AI Based Chatbots in Saudi Higher Education Institution: Perceived Benefits and Potential Risks

Yousef Almoslamani

Instruction Technology Department, Faculty of Education, Hail University, Hail, Saudi Arabia
Email: Y.ALMSLMENY@uoh.edu.sa (Y.A.)
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***Abstract*—Chatbots are currently a popular trend in various industries, including higher education institutions. Chatbots have the potential to enhance engagement, knowledge acquisition, and sociability in higher education. The current study aimed to examine the perceived benefits and potential risks of AI-based chatbots in Saudi higher education by surveying students about the feasibility of chatbot functioning. The study utilized a descriptive quantitative design based on a random sample clustering technique. In the quantitative study, 529 participants submitted their responses to the randomly distributed online questionnaire; only 307(58.03%) were included in the analysis, representing participants who had used AI-based chatbots in their learning or tutoring context. The study revealed no significant difference in the participants' responses to perceived benefits and potential risks of integrating AI-based chatbots in educational settings related to their demographic profile (Gender, Profession, and Specialty). The overall perceived benefits of AI-based chatbots are providing interactive learning experiences, enhancing students' learning, minimizing administrative workload, fostering self-efficacy, and self-regulation. Nevertheless, raised concerns about the potential risks of integrating AI-based chatbots in the education context were data limitations, privacy and security, and consequences on students' proficiency.**

***Keywords*—Artificial Intelligence (AI), benefits, chatbots, higher education, risks, Saudi Arabia**

I. Introduction

The current surge in interest in chatbots is a result of recent advances in artificial intelligence. Chatbots can change how customer service, education, health care, and information services are provided [1]. Even though chatbots have been around for a while, with their beginnings dating to the 1950s and the so-called Turing test, there was a surge in interest in chatbots in 2016 as a result of significant advancements in Artificial Intelligence (AI) and a substantial shift in user behavior from online social networks to mobile messaging apps [2, 3]. Chatbots are currently a popular trend in a variety of industries, including customer service, medicine, healthcare, and recently education. Today, dialogue systems are persistent, and conversational agents like chatbots are increasingly common [4]. Chatbots, also known as machine dialogue systems, virtual agents, conversation systems, and chatterbots, are computer programs that imitate oral and/or written discussions in natural language with users or other chatbots [5–7].

Given that Information and Communication Technology (ICT) is currently used in a considerable portion of the teaching and learning process, chatbot technology can be viewed as a significant advancement in e-learning for fulfilling the demands of the learning community [8]. Depending on its architecture and the technologies it employs, a chatbot solution could assist with various teaching and learning activities (i.e., generative models and retrieval-based models) [9, 10]. The use of chatbots in education at home will also become more pervasive in the future, the projection is that the use of AI in education will increase dramatically since it is linked with learning due to the potential of individualized AI agents that conveys promise at all levels of education. Chatbots are used in e-learning environments for collecting feedback and analyzing learning styles. Chatbot usage can also inspire students to continue conversations for academic purposes [11–14].

Accepting chatbots as a new ease-of-use technology, educational tool, and assistance stands on three pillars represented in the Technology Acceptance Model (TAM) that shape consumer motivations: perceived usefulness, ease of use, and attitude toward use, which includes both behavioral intention and two main beliefs, ease of use and perceived usefulness [7, 15, 16]. The TAM model incorporates various aspects of acceptance, including user preferences, preparation, technology characteristics, implementation nature, and technology design. Adoption of chatbots in education is an emerging implementation of AI in education. Initially, a chatbot is perceived as a tool that could be a solution for particular problems, saves time and effort, generates a positive attitude in considering its powerful features and characteristics, where education can leverage to adopt chatbots. Thus, the current study uses TAM as a technology acceptance theory for clarifying the adoption of chatbots in education.

