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Investigating the Effectiveness of Artificial Intelligence Chatbots in Enhancing Digital Dialogue Skills for Students

Mona Saleh Alwazzan[*] ID
Qassim University, SAUDI ARABIA

Abstract: The central focus of this study is exploring the potential of Artificial Intelligence (AI) Chatbots in enhancing digital dialogue for students. The study investigates the key attributes of Chatbots that can contribute to the feasibility of facilitating digital dialogue to improve students' communication skills through discussions and dialogues. The study employed a descriptive method using a questionnaire to gather the perspectives of 35 educational experts on the use of AI Chatbots in digital dialogue skills. This study revealed that using AI Chatbots plays a crucial role in enhancing digital dialogue skills and can be effectively integrated into instructional practices to facilitate meaningful dialogue among students. Finally, the study recommends that educational technology specialists leverage new technologies, such as Al Chatbots to help improve student performance and facilitate digital dialogue in education.

Keywords: *Artificial intelligence, Chatbots, digital dialogue, educational experts.*

Introduction

In recent years, much research on education has focused on teaching and learning in the classroom, as well as on the role of Artificial intelligence (AI) as a support tool in the educational process (Barrett et al., 2019; Issa, 2020). With the advent of the digital revolution, AI has become a significant contributor to education and the dissemination of knowledge, particularly among "digital native" students who seek the best education available. The primary objective of this study is to investigate the usefulness of Chatbots as a means of support for digital dialogue and the promotion of interaction through the latest digital tools to enhance student learning. Specifically, this study seeks to provide insights into the process of enhancing Chatbots through digital dialogue and aims to answer the following research questions: How do AI Chatbots assist in the development of digital dialogue in education, and what are their key attributes in this regard? How feasible is the use of Al Chatbots in facilitating digital dialogue for both teachers and students in education from the perspectives of educational experts? And does the age, education level, and prior chatbot experience of the experts affect their view of key attributes?

It is noteworthy that many studies have indicated the efficacy of using Chatbots in education, such as the studies by Abbasi and Kazi (2014), Roos (2018), Kowalski et al. (2013), and L. K. Fryer et al. (2017). Additionally, it has been argued that Chatbot usage enhances academic performance, critical thinking, and effective learning satisfaction (Chang et al., 2022). Some language learners are already using apps that incorporate Chatbots to practice speaking without experiencing embarrassment in simulated situations (Patel, 2023). Therefore, Chang et al. (2022) argued that it was important to further examine the use of Chatbots in learning to develop students' performance because the integration of such novel technologies arguably affects learning outcomes.

Generally speaking, research endorsed the necessity for AI techniques and identified avenues for further research, particularly with regard to Chatbots, to assess the efficacy of educational practices utilising AI. It can be argued that the presentation of information to the learners significantly impacts their comprehension of new concepts. Additionally, it may also cater to different individual learning styles and facilitate the assimilation of new skills and strategies for future application. The importance of Chatbots and digital dialogue is highlighted in their contribution to enriching scientific

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[*] **Correspondence:**
Mona Saleh Alwazzan, Department of Educational Technology, College of Education, Qassim University, Saudi Arabia. ✉ m.alwazzan@qu.edu.sa

content and developing the skill of digital dialogue using artificial intelligence techniques. In addition, curriculum developers can benefit from them and further include them in courses as enrichment materials.

The objective of this study is to investigate the present use of Chatbots as an interactive mechanism for fostering digital dialogue among students. Additionally, it aims to gather the perspectives of educational experts regarding the effectiveness of Chatbots in improving digital dialogue and enhancing students' learning outcomes. This will aid in elucidating the key features of dialogues employed in Chatbots. The study focuses on Chatbots that are currently employed to support learning. Thus, the central question in this regard concerns the techniques used to leverage Chatbots in developing digital dialogue and supporting learning.

Literature Review

According to dialogue theory, technology and dialogue can be combined in learning environments to facilitate the learning process. For example, a teacher's email can be used as a means of communication with students (Wegerif, 2007). This idea aligns with Ausubel's (1962) theory of meaningful learning, which asserted that all educational materials have an organisational structure characterized by another representation. Therefore, Chatbots function similarly to purposeful learning because they provide learners with meaningful learning through digital dialogue. Furthermore, the use of Chatbots and digital technology in education aligns with the cognitive load theory, which suggests that an excessive amount of information and elements can overwhelm short-term (working) memory, leading to cognitive overload (Sweller et al., 2011). The cognitive load theory provides valuable insight into the current study as it perceives that the cognitive load decreases during dialogue, whether it be between teachers or students. As a result, because digital technology aids in generating ideas, the student does not bear the entire responsibility alone.

