed and personalized learning. These abilities allow students to acquire knowledge according to their abilities and specific needs [69–70]. Consequently, these features help students achieve their learning objectives, thereby enhancing academic achievement and satisfaction, which in turn enhance their well-being. Further [71] suggests that a chatbot is a probable tool to aid students' well-being.

The findings indicate that the academic intensity use of chatbot-based AI positively correlates with academic well-being. This underscores the potential benefits of AI tools in educational settings, particularly in improving student well-being. Consequently, the researcher suggests further investigations into the implications of incorporating chatbot-based AI in academic activities and the learning process. Additionally, these results propose that chatbot-based AI could serve as a beneficial psychological tool, positively impacting both the academic context and the psychological constructs of students.

4 CONCLUSIONS

This study has particular significance as it is the first to assess the levels of academic intensity use of chatbot-based AI's and explore their correlation with academic well-being among undergraduate students in Jordan. It assessed the intensity of use of important modern technology that is rapidly spreading, namely chatbot-based AI applications, and examined their correlation with the psychological construct of well-being, which is a pivotal variable influencing students' success and contributing to the achievement of the Sustainable Development Goals.

The study implemented a quantitative research method and a correlational design. The data was gathered using a web-based questionnaire, including the AIUCA scale and the college student's subjective wellbeing. The analysis of the gathered data consisted of 340 randomly selected undergraduate students who reported a moderate level of academic use of chatbot-based AI and a moderate degree of academic well-being. Additionally, it revealed a statistically moderately positive correlation between the academic use of chatbot-based AI and academic well-being.

The findings of this study have significant implications for the integration of chatbot-based AI technologies in higher education. They underscore the essential need to promote academic well-being among undergraduates to enhance their quality of health at school and academic success. This could be addressed by creating an effective learning environment that involves the integration of chatbot-based AI to support students' satisfaction, efficacy, connectivity, and gratitude to school. Furthermore, the study suggests that decision-makers in higher education should encourage the integration of chatbot-based AI into educators' instructional practices. Additionally, developing targeted initiatives to highlight the benefits of these technologies and fostering their incorporation into students' learning processes and academic activities could enhance their overall academic well-being, contributing to achieving the SDGs and positively impacting society as a whole.

However, the study has some limitations related to the sample, which include the size and diversity since it was solely selected from one school at a single university, and only 9.4% of the participants were males due to the small ratio of male undergraduates who joined the SES at the University of Jordan (8.6%). This limited diversity may affect the generalizability of the findings. To address this, we recommend repeating this study with a larger and more differentiated sample to confirm and explore this relationship between chatbot-based AI and academic well-being. Additionally, future studies should investigate how this relationship varies by gender or academic majors to provide a better understanding of the impacts of chatbot usage across different demographic groups.

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