Problem Statement: Chatbots have the potential to enhance engagement, knowledge acquisition, and sociability in Higher Education (HE) By altering the educational flow to be more interactive and dynamic [12]. Students may gain from the employment of chatbots in educational settings by having faster and more effective access to information. Nevertheless, only a small number of chatbots are utilized in higher education, assisting students with their academic work, as per the researcher's knowledge [13]. However, chatbot's adoption would present certain difficulties. These can be categorized as morality, assessment, user attitudes, programming, management, and maintenance difficulties [1, 9]. Other issues have included technology restrictions and negative training outcomes. Therefore, the current research question is "What are the perceived benefits and risks associated with implementing a chatbot in Saudi higher education"?

Objective: This quantitative study seeks to comprehend the perceived advantages and potential hazards of a chatbot in Saudi higher education by surveying students about feasible chatbot functioning?

The current study intends to contextualize AI adoption framework in a Saudi context, corresponding to the western

contextualization, highlights benefits and associated risks of using such AI based technology, deliberates at play factors of the adoption rather than only stating its reality and explicitly conveys cultural sensitivity in the technology, if it exists.

II. Literature Review

Over the past few years, notably by the end of 2022, the use of chatbots and Artificial Intelligence (AI) in research and teaching has increased. Automated conversational agents known as chatbots mimic human interaction with users by using machine learning and natural language processing. However, there are ethical issues that need to be resolved as a result of the expanding usage of AI and chatbots in these industries [1, 14]. This literature review aims to give readers an overview of the present status of AI in education and some of its potential advantages, such as tailored learning, more accessibility, and higher effectiveness.

The Technology Acceptance Model (TAM) was created to determine the degree of new technology adoption based on customers' attitudes. It is an a framework to evaluating how people react with and use emerging technologies. One of the most well-known and well-accepted models for examining the level of resistance to new technology is this one [15]. Accordingly, numerous factors affect how and when consumers utilize new technology [7]. While TAM model only focused on behavioral intentions and perceived usefulness, ease of use, attitude toward use, it does not tackle incorporated external variables toward using technology, such as training, nature of implementation process [16, 17]. TAM explicitly adapts items to specific technology [16]; however, the current study will employ TAM to gauge students' acceptance of AI technology, a chatbot. The current study extensively focuses on highlighting why students might embrace the chatbot in their education, focusing on the perceived usefulness and ease of use, which align with the TAM model pillars.

According to the literature, the design of chatbot-related features may have a favorable effect on customers' willingness to use chatbots as a platform for customer service. Design and security aspects, on the other hand, are the stimuli that represent the system and its capabilities [18]. Earlier investigation has established the design's substantial influence on perceived trust in the private service sector [19]. Previous research has demonstrated that expectation confirmation positively impacts perceived usefulness when used with intelligent chatbots [7, 20].

According to Winkler and Soellner [21], Chatbot-Mediated Learning (CML) is a learning environment where students use chatbots in their learning process to improve the quality and outcome. Chatbots are conversational agents primarily using language and conversation to interact with humans. The purpose of CMLs is to provide capable chatbots that help both instructors and students when classes are more extensive and providing individual support becomes more difficult.

Since chatbot technology is still in its infancy within the educational sector, there is a demand to experiment with it to discover its advantages and disadvantages in this particular sector [20]. The research suggests that chatbots are infrequently used in the field of education. However, more recent research indicates utilizing chatbots in the classroom is projected to increase learning outcomes noticeably and students' happiness [21, 22].

There have been numerous studies on chatbot technology utilization for educational purposes, such as using chatbots to respond to students' questions about computer programming concepts [22]. The majority of this research has underlined the usage of chatbot platforms and carried out to produce solid summaries of current knowledge in chatbot applications for education; As an illustration, Cunningham-Nelson [23] reviewed the pertinent chatbot literature and illustrated two potentials scenarios of using chatbots in an educational context, along with a prototype application for each of the scenarios.

Smutny [24] employed a screening method in an impartial web directory to look at chatbots that support learning via Facebook Messenger. The findings were made public in a separate online directory. The benefits of chatbots exceeded the drawbacks, and they delivered a more successful educational experience, according to a previous study that found they were helpful for both students and instructors [11, 14]. Pérez [9] who used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach, examined several chatbots used for educational purposes.