Similarly, the connectivism theory is relevant to this study as it places emphasis on the importance of network flows that enable learners to build their learning environments and connect to successful networks, assuming that learning occurs naturally and easily through social media (Downes, 2012). According to this theory, when educational platforms, sources of support, and Chatbots are integrated into the learning environment, students can improve their learning process through digital means, which is a compelling argument that warrants further investigation.

Artificial Intelligence (AI) Chatbots

In a broad sense, Holmes et al. (2019) defined Chatbots as AI-powered software that can converse with users in a natural language through audio and text forms. This definition is supported by Zemčík (2019), who noted that Chatbots are designed to communicate with users in a manner that resembles real people. With the increased use of the Internet and social media platforms, Chatbots are being utilised in various areas, including customer service, marketing, advertising, entertainment, and technical support.

Expanding on the previous areas, Smutny and Schreiberova (2020) proposed that Chatbots can effectively engage users in natural text and voice conversations on specific topics or fields and can be utilised in various domains, such as education and training. Furthermore, Zimmerman (2020) mentioned that Chatbots can simulate human conversations through text chat, voice commands, or both. Based on this understanding, this study defines Chatbots as AI-powered tool that facilitates digital dialogue, providing students with an opportunity to improve their dialogical skills and enhance learning.

Additionally, Abdel Wakil and Musharak (2019) have emphasised that Chatbots are specifically designed to perform specific tasks in diverse fields, including education. Consequently, it is possible to improve the performance of Chatbot tasks in serving and developing education in accordance with the required education outcomes, such as enhancing digital dialogue skills.

Issa (2020) asserted that the incorporation of AI-based web applications, such as Chatbots, in education can provide learners with a smart adaptive mobile learning environment that is tailored to their individual learning styles. Such adaptive learning systems are designed to be more responsive to learners' unique characteristics and needs. Therefore, an adaptive learning environment entails creating a distinctive learning experience for each learner based on the learner's personality, interests, and performance, by providing appropriate materials to achieve academic progress (Monova-Zheleva, 2005). Empirical evidence has shown that Chatbots can positively impact students' academic performance and interaction, serving as a virtual assistant for teaching (Essel et al., 2022).

The potential of Chatbots in education has been extensively researched. The results of Al-Amri's study (2019) showed that the students' use of Chatbots contributed to improving learning outcomes in the achievement test, as the results revealed the effectiveness of Chatbots in developing the cognitive aspects of the science course. Al-Najar and Habib (2021) found a positive effect of using AI Chatbots in an electronic training environment in developing the cognitive and performance aspects of the skills of using e-learning management systems.

In addition, P. K. Bii et al. (2018) found that the teachers had a positive attitude towards Chatbots in teaching, as it improved students' understanding and made learning more engaging. Al-Shanqeeti (2022) advocated for the need to train teachers to use Chatbots in education. In another study, Roos (2018) also aimed to develop the services provided

by interactive Chatbots in education to achieve the greatest educational value, which could be expanded by integrating them into other systems, such as virtual learning environments, to support communication between students and their peers. Benotti et al. (2014) designed a Chatbot that simulated student participation, and L. Fryer and Carpenter (2006) argued that Chatbots provided an enjoyable way of learning and played a helpful role in activating student participation because students felt more comfortable when they talk to a neutral entity. Moreover, Windiatmoko et al. (2021) noted that e-learning helps students focus on important ideas so that the scientific material is more easily organised.

Furthermore, Debecker (2017) highlighted several features of Chatbots in learning, such as unrestricted learning, the ability to discuss lessons with the teacher, facilitating dialogue, and providing students with homework activities. Ghoneim (2022) emphasised the ease of conducting an interactive dialogue with the student supported by multimedia resources, such as pictures and videos to obtain additional information using Chatbots. He confirmed that employment of learning support with Chatbots on educational platforms as a technological innovation is a positive development, especially given the interest of many educational institutions in employing them. This is particularly important due to the shortcomings of some chat programs in addressing students' questions, requiring human intervention (Smutny & Schreiberova, 2020). On the other hand, just as Chatbots have advantages, they have limitations; as the study of Kuhail et al. (2023) indicated that the use of Chatbots includes challenges and limitations, including that they need to be constantly developed on the set of data contained within them, as insufficient or improper development weakens the trust of accreditation on that data. In addition, not using Chatbots in education may be attributed to the lack of data and insufficient support for resources and materials (Stone et al., 2016). Hence, it is necessary to effectively employ Chatbots in educational environments and educational platforms, which provide a suitable environment to support Chatbots. This assumption calls for an extension of addressing and activating educational platforms by supporting Chatbots as an environment that improves learning, especially digital dialogue.

