DOING TAKE-HOME ASSIGNMENT WITH CHABOT: INVESTIGATING STUDENTS' PERCEPTIONS AND THE EFFECTS ON ACADEMIC PERFORMANCE FOR A BASICS OF RESEARCH COURSE AT MOROGORO-CAMPUS, TANZANIA

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ABSTRACT

The study aimed to examine students' perceptions of whether doing take-home assignments using chatbots in the basics of research courses is convenient for students and improves performance in a final examination. The study was conducted at the Institute of Adult Education in Morogoro-Campus in 2022. One hundred and nine (109) diploma students from a first-year class participated in this study. A quasi-experimental design and mixed research approach were used in this study. Participants were randomly divided into experimental (chatbot users, n=54) and control (non-chatbot users, n=55) groups. Data were collected using questionnaires and analyzed with an independent t-test in SPSS Version 20. In addition, a questionnaire survey was given to the experimental group to investigate their perceptions of the chatbot's effectiveness. Results indicated that 59.3% of respondents strongly agreed that the use of chatbots promotes critical thinking in the course (M = 4.00, SD =0.59) and 53.7% of respondents indicated that chatbot use made the subject matter realistic (M = 4.12, SD = 0.72), also the use of chatbots helped 78.9% of students to understand the course material better (M = 4.01, SD = 0.84) and saved time in obtaining answers (65.4%) while appreciating the 24/7 availability and user-friendly interface. Chabot use was considered an assistant throughout the learning process (M=4.12, SD=0.884). The experimental group illustrated the practical problem within the subject (M=3.73, SD=0.71). Results also indicated significant performance differences between the two groups t (107) =8.728, p =.000), with the experimental group outperforming the control group. This study concluded that chatbots are effective learning tools, enhancing productivity and engagement, though some students preferred traditional methods of learning by using textbooks. Alongside the convenience they provide, chatbots also present potential ethical challenges, such as issues of plagiarism and copyright, when users rely on the information they directly supply. It is recommended to integrate chatbots into teaching practices to improve academic outcomes and support innovative digital pedagogy but teachers should caution students to carefully review and think critically about the information provided by chatbots when they use them.

Keywords: Chatbots, Students, Perceptions, Performance, Tanzania.

INTRODUCTION

With the outstanding expansion of educational technology throughout the past decade, chatbots are evolving into an inexorably prominent alternative method for communicating with students, and their appropriation is rapidly spreading (Laurillard & Masulis, 2013). Innovation leads to improved chatbot platforms that can be trained to respond to user input with reasonable accuracy, resulting in user satisfaction and flexibility in functions, however, testing methods to mitigate miscommunication and optimize learner engagement need attention. A chatbot is a software tool that interacts with users on a certain topic or in a specific domain in a natural, conversational way using text and voice. For many different purposes, chatbots have been used across a wide range of domains, including marketing, customer service, technical support, as well as education and training (Holotescu, 2016).

Current developments in this area suggest that interaction with technologies, either by natural language or by speech, is possible because technology develops, and users become more used to interacting with digital entities. Rather than creating a human-like smart machine application, it is about creating effective digital assistants who are able to provide information, answer questions, discuss a specific

topic, or perform a task. A chatbot also referred to as "a talking bot" is a type of software prominently emerging in the information technology field (Shorey et al., 2019), that can have verbal or written conversations with human users, and address their requests, using the question-and-answer format (Lee & Park 2019). A chatbot also has various applications in the education field, as people can use it to learn without time and space restrictions (Kaur et al., 2021). It also improves the effect of self-directed learning as learners experience low levels of stress while engaging in conversations with a chatbot and repeated learning (Stathakarou et al. 2020). Furthermore, it facilitates immediate user feedback through conversations during the learning process and provides customized content based on the feedback (DeveciTopal et al., 2021). Chatbots act as an artificial person who conducts a conversation with real humans. This could be a text-based conversation,   a voice-based conversation, or a non-verbal conversation. They can speak almost every major language using natural language processing (NLP). Their language skills can be extremely poor or very intelligent. As a computer program, chatbots simulate a humanlike conversation using a natural language. A variety of terms have been used related to chatbots, including chatbots and chatterbots. Considering the word 'bot' as a term for 'robotic action', they regard chatbots as a special kind of robot. Chatterbots can refer to chatbots that talk a lot, and they do not have to be very intelligent when processing the user's answers. Chatbots are the most popular among these three terms and have the broadest meaning (Kim, 2017).

With integrated artificial intelligence, chatbots can be used as a digital learning tool to ask questions, give answers to questions, retrieve information (Shawar & Atwell, 2007), visualize the contents (Bayan, 2005), explore online content (James, 2016), provide useful information (Brandtzaeg & Følstad, 2017), establish the knowledge that the students have to learn (Wenger, 1987), and propose possible solutions to the students individually (Singh, 2018) because several studies have shown that poor personalized support can lead to weak student learning outcomes while good personalized support can improve student learning outcomes (Pane et al., 2017; Hone & El-Said, 2016). Using chatbot technology has many potential benefits. The advantages of using chatbots include low cost, less time in obtaining answers, better interaction, creative learning, and improved efficiency when used in instruction (Llic & Markovic, 2016) because users find chatbots safe and easy to chat online (Cameron et al., 2017) with the ability to operate as a 24/7 support service, provide responses to repetitive or frequently asked questions that can easily be resolved, and give access to learning contents (Garcia-Brustenga et al., 2018; Winkler & Söllner, 2018) when required. In addition, students can refresh their memory by using chatbots to help them recall, revise, and remember the knowledge studied. With chatbots, timely and efficient assistance or information can be obtained with reported motivation and curiosity in their entertaining, social, and relational factors. Students also view chatbots as a novel phenomenon. Furthermore, chatbots can play the role of teaching guide (Silvervarg, Kirkegaard, Nirme, Haake, & Gulz, 2014) and assistant throughout the learning process with a wide range of functions of obtaining information for students, giving knowledge and enhancing understanding with uninterrupted availability if learning through chatbot technology is properly designed. The teachers can also use questions asked to collect data, modify a knowledge base, and expand more knowledge by using chatbot technology to look for questions and add additional answers to those questions asked in its knowledge base. Most students prefer using chatbot technology because chatbots can give direct answers instead of links for further searching like using search and sort-based tools (Shawar & Atwell, 2007).