Several relevant studies, [9, 12, 24–26], addressed chatbot implementation and observed benefits in the educational context using experimental and exploratory studies of existing implementations. These studies contribute to the introduction of evidence-based results regarding chatbot design and implementation gains in the educational context. While it is considered valuable preliminary exploration, the rapid revolution of educational chatbot applications across most educational fields has changed the students' perception, engagement, and awareness of these applications. Accordingly, there is a gap in tackling perceived benefits and risks of faculty members and students to define chatbot implementation scenarios effectively and their exploitation in the educational context.

A. Perceived Benefits

Interactivity: In order to achieve excellent engagement between students and the chatbot, interactivity refers to users' dialogue and reaction [9]. Previous research [25] has employed and evaluated interaction in different settings. To guarantee an effective connection between students and the chatbot, the authors of [26] investigated interactivity in relation to users' communication and feedback. The authors of [18] divided interaction into categories for discussion and language, reaction, and communication. In a prior study setting, the impact of interaction on the intention to use chatbots powered by AI was examined. It is crucial to have a deeper comprehension of the user's issue. To better comprehend the user's problem, communication and understanding between the user and chatbot are crucial [1, 12, 23]. In terms of interaction, communication, and responsiveness between bots and users or humans, this shows the efficacy and efficiency of chatbot deployment in the organization.

1) Ethics

Ethical concerns incorporate what distinguish chatbots usage, what user may and might not do as pupils [27]. A

similar idea was expressed by [23], who stated that ethics takes into account the standards that distinguish between appropriate and inappropriate behavior. The ethical implications of using new technology are taken into account and directly affect people's confidence in doing so. There is an ethical dilemma associated with chatbot adoption in education that incorporates social bias, discrimination, inequality, privacy, and bias in trained data that was utilized within chatbot applications [28, 29]. According to [28], the primary ethical concerns associated with AI applications' adoption in the educational context are privacy leakage, autonomy reduction, academic misconduct, and lack of transparency. In the Saudi context, Elmahdi *et al.* represented various associated risks with AI adoption in the Saudi educational context including, but not limited to, 53% of study sample mentioned challenges of assessment authenticity, 51% agreed with the challenge of originality verification, 66.7% agreed with the challenge of maintaining assessment validity, sensitive data leakage, and human replacement fears. Elmahdi *et al.* [29] additionally mentioned the lack of ethical guidelines for the adoption of AI applications in education. Furthermore, Aljabr [28] introduced an empirical finding that Saudi faculty members recognize the ethical risk associated with AI application integration in educational system, and illustrated that using AI-based plagiarism software, training students to use AI ethically, and conduct exams in campus conducting in person neither online, and reformulating grading system is one of associated solution to mitigate ethical dilemma of AI in education.

2) *Perceived trust*

Users' impressions of the expected dependability and integrity of the chatbot platform are referred to as perceived trust. Perceived trust and behavioral intention are directly related, according to earlier research [8, 11, 21], with perceived trust leading to a user's commitment to taking part in certain activities. Previous studies have pinpointed factors that are vital in determining whether people trust chatbots. However, because chatbots have many distinctive characteristics, it is worth considering trust, particularly in the context of this interactive technology.

B. *Potential Risks*

It is critical to recognize the issues raised in relation to chatbot abuse and to put precautionary measures in place to reduce the dangers involved. Creating comprehensive public policies for sustainable development and guaranteeing inclusion and fairness are among the difficulties. Partnerships at both the national and international levels are essential to encounter these problems, as well as open discourse on security, ethics, and accountability. According to [9], among the worries about AI and its effects on education are potential discrimination, inadequate recommendations for specific student groups, the concentration of personal data, liability, and the influence of AI automation on teacher jobs. Ensuring protection of personally identifiable information and privacy preferences poses a challenge, specifically in case of young students who are unable to provide their explicit consent [14, 22].

Studies by Aljabr and Elmahdi [28, 29] exclusively addressed chatbot usage within Saudi educational settings, which focused on ethical consideration as primary study pillars. It primarily concentrated on assessing the authenticity and originality of students' works, neglecting privacy and security concerns associated with chatbot implementation, which could significantly affect user-trust. Furthermore, there were poor representations of undergraduate students, postgraduate students, and faculty members in these studies.