Digital Dialogue and Chatbots

The utilisation of technology provides numerous opportunities for dialogue and discussion among students in the classroom (Al-Wazzan, 2019). Wegerif (2007) emphasised that students can enhance their dialogue development through the capabilities of Information and Communication Technology (ICT), which enable in-depth discussions. He contended that dialogue promotes higher levels of thinking and enables students to achieve greater levels of Bloom's Taxonomy, moving beyond the traditional Gagné (1985) and Bloom (1956) approaches, and towards a cultural and social view of learning, which prioritizes relationships and interaction between students to understand and accept diverse opinions. Thus, digital dialogue can further enhance the benefits of Chatbots. Chatbots can be regarded as a basic version of dialogue-based teaching systems. For instance, Evens and Michael (2005) identified the Intelligent Learning System (CIRCSIM) as one of the first Dialogue-Based Tutoring Systems (DBTSs) that uses dialogue to assist students in studying in-depth and reinforcing their learning. Additionally, the Auto Tutor System has been developed to simulate an educational dialogue and includes adaptive learning activities that engage students in educational dialogue (Holmes et al., 2019). Watson Tutor is one of the most recent DBTS smart learning systems that have been integrated into a product for higher education curricula to enable students to access a deeper understanding of learning material (Ventura et al., 2018).

Chatbots can be used to support learning and be considered educational chat programs (Holmes et al., 2019). Researchers have also explored possibilities of interactive Chatbots interfaces based on dialogue and mutual interaction between the student and the system, using the natural language of the students, which could increase their motivation to search, question, and accept diverse opinions (Al-Amri, 2019). Chatbots are part of a constructive learning and teaching environment that enables students to acquire twenty-first-century skills, such as digital dialogue (Al-Amri, 2019; P. Bii, 2013). Wegerif and Major (2019) emphasised that technology expands the conversational space between learners, opening a common ground for interaction between different perspectives and leading to new learning and knowledge. It has been suggested that the level of experience may not affect digital skills. According to Al-Mujallad (2011), the experience variable does not affect the amount of digital learning skills by experienced instructors. Mamkegh (2021) confirmed that there are no statistical differences in the degree of experience to which instructors possess digital learning skills.

In general, previous studies highlighted the use of Chatbots in developing knowledge and skills in e-learning management systems (Al-Najar & Habib, 2021; L. Fryer & Carpenter, 2006), as well as how Chatbots contributed to improving learning outcomes in the achievement test (Al-Amri, 2019; Ghoneim, 2022). In another study, Farkash (2018) also proved that Chatbots have a significant role in teaching dyslexic students in the primary stage. Despite the wide research on the use of Chatbots, the focus on digital dialogue skills has not been addressed. Therefore, the current study may have been distinguished by its focus on the contribution of Chatbots in developing the skill of digital dialogue.

Methodology

To achieve the objectives of the study, the following research questions were formed:

1. How do AI Chatbots assist in the development of digital dialogue in education, and what are their key attributes in this regard?

2. How feasible is the use of Al Chatbots in facilitating digital dialogue for both teachers and students in education from the perspectives of educational experts?

3. Does the age, education level, and prior chatbot experience of the experts affect their view of key attributes?

Study Design

The study utilises the descriptive method and employs a questionnaire to collect the data. It aims to examine the use of AI-Chatbots in facilitating digital dialogue for learners by surveying the perspectives of 35 female educational experts. These experts are computer science teachers and specialists in the Educational Technology Department; and have experience using Chatbots in both teaching and learning. The educational level of the participants is a master's degree and above. The participants' ages range from 35 to 45 years, and their experience varies from five years and above. The surveyed sample of this study consisted of educational experts and computer specialists in the Qassim region of Saudi Arabia. The sample was chosen randomly, and a pilot study was conducted with 20 educational experts to test the design for authenticity, reliability, and error handling.