Chatbots have significant educational potential and a positive impact on student learning and satisfaction through their personalized learning support (Winkler & Söllner, 2018). Although there were numerous studies related to the successful implementation of chatbots (Dutta, 2017; Huang, Lee, Kwon, & Kim, 2017), only a few of them have been used for educational purposes (Kowalski et al., 2011). In Tanzania's context, there is little research being done in education although chatbot technology has high potential as a digital learning tool for providing personalized learning support. Therefore, more research is necessary to widen findings related to chatbot technology. In an attempt to fill the knowledge gap, it is therefore critical to assess the students' perceptions of chatbot use in an educational context that will help to address the research questions, and this a pertinent problem to be investigated.

Aim and objectives of the study

The study aimed to examine the perceptions of students of whether doing take-home assignments using chatbots in the basics of research courses is convenient to students and improves performance in a final examination. To facilitate the achievement of the aim, this research developed the following three specific objectives:

i. To assess the perceptions of students regarding the usefulness of chatbots in a basic research course

ii. To examine if there is any difference in the performance of the chatbot users and non-users in the final examination for the basics of research course

iii. To determine the advantages and disadvantages of using chatbots in the learning process as compared to the traditional way of learning

Research questions

To fulfill the aim of this study, three specific questions were developed by this study.

i. What are the perceptions of students in the experimental group regarding the usefulness of chatbots in a basic research course?

ii. Is there any significant difference between the achievements of the experimental group using the chatbot application and the control group who don't use the chatbot?

iii. What advantages or disadvantages of using chatbots in the learning process as compared to the traditional way of learning?

Hypothesis formulation

Null Hypothesis*:* There is no significant difference in academic performance between students who study with a chatbot and those who don't use a chatbot.

Theoretical Framework

Constructivism Learning Theory

The study was guided by the theory of constructivism. That is, the constructivist theory of learning is based on information and communication technology (ICT). The constructivist learning theory explains that learning with innovation should not be limited to the classroom environment but should be beyond the classroom and teachers are expected to be current and boost students' initiative by introducing new ideas in his/her subject. Chatbot supports the constructivist learning theory proposed by Vygotsky. Notably, the relevant theory emphasizes the active participation of learners in constructing their understanding (Efgivia et al., 2021). Instead of simply gripping information, learners contemplate their experiences and developmental prototypes and incorporate new knowledge into their current frameworks (Kim & Adlof, 2024). This technique enables deep learning and understanding by stimulating learners to participate actively in the learning process. Constructivism is a prevalent, educational ideology that shapes modern learning and teaching methods (Hatmanto & Sari, 2023). While the classic instructional design was embedded in objectivist principles, researchers now prefer constructivism's effectiveness in promoting critical learning-solving skills (Hasanein & Sobaih, 2023). Unlike behavioral theories, constructivist learning theory highlights the internal processing of information to create knowledge and skills. Students actively expand their knowledge of technology-aided learning in a constructivist learning environment (Firaina & Sulisworo, 2023). Educational technologies can improve interactive and engaging learning experiences, encouraging investigation and experimentation. Besides, technology-supported, construing learning environments entrust students with the power to handle their learning by managing their knowledge gaps (Farhi et al., 2022). Thus, consistent with the current research, it is assumed that tools like Chatbot can facilitate constructivist learning experiences by allowing students to probe ideas (Rasul et al., 2023), ask questions, and obtain immediate feedback, eventually facilitating their understanding of knowledge. Thus, this research proposes that students actively construct their understanding of academic concepts and problem-solving strategies by designing and asking questions, analyzing responses, and synthesizing information. Also, the collaborative nature of ChatGPT exchanges permits students to engage in meaningful discourse, communicate perspectives, and intercede meanings, aligning with the social facet of constructivist learning.

Material and Method

Design and Setting

This study employed a quasi-experimental design with experimental and control groups, using only a post-test design to measure outcomes (Figure 1). Post-test-only design observation is carried out on both groups to assess the effect of manipulation. The experimental group was those using a chatbot and the control group was those not using chatbots.
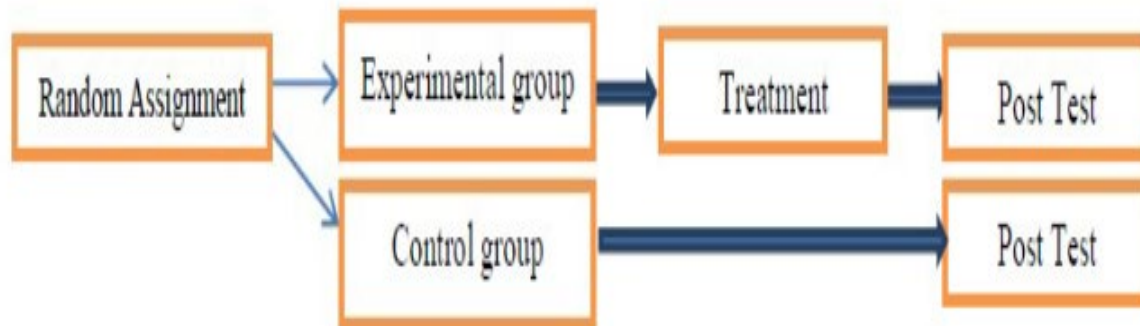