III. Materials and Methods

This study, in its nature, is a descriptive study that relies on a descriptive analytics approach to fulfill study objectives and aims. The study relies on generative, subjective, and comprehensive data, particularly quantitative data. The study aims to get more insights into the potential risks and benefits associated with using chatbots in the academic fields. Accordingly, descriptive analysis is appropriate to acquire comprehensive knowledge of a phenomenon.

A. *Research Sample*

The study sample is faculty members, undergraduate and postgraduate students enrolling in the University of Ha'il [30], and a random sample of faculty members working in the university. The study adopted cluster random sampling techniques to select the study sample participants.

The sample was selected based on being either students or instructors at the University of Ha'il [30]. The researcher first assigned four groups based on faculty affiliation, following the university's established structure of faculties, as following: medical faculty, humanity faculty, administrative faculty, and technology faculty. From each group (i.e., faculty), faculty members and students from both postgraduate and undergraduate were selected randomly. The researcher used this cluster random sampling technique, which is most suited to university architecture, due to time restrictions and limitations in participant rates.

Regarding the sampling technique, the researcher adopted a random cluster sampling technique. Assuming the difference in sample means is statistically significant at the level 0.5, the total required sample size is greater than 71 at each cluster, where the most common size that researchers agreed upon is 100 per cluster. Nevertheless, Cahan [31] established that increasing sample size rather than confidence intervals is the way to avoid ungeneralizable results.

To avoid bias in sampling, the researcher ensures that the study sample represents all clusters of the university, including students, faculty members from all four identified faculties, and from the two main educational streams: postgraduate and undergraduate. Moreover, the size of the clusters reflects proportional representation of the population.

B. *Data Sources*

The data was collected utilizing an online questionnaire in an anonymous form of collection that had been distributed randomly to the study sample. The questionnaire was developed to investigate students' and faculty members' perceptions and feedback on using chatbots in the educational context. The questionnaire was developed by researchers based on the existing literature on chatbots in education, such as [2, 5–7]. The researcher embedded a consent form at the beginning of the research tools that informed potential participants of complete information

regarding the research study. The introduction declared the research objectives and informed them of their right to request research results and findings.

The researcher conducted a pilot study to evaluate research data source validity and reliability. The pilot study incorporated 45 responses gathered from both instructors and students out of the original research sample. The questionnaire scored 0.92 as a reliability score of the items related to chatbot's potential benefits and 0.90 as a reliability score of the items related to chatbot's potential risks, considered a high reliable score, which indicated that the scale has adequate psychometric qualities.

Regarding content and construct validity, the questionnaire was introduced to a panel of independent judges, who were affiliated with academic ranking in Hail University, adhering to the research and methodology code of the research ethics standing committee- University of Hail.

C. Participant Demographic

The researcher collected 529 responses; only 307 were included in the analysis, corresponding to 58.03% of the participants and representing participants who had used functional chatbots in their learning or tutoring context. Accordingly, the researcher guaranteed the robustness of the results and eliminated the impacts of other variables on the results, such as previous knowledge, biases, and so forth. According to Table 1, 17 faculty members participated in the study, where the majority of participants were students, 80% were at the undergraduate level, and 14% at the postgraduate level. The majority of participants were from humanities colleges, while the second largest participation observed was from administrative colleges.

Table 1. Participants' demographic distribution and background information (N = 307)

Variable	Category	N(%)
Gender	Male	165(53.7%)
	Female	142(46.3%)
	Total	307(100.0%)
Professional	Faculty member	17(5.5%)
	Postgraduate Student	42(13.7%)
	Undergraduate Student (Bachelor)	248(80.8%)
Specialties	Medical	52(16.9%)
	humanity	127(41.4%)
	Administrative	81(26.4%)
	Technology	47(15.3%)

D. Data Analysis

The researcher used descriptive statistical methodology that relies on frequencies, standard deviations, means, and exploring graphs. Quantitative analysis was conducted using SPSS version 25 incorporating, categorical responses, including participants' demographic background, and 5-points agreement scale items including items related to potential benefits and items related to potential risks associated with integrating chatbots in the educational context. Means of the Likert scale was interpreted as follows:

Strongly Disagree: 1.00 to 1.80
Disagree: 1.81 to 2.60
Neutral: 2.61 to 3.40
Agree: 3.41 to 4.20
Strongly Agree: 4.21 to 5.00

Furthermore, the researcher utilized variance tests as a measure of departure statistics to infer differences between respondents that are attributed to any demographic variable (if-existed). However, the normality test was conducted to ensure the normal distribution of data validating the choice between parametric or non-parametric tests.