Upon reviewing previous studies and in light of the research questions, the questionnaire was developed. The questionnaire relies primarily on a set of statements that measure various aspects related to the research question. Therefore, the statements in the questionnaire were deduced by the researcher after reading previous studies in this field.

To ensure the validity of the questionnaire used in this study, face validity (arbitrator's validity) and internal consistency with correlation coefficients were relied upon. The study examined the correlation coefficients between the questionnaire phrases and the total score of the respective themes related to educational digital dialogue skills and the use of Chatbots in enhancing educational digital dialogue. The results showed positive and statistically significant correlations, indicating a moderate to strong relationship between the individual phrases and the overall theme scores. The reliability of the questionnaire was assessed using Cronbach's alpha, and high-reliability coefficients were obtained for the themes and sub-dimensions, Where Cronbach's alpha was 91.2% for the questionnaire, as shown in the results in Table 1:

Table 1. Reliability Statistics

Cronbach's Alpha	N of Items
.916	35

These findings confirm the validity and reliability of the questionnaire for the study. The data analysis was conducted using SPSS.22 and means and standard deviations were used for further analysis. It should be noted that the participants responded to the questionnaire items by choosing from four options that reflect the degree of agreement (strongly agree, agree, disagree, strongly disagree) corresponding to scores of 4, 3, 2, and 1, respectively.

The appropriate educational digital dialogue skills for students and their importance in learning, in addition to the importance of using Chatbots in promoting educational digital dialogue from the perspective of educational experts, were based on the criteria shown in Table 2. These criteria were derived by calculating the range of scores (the largest score – the smallest score = 3) and dividing it by the number of responses (3/4 = 0.75), resulting in the amplitude of the criteria presented in Table 2.

Table 2. Criteria for Student Digital Dialogue Skills and Chatbots Importance in Education

Means	Verification
Less than 1.75	Very Weak
From 1.75 to less than 2.5	Weak
2.50 to less than 3.25	Significant
3.25 and over	Very significant

Normality Test

The Shapiro Wilk K test the linear normality; the results show that the data is normally distributed as significant (*p*-value >.05) for all variables in the following Table 3. The findings revealed that factor one was distributed normally, but factor two was not a normal distribution, but the overall score of the scale was distributed normally.

Table 3. One-Sample Kolmogorov-Smirnov Test

	Factor one	**Factor two**	**Overall score**
N	34	34	34
Missing	0	0	0
Shapiro- Wilk W	0.964	0.859	0.968
Shapiro- Wilk P	0.320	0.000	0.399

Results

Data obtained from the questionnaire was used to answer the first research question: How do AI Chatbots assist in the development of digital dialogue in education, and what are their key attributes in this regard? The following summary, Table 4, provides the means and standard deviations of the responses calculated on each of the phrases:

Table 4. Responses on Students Digital Dialogue Skills: Experts' Viewpoint

No.	Phrases	Means	Standard deviation	Verification	Order
1	The ability to communicate effectively	3.382	0.604	Highly significant	5
2	Think clearly during digital dialogue	3.441	0.613	Highly significant	3
3	Stimulating the skill of listening to others	3.529	0.563	Highly significant	1
4	The ability to discuss and put forward ideas without hesitation	3.447	0.613	Highly significant	3 repetitive
5	Respect and understand different points of view	3.235	0.654	Significant	7
6	Tolerance and respect for evidence of other opinion	3.147	0.702	Significant	9
7	The ability to think critically	3.147	0.610	Significant	8
8	Develop the skill of persuasion	3.265	0.710	Highly significant	6
9	The ability to organise ideas	3.529	0.563	Highly significant	1 repetitive
		3.346	**0.626**	Highly significant	

This study explores the perspective of educational experts on the appropriate educational digital dialogue skills for students used in learning. The responses from the study sample indicate that these skills are highly significant. It is shown that the mean average of the total scores in this theme was 3.346, with a standard deviation of 0.626.

Several phrases related to personal skills and abilities were evaluated for their degree of verification. Among them, "Stimulating the skill of active listening to others" received the highest level of verification, with an average response value of 3.529 *(SD* = 0.563). Similarly, "Enhancing the ability to organise ideas" also ranked first in terms of verification, with an average response value of 3.529 (*SD* = 0.563). In the third place, both "Thinking clearly during educational digital dialogue" and "The ability to discuss and present ideas without hesitation" received high verification ratings, with an average response value of 3.441 (*SD* = 0.613). The phrase "The ability to communicate effectively" ranked fifth in terms of verification, with an average response value of 3.382 (*SD* = 0.604).