Figure 1: Post-Test only Design

Procedures

The participants were randomly divided into two groups: one experimental group (n=54) and the control group (n=55). The first group of 54 students served as the experimental group (22 males and 32 females) and a second group of 55 students (25 males and 30 females) served as the control group. The students in the experimental group did their take-home assignment by using a chatbot whereas the control group did not use chatbots i.e. they practiced on their own using textbooks and lecture notes. The students in both groups had not taken any course related to the basics of research before this study. After 6 weeks of teaching with the same teacher, the same course contents, 3 take-home assignments were offered to all 109 students. The students who were in the experimental group were given codes and also those who were in the control group were given codes so that it became easier to identify the group of each student when marking the assignment and the results were kept for further analysis.

In addition, to examine students' perceptions of using chatbots in a learning process, a questionnaire survey was given to the experimental group to investigate their perceptions of the chatbot's effectiveness. This questionnaire was then utilized to obtain opinions related to the chatbot applicability from students. A 5-point Likert scale with statements ranging from "Strongly Disagree to Strongly Agree" was used in this study. The questionnaire was composed of 5 items on a 5 Likert scale basis (1 = very low to 5 = very high). The evaluation criteria of average scores were established at a level of 3.7-5.00 as the high, 3.0-3.6 as the medium and 1.0-2.9 as the low.

Research approach

This study utilized a mixed methods research approach since it involved both quantitative and qualitative data (Mertler, 2019). According to Creswell and Creswell (2018), combining quantitative and qualitative data in a single study allows a better and deeper understanding of a research problem. In this study, combining the quantitative data (e.g., survey results on the perceptions of the respondents on the use of Chatbot when doing research assignments and the factors affecting the perceptions of the respondents on the use of Chatbot) with qualitative data (e.g., interview responses on participants' practices and perceptions of using Chatbot) can allow more holistic and nuanced understanding of how learners from different learning contexts view and use Chatbot and why they perceive it in the way they do.

Statistical Data analysis

The collected data were processed and analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 20.0. The analysis encompassed frequency analysis, mean analysis, the independent sample t-test, and a reliability test. The frequency analysis was primarily employed to

understand the perceptions of the respondents, offering a comprehensive view of the participant makeup. The mean analysis shed light on the students' detailed perceptions concerning the use of chatbots in their learning process. By categorizing the feedback into distinct factors, the study was able to derive specific insights, represented by the mean values and standard deviations. The independent sample t-test was pivotal in ascertaining whether there were any mean differences between the experimental and control groups. The significance level was set at 0.05.

Results
Perceptions of students regarding the usefulness of chatbots in a basic research course
Table 1 presents the descriptive statistics of students with respect to their perceptions regarding the usefulness of chatbots in a basic research course. Results indicated in Table 1 reveal that 57.7% of respondents strongly agreed that the chatbot promoted critical thinking, with an additional 13.5% agreeing. The mean perception score is 4.00 with a standard deviation of 0.59, suggesting that the responses are relatively consistent and positive. 46.2% strongly agreed that the chatbot helped them learn how to obtain information from various sources, and 40.4% agreed. The mean perception score is 4.17 with a standard deviation of 0.84, indicating a generally positive response but with a slightly higher variability compared to the first statement. 51.9% strongly agreed that the chatbot made the subject matter realistic, and 28.8% agreed. The mean perception score is 4.12 with a standard deviation of 0.72, suggesting a positive response with a relatively low level of variability. 44.2% agreed that the chatbot is more interactive and engaging, with an additional 25% strongly agreeing. The mean perception score is 3.81 with a standard deviation of 0.73. While the response is positive, the slightly lower mean and moderate standard deviation indicate a more diverse range of opinions compared to the previous statements. 40.4% agreed that the chatbot helped them understand the course material better, and 38.5% strongly agreed. The mean perception score is 4.01 with a standard deviation of 0.84. Similar to statement 2, there is a positive response with slightly higher variability. 42.3% strongly agreed that the chatbot illustrated practical problems within the subject, and 30.8% agreed. The mean perception score is 3.73 with a standard deviation of 0.71. While there is an overall positive response, the lower mean and standard deviation suggest a broader range of opinions compared to some of the earlier statements. 59.3% of respondents strongly agreed that the use of Chatbot promoted critical thinking in the course (M = 4.00, SD = 0.59), and 53.7% of respondents made the subject matter realistic (M = 4.12, SD = 0.72). As seen in Table 1, the use of Chatbots helped 75.2% of students to illustrate the practical problem within the subject (M=3.73, SD=0.71).