E. Ethical Considerations

The current study adhered to the ethical code of the research ethics standing committee, University of Hail and gained the approval from the review board. No personal data or personal identifier, such as contact information or university identity, was collected from participants. Collected data was stored securely in the researcher's storage unit, adhering to data handling protocols in the accredited ethical code of Hail University to sustain security and privacy.

IV. Result and Discussion

A. AI Based Chatbot's Perceived Benefits

The participants rated their agreement with 12 items of Chatbot benefits in the learning and tutoring context using a 5-point Likert scale. Table 2 summarizes how participants perceived these benefits.

According to Table 2, participants showed high consensus on the chatbot's potential to facilitate students' learning as 280 (91%) responded with agree or strongly agree with the first statement, which represented a high level of agreement (M = 4.5, SD = 0.70). The second benefit is related to Chatbot capabilities providing an interactive learning experience, which was rated at a high level of agreement (M = 4.41, SD = 0.72). Furthermore, 87% of participants showed a high level of agreement about Chatbot benefits in handling administrative workloads such as providing administration information to users, enrolling students in the courses, grading, scheduling, e.tc.). 88% of participants considerably agreed on the general useability of the chatbot across the educational majority, 86% agreed on the chatbot providing continuous monitoring of learning progression, 85% agreed on chatbot fostering self-efficacy skills, and 84% of participants agreed that chatbot acts as learning support and promotes self-regulated learning.

Furthermore, the Mann-Whitney test was performed to check if there was any difference between female and male participants in the way they perceived chatbot benefits in the educational context. Kolmogorov-Smirnov results were interpreted to violate the prerequisites of the parametric test ($p < 0.05$) since the distribution of participant responses was not normally distributed. Thus, the researcher used a non-parametric test, the Mann-Whitney test, to compare female and male participants. There was not a significant difference in average agreement with the chatbot benefits in the educational context between female and male participants ($z = -0.84$, $p > 0.05$).

To get more insights, the researcher performed Kruskal-Wallis's test to investigate variations in the perception of chatbots' benefits within the educational context across professionals. According to Table 3, there were no significant differences in the perception of chatbots' benefits within the educational context across professionals ($\chi 2$ (2, 307) = 5.77, p = 0.056). Similar to results obtained from the Kruskal-Wallis's test to examine variation in the

perception of chatbots' benefits within the educational context across academic majors ($\chi2$ (3, 307) = 4.11, p = 0.25).

In a nutshell, there were no variations in the way they perceived chatbot benefits in the educational context attributed to their demographic profile, which interpreted a high sense of certainty and agreement regarding the benefits of chatbots within the education context. This result suggests unified agreement and interaction with chatbots.

Table 2. Percentage, means, and standard deviations of chatbot's benefits bring to educational context