Furthermore, "Developing the skill of persuasion" obtained a verification ranking of sixth, with an average response value of 3.265 (*SD* = 0.710). "Respect and understanding of different points of view" came in seventh place with an average response value of 3.235 (*SD* = 0.654), followed by "The ability to think critically" in the eighth position with an average response value of 3.147 (*SD* = 0.610). Lastly, "Tolerance and respect for opposing opinions" ranked ninth in terms of verification, with an average response value of 3.147 (*SD* = 0.702). Overall, the results suggest that the appropriate educational digital dialogue skills for students used in learning should prioritize skills related to listening, organisation, communication, and persuasion. However, educators should also consider teaching skills related to critical thinking, idea discussion, and respecting diverse viewpoints.

The Results of the Second Research Question

To answer the second research question: How feasible is the use of AI Chatbots in facilitating digital dialogue for both teachers and students in education from the perspectives of educational experts? The means and standard deviations of the responses of the research sample members were calculated on each of the phrases of this theme. The results were as shown in the following Table 5:

Table 5. Chatbots' Impact on Educational Digital Dialogue: Experts' Views

No.	Phrases	Mean	Standard deviation	Verification	Order
1	Assists in performing tasks and activities for students	3.412	0.500	Highly significant	7
2	Raises the ceiling of motivation in learning	3.529	0.507	Highly significant	4
3	Contributes to the use of time to study and review	3.176	0.673	Significant	11
4	Makes exercise more innovative	3.265	0.666	Highly significant	10
5	It enables knowledge exchange between learners	3.500	0.508	Highly significant	5
6	Provides immediate feedback	3.618	0.493	Highly significant	2
7	Makes learning more fun	3.647	0.485	Highly significant	1
8	Contributes to gaining greater boldness in expressing ideas	3.558	0.557	Highly significant	3
9	Stimulates interaction between the two sides of the educational process (teacher and learner)	3.412	0.657	Highly significant	9
10	Retains acquired information for a longer period	3.412	0.557	Highly significant	8
11	Motivates students to participate and interact with the topics presented	3.500	0.564	Highly significant	6
	The total degree of this theme	**3.460**	**0.560**	Highly significant	

According to Table 5, the responses of the study sample, regarding the feasibility of using Chatbots to enhance educational digital dialogue for the learner, were highly significant. The mean average for this axis was 3.460 with a standard deviation of 0.560. The sub-phrases were ranked based on their degree of verification, with the statement with the lowest standard deviation given priority if the averages were equal. This indicates higher stability and homogeneity in the responses.

Table 5 shows the degree of verification of different sub-phrases related to the feasible of using Chatbots to enhance educational dialogue. The phrase "Makes the learning method more enjoyable" ranked first, followed by "the availability of immediate feedback" and "contributes to gaining greater boldness in expressing ideas." Other verified phrases included "raises the ceiling of motivation in learning," "enables knowledge exchange between learners," and "motivates students to participate and interact with the topics raised." The last verified phrases were "stimulates the interaction between the two sides of the educational process" and "contributes to the use of time for study and review."

The Results of the Third Research Question

To answer the third research question: Does the age, education level, and prior chatbot experience of the experts affect their view of key attributes?

Firstly, it can be conducted to measure the significant differences in the sample's opinions about the effect key attributes of AI Chatbots that contribute to enhancing digital dialogue skills by using the ANOVA test and the results are shown in Table 6:

Table 6. ANOVA Test for Effect Attributes of AI Chatbots

		Sum of Squares	df	Mean Square	F	Sig.
Age	Between Groups	13.941	20	0.697	1.648	.179
	Within Groups	5.500	13	0.423		
	Total	19.441	33			
Education Level	Between Groups	19.559	20	0.978	1.695	.166
	Within Groups	7.500	13	0.577		
	Total	27.059	33			
Chatbot Experience	Between Groups	19.284	20	0.964	1.834	.132
	Within Groups	6.833	13	0.526		
	Total	26.118	33			

According to Table 6, there were no differences indicated between the opinions of the study sample about the effect of characteristics of AI Chatbots that contribute to enhancing digital dialogue skills in terms of the sample age, education level, and experience. This means that most of the respondents agree with close degrees on the importance of artificial intelligence in improving technological learning.