Table 1: Students' Perceptions regarding the usefulness of Chatbots in the learning process (n=54)

Perceptions	SD f (%)	D f (%)	N f (%)	A f (%)	SA f (%)	Mean	Std Dev.	Interpretation
1.Promoted critical thinking skills	6(11.5)	3(5.8)	6(11.5)	7(13.5)	32(59.3)	4.00	0.59	High
2.Helped me learn how to obtain information from a variety of source	2(3.8)	4(7.7)	1(1.9)	21(40.4)	26(48.2)	4.17	0.84	High
3.Made the subject matter realistic	3(5.8)	5(9.6)	2(3.8)	15(28.8)	29(53.7)	4.12	0.72	High
4.Chatbot is more interactive and engaging	4(7.7)	9(17.3)	3(5.8)	13(25)	25(46.3)	3.81	0.73	High
5.Illustrated practical problem within the subject	9(17.3)	4(7.7)	1(1.9)	16(30.8)	24(44.4)	3.73	0.71	High

Note: Scale: 1=Strongly Disagree (SD), 2=Disagree (D), 3=Neither Disagree or Agree (N), 4=Agree (A), 5=Strongly Agree (SA) and f=frequency

The results presented in Table 1 indicate that the chatbot appears to be positively perceived by the majority of students across various aspects, such as promoting critical thinking and helping to obtain information from different sources. Some variability in responses is observed, especially in statements related to the chatbot being more interactive and engaging and illustrating practical problems within the subject. The standard deviations indicate the degree of agreement or disagreement among respondents for each statement, with lower values suggesting more consistent opinions and higher values suggesting a more diverse range of perceptions

Subjective rating and qualitative feedback

To understand the end-users that this study was working with, the participants were asked if they have used a Chatbot before or if they have an idea of what a Chatbot is. This question can also help in future studies to meet the expectations of the different end-users. In Figure 2, 82.7% of the participants did not know what a Chatbot was or if they had used one before, whereas 17.3% had an idea what a Chatbot was. The results of this question show the possibility that training or a manual guide might be needed for the end-users who have not used a Chatbot or have any idea what a Chatbot is, to take them through a step-by-step approach of how to use Chatbot.
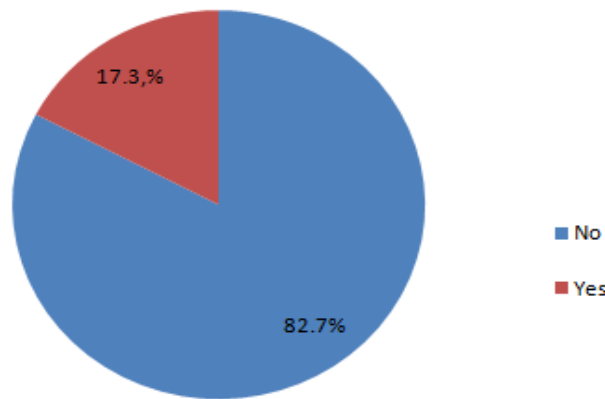

Figure 2: **Have you used Chatbot or do you have an idea with what a chatbot is?**

For usefulness, 90.7% of the participants indicated that a chatbot is a useful tool and can assist them when they are looking for answers in different subjects, whereas 9.3% do not find it useful. The results for this question in Figure 3, indicate that there is a demand for chatbots to be used in the learning process.
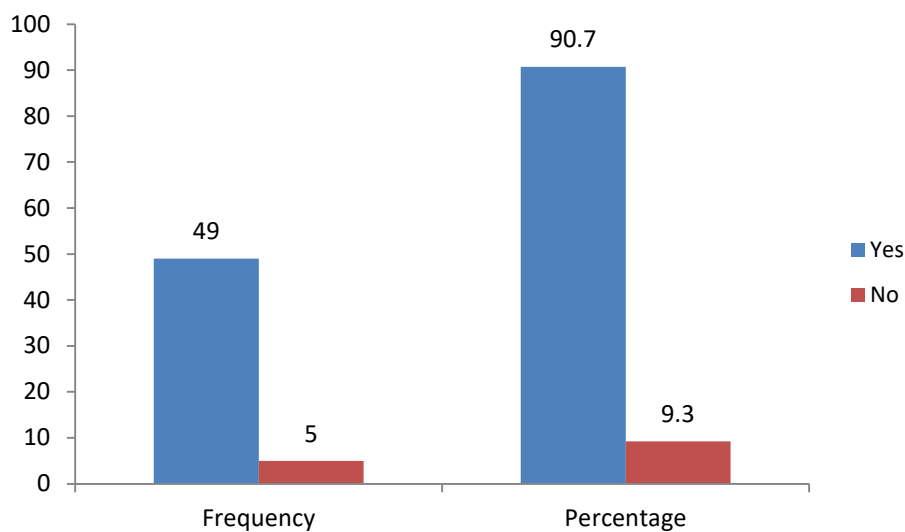

Figure 3: Do you consider chatbot as a useful tool in learning process?

Perception of Disadvantages of Utilizing Chatbots

The study also examined how students perceive the disadvantages of using chatbots in the learning process (Figure 4). As shown in Figure 4, respondents indicated that there is inconvenience (29.6%) when the chatbot stops functioning due to technical issues during use, making it difficult to use the chatbot smoothly for that period. Other disadvantages mentioned were; misleading information (25.9%). Plagiarism (18.5%), spelling and grammar mistakes (14.8%), and collecting personal information (11.1%).
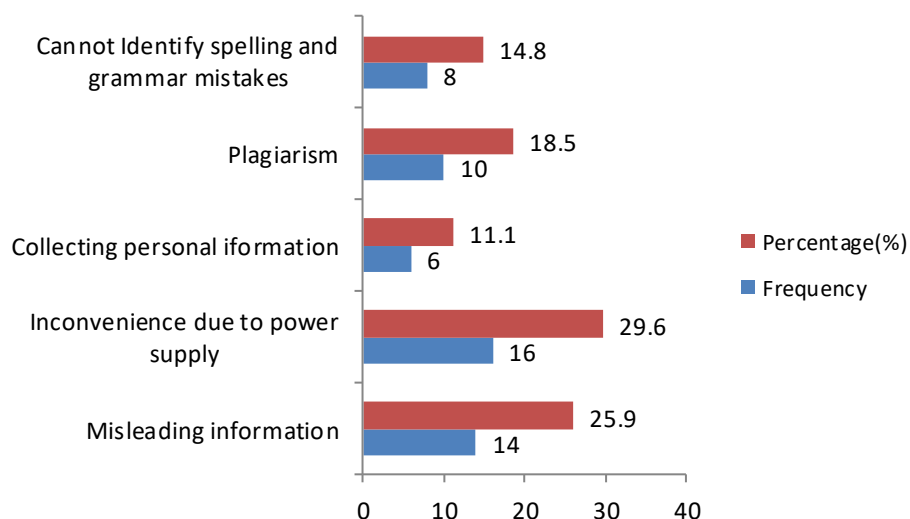