Benefits	Mean (std Dev)	Agreement (F%)				
		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
		N (%)	N (%)	N (%)	N (%)	N (%)
AI-based chatbots have the potential to facilitate students' learning	4.51(0.70)	1(0.3%)	2(0.7%)	24(7.8%)	91(29.6%)	189(61.6%)
AI-based chatbots have the potential to offer interactive learning experiences for the students	4.41(0.73)	2(0.7%)	2(0.7%)	27(8.8%)	113(36.8%)	163(53.1%)
AI-based Chatbots could smoothen the transition of secondary-education students into university	4.28(0.82)	2(0.7%)	7(2.3%)	38(12.4%)	116(37.8%)	144(46.9%)
AI-based chatbots can be used as instructor-assistant (such as answering frequently asked questions, sending reminders to students, scheduling meetings with instructors, and conducting online assessments)	4.30(0.84)	4(1.3%)	7(2.3%)	31(10.1%)	117(38.1%)	148(48.2%)
AI-based chatbots can serve as remote instructor-assistant such as delivering materials, answering subjective questions, sharing resources, or providing recommendations for resources)	4.23(0.93)	7(2.3%)	7(2.3%)	42(13.7%)	104(33.9%)	147(47.9%)
AI-based chatbots could advance students' and users' administrative work (such as providing administration information to users, enrolling students in courses, deliver rapid answers to library inquiries)	4.37(0.76)	1(0.3%)	5(1.6%)	31(10.1%)	112(36.5%)	158(51.5%)
AI-based chatbots can be utilized to increase university enrolment (such as using it for safeguarding students successfully transition to college, Georgia state university experience)	4.26(0.87)	4(1.3%)	9(2.9%)	35(11.4%)	113(36.8%)	146(47.6%)
AI-Based chatbots can be used in vast educational contexts such as medical education, humanity education, engineering education, etc.	4.36(0.76)	1(0.3%)	6(2.0%)	30(9.8%)	116(37.8%)	154(50.2%)
AI-based chatbots can be used to monitor learning progression.	4.32(0.85)	2(0.7%)	12(3.9%)	29(9.4%)	106(34.5%)	158(51.5%)
AI-based chatbots can be used to provide individual support such as assessing prior knowledge, setting learning goals, fostering inter-social interaction, etc.	4.29(0.83)	1(0.3%)	10(3.3%)	37(12.1%)	109(35.5%)	150(48.9%)
AI-based chatbots have the potential to foster self-regulated learning skills	4.31(0.81)	2(0.7%)	5(1.6%)	41(13.4%)	107(34.9%)	152(49.5%)
AI-based chatbots can be used to foster self-efficacy skills	4.30(0.82)	1(0.3%)	10(3.3%)	35(11.4%)	112(36.5%)	149(48.5%)

Table 3. Kruskal-Wallis results exploring the variations in the perception of chatbot's benefits within the educational context across professionals and Specialties (N = 307)

Dimension	$\chi2$	df	Sig.
professionals	5.77	2	0.056
Specialties	4.11	3	0.25

Based on this result, it also precludes that the current chatbot can be exploited in an educational context. Nevertheless, this result does not demolish existing differences in specific chatbot features or particular tasks; it could be a significant difference in the effectiveness and preferences of participants.

B. AI Based Chatbot's Perceived Risks

The participants rated their agreement with 8 items of Chatbot risks in the learning and tutoring context using a 5-point Likert scale. Table 4 summarizes how participants perceived risks associated with Chatbot utilization in the educational context.

According to Table 4, participants exhibited a high level of agreement on all of the risks associated with using an AI-based Chatbot within the educational context. 79.1% of participants rated data limitation as the greatest risk associated with utilizing a chatbot in the educational context. 66.8% of participants have concerns regarding the information reliability that chatbot generates, where 65.5% of participants agreed that chatbots generate faulty information, inaccurate information. Furthermore, the participants exhibit concerns related to the consequences of the extensive usage of chatbots in learning contexts; 62.6% agreed that extensive use of chatbots could affect students' ability to search and acquire information, 68.8% have suspicions that students could not always check the trustworthiness of the information generated by chatbots, and 60.6% had concerns that chatbots could increase loneliness among students. Furthermore, 61.5% of participants had concerns regarding unethical use of chatbots in the educational context, including but not limited to cheating, solving homework, and solving research assignments, and 45.1% agreed that chatbots in the educational context could bring security risks and breach security.

Moreover, the Mann-Whitney test was performed to check if there was any difference between female and male participants in the way they perceived chatbot risks in the educational context. Kolmogorov-Smirnov results were interpreted to violate the prerequisites of the parametric test ($p < 0.05$) since the distribution of participant responses was not normally distributed. Thus, the researcher used a non-parametric test, the Mann-Whitney test, to compare female and male participants. There was not a significant

difference in average agreement to chatbot risks in the educational context between female and male participants ($z = -1.11$, $p > 0.05$).