Regression Testing for the Effect Attributes of AI Chatbots

Regression testing was conducted to measure the significant effect of attributes of AI Chatbots on enhancing digital dialogue skills. The results are shown in the following table:

Table 7. Regression Testing for the Effect of Attributes of AI Chatbots

Model Summary		Model 1.00
R		.754
R Square		.569
Adjusted R Square		.555
Std. Error of the Estimate		0.30216
Change Statistics	R Square Change	.569
	F Change	42.168
	$df1$	1.00
	$df2$	32
	Sig. F Change	.000
Durbin-Watson		2.280

According to the results of Table 7, there is a significant effect of AI Chatbots on enhancing digital dialogue skills where R^2 = .569 and *p*-value = .000 (*p*<.05).

Multiple Regression Testing for the Effect of Attributes of AI Chatbots

Multiple Regression testing was conducted to measure the significant effect of the independent variable AI Chatbots on the dependent variable enhancing digital dialogue skills for students and teachers. The results are as shown in Table 8:

Table 8. Coefficients for Multiple Regression Testing

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.817	0.002	-	0.404	< .001
	M1	0.500	0.000	0.506	1093.194	< .001
	M2	0.500	0.000	0.702	1515.181	< .001

From the previous table, it can be concluded that there is a significant effect of AI Chatbots on enhancing digital dialogue for students and teachers, where *p*-value = .000 (*p*<0.05). Secondly, it was conducted to measure the significant differences in the sample's opinions about the importance of using Chatbots in promoting educational digital dialogue for the learner and the teacher by using ANOVA test and the results are shown in Table 9:

Table 9. ANOVA Test for Importance Attributes of AI Chatbots

		Sum of Squares	df	Mean Square	F	Sig.
Age	Between Groups	5.475	12	0.456	0.686	.747
	Within Groups	13.967	21	0.665		
	Total	19.441	33			
Education	Between Groups	10.092	12	0.841	1.041	.451
	Within Groups	16.967	21	0.808		
	Total	27.059	33			
Chatbot Experience	Between Groups	6.818	12	0.568	0.618	.804
	Within Groups	19.300	21	0.919		
	Total	26.118	33			

According to Table 9, there are no differences between the opinions of the study sample about the importance of using Chatbots in promoting educational digital dialogue for the learner and the teacher in terms of the sample age, education level, and experience. This means that most of the respondents agree with close degrees on the importance of using Chatbots in promoting educational digital dialogue for the learner and the teacher.

Regression Testing for Importance Attributes of AI Chatbots

Regression testing was conducted to measure the significance of the independent variable AI Chatbots on the dependent variable enhancing digital dialogue skills for the learner and the teacher. The results are shown in Table 10:

Table 10. Regression Test for Importance Attributes of AI Chatbots

Model Summary		Model 1.000
R		.881
R Square		.775
Adjusted *R* Square		.768
Std. Error of the Estimate		.218
	R Square Change	.775
	F Change	110.477
Change Statistics	*df*1	1.000
	*df*2	32
	Sig. *F* Change	.000
Durbin-Watson		1.500

According to Table 10, there is a significant effect of AI Chatbots on promoting educational digital dialogue for the learner and the teacher where $R2$= .775 and *p*-value = .000 (p<.05). The following table, Table 11, presents the results of the study sample's responses regarding the importance of using Chatbots in enhancing educational digital dialogue for the learner and the teacher.

Table 11. Means and Standard Deviations: Experts' Views

No.	Phrases	Mean	Standard deviation	Verification degree	Order
1	It takes into account the individual differences among learners through the diversity of learning methods	3.529	0.615	Highly significant	6
2	Acts as an educational virtual guide with the teacher	3.353	0.691	Highly significant	9
3	It gives an opportunity for dialogue with each learner	3.559	0.660	Highly significant	2
4	Recognizes the preferences of the learners	3.588	0.657	Highly significant	1
5	Ease of adding in different digital platforms	3.529	0.563	Highly significant	4
6	An effective tool for guidance and counselling when the learner encounters difficulty in learning	3.559	0.705	Highly significant	3
7	Contributes to automation of learning	3.500	0.615	Highly significant	7
8	Flexibility to modify and update the content of the educational material	3.529	0.563	Highly significant	4 repeated
9	It takes into account the individual differences among learners through the diversity of learning methods	3.500	0.615	Highly significant	7 repeated
	The total of this theme	**3.516**	0.632	Highly significant	