Figure 4: Perceptions of Disadvantages of Utilizing Chatbots in the Learning Process

Differences in the performance of the chatbot users and non-users in the final examination

The findings are from the analysis of data by an independent t-test which was used to determine if there was any significant difference between the mean achievement scores of the experimental and control groups at a significance level of 0.05. as shown in Table 2. Comparatively, the experimental group's average academic performance was 50.20, with a standard deviation being 16.164 and the control group's average was 22.02 with a standard deviation being 17.536 meaning that the experimental group and the control group had different learning results. According to the results in Table 2, the difference between the mean scores of the experimental group (50.20) and control group (22.02) was found to be significant (t =8.728, df = 107, p =.000). Generally, the results of the independent t-test presented in Table 2, revealed that there was a significant difference between experiment (M=50.20, SD=16.164) and control (M=22.02, SD=17.536),   t (107) = 8.728,   p < 0.05.

Table 2: Independent t-test Results between Academic Performance of Students from Experimental and Control group (n=109)

Group	Number	Mean	Standard Deviation	df	t-value	Sig. Value
Experimental group	54	50.20	16.164			
				107	8.728	.000
Control group	55	22.02	17.536			

***Significant level is at p<0.01*

Advantages and Disadvantages of using chatbots in learning process as compared to the current way of studying

The determination of the advantages and disadvantages related to using chatbots in the learning process contributes to identifying both the advantages (in order to strengthen them) and disadvantages (in order to avoid and solve them). Arithmetic means, standard deviations and rank related to skills of using

Chatbots and its applications were calculated as shown in Table 3. Participants were invited to agree or disagree with a series of positive (advantageous) or negative (disadvantageous) statements. An arbitrary level was identified (high, medium, low) based on the following equation:

$$\frac{\text{the scale's highest value - the scale's lowest value}}{\text{number of levels}} = 1.33$$

This equation is used to organize and summarize data to provide a simple indication of the level of the means associated with each response. Marwan (2000) used a similar equation to group his results. Using these intervals of 1.33, the study defined 3.67 to 5.00 as a high response, 2.34 to 3.67 as a medium response and any value below 2.34 as a low response.

Students asserted the advantages of using chatbot when compared to a real conventional method. One of the most frequently mentioned advantages was accessibility for 24/7 as mentioned by 75% of respondents. One student said, "We cannot reach a teacher 24/7, but we can reach the chatbot". According to students, other advantages of the chatbot is that it takes less time in obtaining answers (86.6%), add additional answers to those questions asked (52%) and automatically answering questions (67.1%).Other advantages is that, "When our teacher teaches a subject, she/he has to be quick, but the chatbot doesn't have such problems, it can tell us the topic as many times as we want". However, one disadvantage mentioned by students was that chatbots can't identify spelling and grammar mistakes (75%).

Table 3: Advantages and Disadvantages of using Chatbot in learning process (n=54)

S/No.	Advantages of using chatbots in learning process	Mean	SDEV	Rank	SD	D	N	A	SA	Level of use
								Percentage		
1.	It is an assistant throughout the learning process	4.12	0.884	2	5.8	9.6	7.7	21.2	55.8	High
2.	Less time in obtaining answers	4.35	0.865	1	7.7	1.9	3.8	21.2	65.4	High
3.	Increases the productivity and is a cost-saving solution	4.06	0.793	4	7.7	1.9	11.5	34.6	44.2	High
4.	Add additional answers to those questions asked	3.48	0.852	8	9.6	15.4	23.1	13.5	38.5	Medium
5.	Automatically answering questions	3.79	0.968	7	5.8	11.5	15.4	32.7	34.6	High
6.	Help recall, revise and remember the knowledge studied	3.81	1.066	6	11.5	3.8	13.5	34.6	36.5	High
7.	Can provide continuous communication to users 24 hours a day and 7 days a week	4.10	0.977	3	7.7	3.8	13.5	21.2	53.8	High
8.	Chatbot as the quickest communication tool	3.35	1.153	9	21.2	7.7	13.5	30.8	26.9	Medium
9.	Identify spelling and grammar mistakes	3.88	1.031	5	7.7	13.5	3.8	32.7	42.3	High
	Total	**3.89**	**0.98**	-	-	-	-	-	-	**High**

Note: Scale: 1=Strongly Disagree (SD), 2=Disagree (D), 3=Neither Disagree or Agree (N), 4= Agree(A), 5=Strongly Agree(SA).

In Table 3, item 2 is the top-rank item having the highest mean score (M=4.35, SD=0.865) in which 86.6 % of the participants agreed that the chatbot uses less time in obtaining answers. As for items 1 and 7, Over 77% of the participants agree that chatbots an assistants throughout the learning process (M=4.12, SD=0.884) and help recall, revise, and remember the knowledge studied (M=4.10,

SD=0.977). The results from Table 3 indicate that the highest advantage of using chatbots in the learning process were "Less time in obtaining answers " where the arithmetic mean is 4.35 with a standard deviation of 0.865, implying usefulness amongst respondents with a percentage response rate of 65.4%. A significant majority (87.1%) agreed or strongly agreed that chatbots reduce the time needed to obtain answers. A substantial percentage (79.8%) agreed or strongly agreed that chatbots enhance productivity and save costs. Some challenges face the effective use of chatbots including languages, implementations, and education. Item 9 in Table 3 indicated that students strongly agreed with the inability to recognize grammatical errors and similar meanings questions. Moreover, information retrieval from a database is not realistic; two questions may look different in terms of words but have the same meaning.