To get more insights, the researcher performed the Kruskal-Wallis test to investigate variations in the perception of chatbots' risks within the educational context across professionals. According to Table 5, There were no significant differences in the perception of Chatbot's benefits within the educational context across professionals ($\chi2$ (2, 307) = 0. 91, p = 0. 63). Similar to results obtained from the Kruskal-Wallis test to examine variation in the perception of chatbot's risks within the educational context across academic majors ($\chi2$ (3, 307) = 5.56, p = 0.14).

In a nutshell, there were no variations in the way they perceived chatbot risks in the educational context attributed to their demographic profile, which interpreted a high sense of certainty and agreement regarding the risks of chatbots within the education context.

Absence of variation suggests that the sample of the study shared a uniform level of concerns regarding chatbot usage. Nevertheless, any implementation of a chatbot in a higher educational context has to address such concerns either in design or awareness.

Table 4. Percentage, means, and standard deviations of chatbot's risks bring to educational context (n = 307)

Risks	Mean (Std. Dev)	Agreement (F%)				
		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
		N (%)	N (%)	N (%)	N (%)	N (%)
AI-based chatbots could provide faulty information	3.83(1.11)	12(3.9%)	27(8.8%)	67(21.8%)	96(31.3%)	105(34.2%)
AI-based chatbots could increase loneliness among students	3.69(1.20)	13(4.2%)	48(15.6%)	60(19.5%)	85(27.7%)	101(32.9%)
Ai-based chatbots could perform safety risks	3.41(1.40)	35(11.4%)	64(20.8%)	42(13.7%)	72(23.5%)	94(30.6%)
AI-based chatbots require a consistent update to tackle changes in the information	4.21(0.90)	3(1.0%)	10(3.3%)	51(16.6%)	98(31.9%)	145(47.2%)
AI-based chatbots could be used for cheating and unethical purposes in education field (such as solving homework, doing research work instead of students)	3.72(1.21)	18(5.9%)	35(11.4%)	65(21.2%)	83(27.0%)	106(34.5%)
Higher dependency on AI-based chatbots could decrease students' exposure to new knowledge and information	3.70(1.19)	15(4.9%)	41(13.4%)	65(21.2%)	86(28.0%)	100(32.6%)
Extensive use of AI-based chatbots negatively affects students' skills in information research and acquisition	3.73(1.22)	16(5.2%)	41(13.4%)	58(18.9%)	84(27.4%)	108(35.2%)
Students could not always check if the information and knowledge generated by chatbots is true or false	3.90(1.11)	11(3.6%)	27(8.8%)	58(18.9%)	96(31.3%)	115(37.5%)

Table 5. Kruskal-Wallis results exploring the variations in the perception of chatbot's risks within the educational context across professionals and Specialties (N = 307)

Dimension	$\chi2$	df	Sig.
professionals	0.91	2	0. 63
Specialties	5.56	3	0.14

V. Discussion

Artificial intelligence implementation evolves practices and technologies in education. Currently, the dominant trends in education are imposing AI-based chatbots in learning and teaching contexts. Most students and tutors in Saudi universities have experience using AI chatbots in educational settings. Investigating students' and tutors' familiarity with AI chatbots revealed their perceived benefits and risks across educational settings.

The main objective of this study is to comprehend the perceived benefits of AI-based chatbots in Saudi higher education. A significant percentage of the participants exhibited a certainty toward the benefit of utilizing AI based Chatbot in academic settings, facilitating students' learning where chatbots provide a variety of supplement materials in different formats such as visual representations like images and workflows, auditory presentations like audio, and written contents format like articles, chatbots provide instant responses and feedbacks to students' and tutors' queries, eliminating any time constraints associated with the conventional methods. Agreed with Yin *et al.* [5] and Sedrakyan [32] who advocated the integration of AI-based chatbots with a learning management system to enhance the learning process and support students learning, Kumar [12] reported the ability of chatbots to facilitate knowledge acquisition, Cunningham-Nelson *et al.* [23] elaborated that students use chatbots to instantly respond to their subject matter questions, Winkler and Soellner [21] reported the ability of chatbots to give help to both instructors and students when classes get more extensive, He *et al.* [13] emphasized Chatbot is capable to provide faster and more effective accessibility to information and help students with their academic work, consensus with Delello *et al.* [33] who conveyed students' positive perspective toward the ability of Chatbot in academic setting to tailored instant feedback, simplify abstract concepts effectively. Nevertheless, Owoc *et al.* [34] discussed a feedback loop to enhance the fairness of students' evaluations.