The results highlight the multiple benefits of using Chatbots in educational digital dialogue. It can be said that the effects of characteristics of the participants, such as age range, education level, and experience with AI Chatbots, would not differ greatly due to these factors. Chatbots contribute to an enjoyable learning experience, offer immediate feedback to aid understanding and progress, foster confidence in expressing ideas, enhance learner motivation, facilitate knowledge exchange and collaboration, and promote long-term retention of information. In general, Chatbots have the potential to enhance the learning process by incorporating these positive elements. Overall, the theme of using Chatbots in enhancing educational digital dialogue for the learner was considered highly significant by the study participants, with a total mean score of 3.460 and a standard deviation of 0.560.

Discussion

The participants' responses to the first question, which focused on key attributes of AI tools, such as Chatbots, in enhancing digital dialogue skills yielded highly significant results–where the most significant skills highlighted were "stimulating the skill of listening to the interlocutor" and "the ability to arrange ideas." Such findings are consistent with the study conducted by Wegerif and Major (2019), which emphasised the role of technology in facilitating conversation and exploring diverse perspectives among learners. Similarly, P. K. Bii et al. (2018) stated that Chatbots contribute to

improving understanding in learning. Additionally, Windiatmoko et al. (2021) suggested that technology and e-learning can assist students in organising essential learning concepts of learning material. The latter two skills are fundamental and serve as a gateway to acquiring other skills. This implies that the students can develop the remaining of their skills by mastering the art of listening to the interlocutor. It is noteworthy that there is a strong correlation between listening skills and the ability to organise ideas, indicating that improved listening skills can lead to more coherent idea organisation by students. In addition, despite its significant achievement, the essential skill of "not being intolerant and respecting the evidence of the other's opinion" was less noted. However, Al-Amri (2019) confirmed the significance of this point by stating that Chatbots tend to inquire and gather more information when confronted with problems, leading to a greater acceptance of different perspectives. This can be attributed to the fact that AI techniques provide opportunities for active listening and critical thinking, which fosters impartiality and respect for the opinions of others.

The participants' responses to the second question, regarding the importance of using Chatbots in promoting educational digital dialogue for the learner, yielded highly significant results. The most noteworthy finding was the importance of using Chatbots to "make the learning method more enjoyable for the learner," which ranked first in terms of verification. This finding aligns with a study by L. Fryer and Carpenter (2006), which stated that students experience pleasure when using Chatbots as they engage in free conversations. This result attained the highest level of significance, likely due to the extent to which AI techniques relate to students' reality, considering their regular use of such technologies in their work and studies.

Furthermore, Chatbots were found to "contribute to the use of time for study and review," as supported by Debecker's (2017) assertion that AI Chatbot features assist students with activities and discussions akin to those encountered at home. Interestingly, this phrase ranked last in terms of validation. This can be explained by the fact that educational experts still perceive technology as being less implemented and activated for revision and memorization purposes, and instead closer to pleasure and activities associated with enjoyment.

The responses to the second question, which examined the potential of AI Chatbots in developing the educational digital dialogue for the teacher, revealed highly significant results. The skill that emerged as of utmost importance was the ability to "recognizes students' preferences in their learning," This finding is supported by Benotti et al.'s (2014) study which highlighted that Chatbots aim to engage students actively by catering to their preferences and interests. This was further confirmed by Issa (2020), as he concluded that Chatbots provide an adaptive intelligent environment that aligns with individual learning patterns–emphasising the importance of AI in enriching student learning by adapting the pace, level, and method of presenting the educational materials, thereby enabling students to achieve higher levels of educational success. Equally important for teachers is the role of AI as a " virtual educational guide." Essel et al.'s (2022) study confirmed this finding, highlighting Chatbots as a virtual assistant in the teaching process. However, this result was ranked last in terms of verification, possibly because some teachers may prefer to rely on their own preferences and experience in choosing sources and references for their lessons. They may exhibit some reluctance in fully trusting AI techniques to direct their teaching as they believe that they possess a deeper understanding of what is appropriate for their students. The results of the third question also highlighted that the participants were selected from a specific demographic with shared characteristics. The age range was not too broad, and they all shared the same expertise and a similar baseline AI Chatbots experience and education level. This is consistent with Al-Mujallad (2011) and Mamkegh's (2021) findings that the experience variable does not affect the use of digital skills, including the use of AI Chatbots. This meant that the effects would not differ greatly due to these factors.