DISCUSSION

This study aimed to examine the perceptions of students of whether doing take-home assignments using chatbots in the basics of research courses is convenient to students and improves performance in a final examination. In this study, experimental students viewed chatbots positively, believing that they could improve their learning skills. They also appreciated that chatbots provided effective feedback on the information given by the students. These research findings are in line with various studies that have reported that consistent use of AI chatbots has a positive impact on vocabulary, writing, reading, and other skills (Kim, 2018a, 2018b; Maeng et al., 2023), but also, by providing immediate feedback, and also can enhance learners' self-directed learning and autonomy (Holmes et al., 2019; Maeng et al., 2023; Shin, 2019).

The findings also revealed that there were significant mean differences between the control and experimental groups, indicating that engaging with a chatbot helped students to improve their performance. The findings of the study are in accordance with previous studies conducted. For example, Heller, Proctor, Mah, Jewell, & Cheung (2005) stated that Chatbot technology has potential in teaching and learning distance and online education. Similarly, a chatbot has the potential to be used in social contexts, since it is a computer program that is created to simulate intelligent human language interaction through text or speech (Kowalski et al., 2011; Torma, 2011). It has the capability to promote social interaction between people and between the chatbot itself and individuals; they are socially and interactively oriented. Chatbots further can provide a mediation means in instructional contexts, where 'semiotic mechanisms (including psychological tools) mediate social and individual functioning, and connect the external and the internal, the social and the individual' (John-Steiner and Mahn, 1996:4). Students can continually interact with the bot by asking questions related to a specific field' (Kowalski et al. 2011, p. 91). This potential was also noted by Bayan (2005), who wrote that a chatbot could be used as a tool to learn or study a new language; a tool to access an information system, a tool to visualize the contents of a corpus; and a tool to give answers to questions in a specific domain.

Secondly, "chatbot is an assistant throughout the learning process" was the next advantage, with a mean of 4.12 and a standard deviation of 0.884, implying convergence amongst respondents. This finding is in line with Ivanov and Webster (2017) who stated that Chatbots carry out jobs much faster than human beings, which therefore increases productivity and is a cost-saving solution. As a result, human positions could be replaced by Chatbots, which from the companies' perspective, could be seen as an advantage. In addition, Chatbots can play the role of teaching guide   (Silvervarg, Kirkegaard, Nirme, Haake, & Gulz, 2014) and assistant throughout the learning process with a wide range of functions of obtaining information for students, giving knowledge and enhancing understanding with uninterrupted availability if learning through chatbot technology is properly designed. The teachers can also use questions asked to collect data, modify a knowledge base, and expand more knowledge by using chatbot technology to look for questions and add additional answers to those questions asked in its knowledge base. Most students prefer using chatbot technology because chatbots can give direct answers instead of links for further searching like using search and sort-based tools (Shawar & Atwell, 2007). Chatbots are easy to use because of natural language processing technology (Kar & Halder, 2016) and are becoming useful to organizations and customers alike, as they are perceived to save time and allow for the deployment of human resources to other areas of the business (Kar & Halder 2016).

However, a majority (75%) agreed or strongly agreed that using chatbots in class is more challenging. The most significant disadvantage given by respondents that can arise as a result of using a chatbot in the learning process was "misleading information, "There is an inconvenience when the chatbot stops functioning due to technical issues during use, making it difficult to use the chatbot smoothly for that period." Additionally, the statement "Chatbots may collect users' personal information without permission, and there is a possibility that this information could be disclosed to third parties. Moreover, they often do not cite sources when offering information and have the potential to collect personal information data during user interactions. Alongside the convenience they provide, AI chatbots also present potential ethical challenges, such as issues of plagiarism and copyright, when users rely on the information they directly supply.

Previous research has highlighted concerns regarding the moral discernment of AI chatbots (Homes et al., 2019; Korn & Kelly, 2023; Shin, 2019). These concerns arise because chatbots, which operate based on a vast amount of data, can sometimes provide incorrect or biased information. Moreover, they often do not cite sources when offering information and have the potential to collect personal information data during user interactions. Alongside the convenience they provide, AI chatbots also present potential ethical challenges, such as issues of plagiarism and copyright, when users rely on the information they directly supply (Holmes et al., 2019; Kim & Byun, 2021). Therefore, teachers should caution students to carefully review and think critically about the information provided by chatbots when they use them. Additionally, it is crucial to educate and guide students to clearly understand and comply with the chatbot's privacy policy to ensure they can adequately protect their personal information.