The second benefit identified by the current study participants was presenting an interactive learning experience, which aligned with Kumar's [12] statement that chatbot alters the educational flow to be more interactive and dynamic and enhance engagement. Mendoza *et al.* [11], Wrinkle and Soellner [21], and Statam *et al.* [8] described chatbots as interactive tools or technology having distinctive characteristics that impact their perceived trust and behavioral intention. Not surprisingly, the current study sample ranked handling administrative workloads such as

providing administrative information to users, enrolling students in courses, and grading as the third perceived benefit of chatbots. Sedrakyan [32], discussed chatbot usage for task and time management as one of the preliminary benefits for saving time and free-up more time to assist students handling other subsidiary academic responsibilities, Delello *et al.* [33] mentioned the efficiency of creating time-saving as a key theme of perceived chatbot benefits, elaborating that chatbot automates administrative and managerial tasks such as creating presentation grading and scheduling, which free-up time and offload a portion of workload, and Owoc *et al.* [34] pinpointed grade automation and implementation of classroom works as perceived benefits of AI-based chatbot.

AI-based chatbots are noted by participants to increase self-regulated learning, foster self-efficacy skills, track learning progression constantly, and provide personalized learning experiences, which agrees with findings of [5, 9, 12–14, 22, 32–34]. There were no conflicts regarding perceived benefits among participants, which indicates consistent beneficial experience and high technical engagement. Consistently, the chatbot can be initially implemented in higher education institutes for a wide range of applications and targeted users due to a lack of evident variation in perceived benefits.

Considering the rapid involvement of AI-based chatbots in educational settings, participants exhibited potential concerns associated with the implementation of AI-based chatbots in colleges and universities. Participants ordered data limitation as the highest crucial concern related to AI-based chatbots, which is associated with outdated or misinterpreted information, according to Delello *et al.* [33]. Participants further declared concerns related to the unethical utilization of AI chatbots, such as cheating and solving assignments. Moreover, the study revealed concerns associated with data security and privacy; users are encouraged to share sensitive data and confidential documents to increase the chatbot's efficiency, which puts them at risk of hacking [32].

Furthermore, participants shared claims associated with the consequences of using AI-based chatbots in an academic context that could affect students' proficiency, such as thinking disorders, self-efficacy reduction, loneliness likelihood, and psychological disorders. Previous studies shared a common version of these concerns, categorizing these concerns into lack of human interaction, lack of effort/dependence on tools [33], overreliance, and lack of face-to-face interactions [32].

The absence of variation in the perceived risks supports chatbot implementation as a widely accessible tool without any necessary initial training or communication efforts, understanding that using chatbots responsibly and accountably may require additional training and communication efforts.

VI. Conclusion

The study found that AI-based chatbot implementation in the educational context is associated with substantial benefits and potential risks. The substantial benefits are pinpointed in providing personalized learning experience, facilitating students' learning, providing continuous monitoring of learning progression, fostering self-efficacy skills, acting as learning support, promoting self-regulated learning, and minimizing administrative workload. Nevertheless, integrating AI-based chatbots in academic settings conveys potential risks, including but not limited to constraints related to data, the unethical utilization of AI chatbots, such as cheating and solving assignments, data security and privacy, affecting students' proficiency.

The current study's limitation was its relatively small sample size, which was from a single university. Future research should incorporate a broader sample size to address more than one university across different geographical locations throughout the Kingdom of Saudi Arabia. Future research is encouraged to conduct longitudinal experimental approaches to examine the impact of AI-based chatbots on students' skills over time, such as critical thinking, research skills, writing skills, information validation skills, and so forth.

Conflict of Interest

The author declares no conflict of interest.

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