Conclusion

This study investigated the viability of AI Chatbots in enhancing educational digital dialogue among students. The results indicated the importance of Chatbots and that their use enhances the digital dialogue skills of the students. The results demonstrated that all the skills are achieved to a larger extent, which is desirable and must be developed and strengthened among the students. In addition, the results showed the positive impact of Chatbots on the educational process. The study demonstrated the importance of using Chatbots in enhancing the educational digital dialogue for each learner, as it helps to activate the mutual digital dialogue between the student and the machine. The findings also suggested that Chatbots can assist teachers in improving their student's educational attainment. From an educational experts' perspective, the study concludes that all of the communication skills were notably enhanced. This indicates the importance of these skills and the extent of the necessity and importance of using AI Chatbots to enhance the educational digital dialogue and advancement for learners and teachers. Finally, it would be said that the study also showed that the variables of age, education level, and experience in using AI Chatbots were similar in experts, so they were not affected.

Recommendations

In light of the study's findings, it is recommended to conduct further studies to investigate the effectiveness of Chatbots with other variables that may enhance other aspects of learning, such as educational achievement, and individual learning, including social and psychological aspects of digital dialogue skills. Moreover, it would be beneficial to conduct further experimental studies to identify the essential skills to enhance digital dialogue through the use of Chatbots to ensure the activation of these skills, the extent to which they directly enhance digital dialogue in the classroom, and to

identify the skills that need further strengthening. In addition, it would be useful to develop training programs for teachers to design Chatbots and incorporate AI techniques in education.

Implications of the Study

- The interactive use of Chatbots has emerged as a valuable tool for developing digital dialogue among students. Educators should explore and implement Chatbot technology to enhance student engagement and learning outcomes.

- This study provides insights from educational experts regarding the potential of Chatbots in improving digital dialogue for student learning. Teachers can leverage these findings to integrate Chatbots effectively into their instructional practices and promote meaningful dialogue among students.

- The identification of key features and characteristics of dialogue used in Chatbots can inform instructional designers in creating more effective and engaging Chatbot-based learning experiences. Designers should consider incorporating interactive and dynamic dialogue elements to optimize the educational impact of Chatbots.

- Decision-makers in the education sector should prioritize the adoption and utilisation of Chatbots that have proven effectiveness in supporting learning. By investing in and promoting the use of established Chatbot technologies, educational institutions can ensure that students benefit from the most relevant and impactful digital dialogue experiences available.

Limitations

At this point, it is crucial to mention the circumstances and factors that influenced this research and, consequently, its findings. The most important of these circumstances was the focus on educational experts using technology in academic fields, which limits the generalizability of the results to a broader population. For this reason, any future research may instead focus on experimenting on students in order to apply the findings of this study to a more diverse population.

In addition, the research was limited to a specific geographical area and educational institution, and therefore, the results may not be fully representative of other contexts. To overcome this limitation, additional forthcoming research should address these variables in a more diverse range of settings and institutions. However, it is important to note that the results may still differ due to variations in participants' experience levels and individual differences.

Furthermore, the chosen approach for this study was descriptive rather than experimental due to time constraints. Future studies should aim to apply an experimental method to obtain more detailed and conclusive results. By employing an experimental design, researchers can establish causal relationships and better understand the impact of educational experts using technology in academic fields.

Lastly, the current research was limited to exploring the role of artificial intelligence (AI) Chatbots in enhancing digital dialogue, which restricts the generalizability of the findings to other variables and different skills. It would be valuable to investigate how AI Chatbots can be applied in various contexts and for different purposes, such as improving student engagement or facilitating personalized learning experiences.

Ethics Statement

The ethical considerations of this research were carefully observed in accordance with the criteria advised by the British Educational Research Association (BERA, 2018). Before distributing the questionnaire, educational experts were informed of the research purpose, and details about the study objectives and questions were provided in a letter. Participants' data were kept confidential throughout the research, as advised by BERA (2018). The participants were also informed about the possible risks associated with participating in the research, and their informed consent was obtained. Furthermore, additional information was made available to those who requested further details about the study.

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