This finding is similar to what was reported by Ivanov and Webster (2017) who stated that chatbots and other forms of AI are not substituting human beings, but rather enhancing them and their ability to perform efficiently. While technology has evolved tremendously, it has not yet reached the point where chatbots can perform all tasks independently. Apart from the risk of implementing chatbots, there are high financial costs associated with acquiring, updating, and hiring specialists (Ivanov & Webster, 2017). Chatbots need to be integrated into already existing infrastructure, which is costly and time-consuming.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it can be concluded that the respondents of this study perceived Chatbot positively. They found it helpful in the learning process as it was innovative and fun for learning. They could get answers instantly and be able to seek specific information related to research knowledge without waiting for responses. In terms of practices, participants mainly used Chatbot for brainstorming, organizing ideas, refining outlines, and editing drafts for appropriateness and accuracy. They used the tool not only as a learning assistant but an active collaborator throughout the writing process, reflecting the concept and practice of human-machine collaboration, an evolving educational practice in the age of artificial intelligence (Meniado, 2024). In conclusion, using Chabot in education settings to give personalized learning support to increase students' research knowledge gave positive results as it led to positive learning outcomes and helped provide better-personalized learning support through this digital platform. Despite the small data set, the results were interesting, demonstrating how a chatbot could be effectively employed for educational purposes, as it assists students in their learning process. Therefore, it is suggested that future research may use a larger sample size with a control and experimental group to extend results to a broader extent in using chatbot technology to create an optimistic personalized learning support for students in higher learning institutions in Tanzania.

IMPLICATIONS

The findings of this study carry significant implications for the research and practice of design education. Chatbot appears to be an appealing platform for design students. The students have expressed a strong sense of interest and optimism about Chatbot. Educators should explore strategies to capitalize on this interest and maximize its potential benefits. By understanding the factors that contribute to students' positive perceptions and engagement with Chatbot, educators can develop effective methods

for incorporating technology into educational settings. This may involve designing activities, assignments, or projects that leverage the capabilities of Chatbot to enhance student learning and foster critical thinking skills.

Declaration of competing interest
The author declare that he have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

Bayan, A. S. (2005). A corpus based approach to generalizing a chatbot system. Retrieved from https://www.comp.leeds.ac.uk/research/pubs/theses/abushawar.pdf.

Brandtzaeg, P. B., & Følstad, A. (2017). Why people use chatbots. Proceedings of the 4th International Conference on Internet Science, 22-24 November, 2017, Thessaloniki, Greece. https://doi.org/10.1007/978-3-319-70284-1_30.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications.

DeveciTopal, A., DilekEren, C., & KolburanGeçer, A. (2021). Chatbot application in a 5th grade science course. *Educ Inf Technol. 26*(5), 6241–65. https://doi.org/10.1007/s10639- 021- 10627-8.

Dutta, D. (2017) Developing an intelligent chatbot tool to assist high school students for learning general knowledge subjects.Georgia Institute of Technology. Atlanta.

Farhi, F., Jeljeli, R., & Hamdi, M.E.(2022). How do students perceive artificial intelligence in YouTube educational videos selection? A case study of Al ain city. *International Journal of Emerging Technologies in Learning* (IJET), *17* (22), 61-82, https://doi.org/10.3991/ ijet.v17i22.33447.

Firaina, R., & Sulisworo, D. (2023). Exploring the usage of ChatGPT in higher education: Frequency and impact on productivity. http://journal.iistr.org/ index.php/BEI/article/view/310

Garcia-Brustenga, G., Fuertes-Alpiste, M., & Molas-Castells, N. (2018). Briefing paper: Chatbots in education. Barcelona: e-Learn Center. Universitat Oberta de Catalunya. https://doi.org/10.7238/elc.chatbots.2018.

Gulz, A., Haake, M., Silvervarg, A., Sjoden, B., & Veletsianos, G. (2011).*Building a social conversational pedagogical agent: Design challenges and methodological approaches*. Hershey: IGI Global. [Accessed 12th July 2023] Available from World Wide Web: https://doi.org/10.4018/978-1-60960-617-6.ch006.

Hasanein, A.M., & Sobaih, A. E.E. (2023). Drivers and consequences of ChatGPT use in higher education: Key stakeholder perspectives *European Journal of Investigation in Health, Psychology and Education, 13* (11), 2599-2614.

Heller, B., & Procter, M. (2010). Conversational Agents and Learning Outcomes: An Experimental.

Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education: Promises and implication for teaching & learning. The Center for Curriculum Redesign.

Holotescu, C. (2016). MOOCBuddy: A chatbot for personalized learning with MOOCs. In: A. Iftene & J. Vanderdonckt (Eds.), Proceedings of the 13th international conference on human-computer interaction RoCHI'2016, Romania, pp.91–94.

Hone, K. S., & El Said, G. R. (2016). Exploring the Factors Affecting MOOC Retention: A Survey. *Computers & Education*, *98*, 157-168. https://doi.org/10.1016/ j.compedu.2016.03.016

Huang, J. X., Lee, K. S., Kwon, O. W., & Kim, Y. K. (2017). A chatbot for a dialogue-based second language learning system. CALL in a climate of change: Adapting to turbulent global conditions. https://doi.org/10.14705/ rpnet.2017.eurocall2017.705

Ivanov, S.H. & Webster, C. (2017). "*Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies–a cost-benefit analysis*", Artificial Intelligence and Service Automation by Travel, Tourism and Hospitality Companies–A Cost-Benefit

Analysis. https://www.emerald.com/ insight/content/doi/10.1108/JTF-01-2021-0009/full/html.

James, G. (2016). A complete guide to chatbots. Retrieved from http://www.garethjames.net/completeguide-chatbots

John-Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. *Educational Psychologist*, *31* (4), 191-206.

Kar, R. & Haldar, R. (2016). Applying chatbots to the internet of things: Opportunities and architectural elements', arXiv preprint ar Xiv: 1611.03799.

Kaur A, Singh, S., Chandan, J.S., Robbins, T., & Patel, V. (2021). Qualitative exploration of digital chatbot use in medical education: a pilot study. *Digital.Health*, https://doi.org/10.1177/20552076211038151.

Kim, M., & Adlof, L. (2024). Adapting to the future: ChatGPT as a means for supporting constructivist learning environments. *Tech Trends*, *68* (1), 37-46, https://doi.org/10.1007/s11528-023-00899.

Kim, N. Y. (2018b). A study on chatbots for developing Korean college students' English listening and reading skills. *Journal of Digital Convergence, 16*(8), 19-26.

Kim, N.Y. (2017). Effects of different types of chatbot on EFL learners' speaking competence and learnerperception. *Cross-Cultural Studies, 48*, 223-252.

Kim, T., & Byun, S. (2021). A study on the necessity and content composition of AI ethics education. *Journal of AI Humanities 8*, 71-104.

Korn, J., & Kelly, S. (2023). January 6). New York City Public Schools ban access to AI tool that could help students cheat. [Accessed 21th December 2024] Available from World Wide Web: https://edition.cnn.com/2023/01/05/tech/chatgpt-nyc-school-ban/index.html.

Kowalski, S., Hoffman, R., Jain, R., & Mumtaz, M. (2011).Using conversational agents to help teach information security risk analysis. SOTICS 2011: The First International Conference on Social Eco-Informatics. [Accessed 22th November 2023] Available from World Wide Web: https://www.thinkmind.org/download.php?

Lachs, J. (2017). Will Chatbots Revolutionise Education? Retrieved from https://www.opencolleges.edu.au/informed/features/will-chatbots-revolutionise-education/

Laurillard, D., & Masulis, A. (2013). Rethinking University Teaching: A conversational framework for the effective use of learning technologies. Routledge.

Llic, D. J., & Markovic, B. (2016). Possibilties, Limitations and Economic Aspects of Artificial Intelligence Applications in Healthcare. *Ecoforum Journal*, 5(1), 1-8.

Maeng, U., Ko, H. K., & Son, B. E. (2023). Utilizing digital·AI in English education: Research trends through text network analysis and topic modeling. *Modern English Education*, 24, 156-170.

Marwan, S.S.M. (2000). Using Alternative Assessment to Assess Undergraduate EFL Students at Yemeni Universities: Challenges from the Perspectives of Faculty. *Interdisciplinary Studies in Humanities*, *3*(3), 440-458.https://doi.org/10.34050/ elsjish.v3i3.11077.

Meniado, J. C. (2023). The impact of ChatGPT on English language teaching, learning, and assessment: A rapid review of literature. *Arab World English Journal, 14*(4), 3–18. https://doi.org/10.24093/awej/vol14no4.1.

Mertler, C. A. (2021). Introduction to Educational Research (2nd ed.). SAGE Publications. 440pp.

Miklosik, A., Evans, N., & Qureshi, A. M. A. (2021). "The Use of Chatbots in Digital Business Transformation: A Systematic Literature Review," IEEE Access, 11pp.

Pane, J. F., Steiner, E. D., Baird, M. D., Hamilton, L. S., & Pane, J. D. (2017). How Does Personalized Learning Affect Student Achievement? [Accessed 20th November 2024] Available from World Wide Web: https://doi.org/10.7249/RB9994.

Powell, K.C., & Kalina, C. J. (2009). Cognitive and Social Constructivism: *Developing Tools for An Effective Classroom. Education*, *130*(2), 241-250.

Rasul, T., Nair, S., Kalendra, D., Robin, M., De Oliveira, F., Santini, W., Junior Ladeira, M., Sun, I., Ahmad Rather, R., & Heathcote, L. (2023). The role of ChatGPT in higher education: Benefits, challenges, and future research directions. *Journal of Applied Learning and Teaching, 6* (1).

Shin, D. K. (2019). Feasibility and constraints in applying an AI chatbot to English education. *Brain, Digital, & Learning, 9*(2), 29-40.

Shorey, S., Ang, E., Yap, J., Ng, E.D., Lau, S. T, & Chui, C.K. (2019). A virtual counseling application. *Journal of Med Internet Res, 21*(10), 14658.

Silvervarg, A., Kirkegaard, C., Nirme, J., Haake, M., & Gulz, A. (2014). Steps towards a challenging teachable agent. In A. T. Bickmore, S. Marsella, & C. Sidner (Eds.), Intelligent Virtual Agents.14th International conference, IVA, Boston, MA, USA, August 27-29. https://doi.org/10.1007/978-3-319-09767-1_52

Singh, S., & Thakur, H. K. (2020). "Survey of Various AI Chatbots Based on Technology Used," in ICRITO 2020 - IEEE 8th International Conference on Reliability, Infocom Technologies

Stathakarou, N., Nifakos, S., Karlgren, K., Konstantinidis, S.T., Bamidis, P.D., Pattichis, C.S., & Davoody, N.(2019). Students' perceptions on chatbots' potential and design characteristics in healthcare education. In: Mantas J, Hasman A, Househ MS, Gallos P, Zoulias E, editors. The importance of health informatics in public health duringa pandemic Mantas. Amsterdam: IOS Press. pp. 209–212. [Accessed 27th November 2023] Available from World Wide Web: https://doi.org/10.3233/shti2 00531.

Torma, N. (2011). Artificial intelligence: Overview on question answering and chatbots. [Accessed 22th November 2023] Available from World Wide Web from http://www.logic.at/ lvas/185054/Torma.pdf.

Wenger, E. (1987). Artificial Intelligence and Tutoring Systems: Computational and Cognitive Approaches to the Communication of Knowledge. https://www.semanticscholar.org/ paper/Artificial-Intelligence-and-Tutoring-Systems%3A-and-Wenger/

Winkler, R., & Söllner, M. (2018).Unleashing the potential of chatbots in education: A state-of-the-art analysis. https://doi.org/10.5465/AMBPP.2018.15903abstract.