Exploring Teachers' Behavioral Acceptance of Using Chatbots in Teaching

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Abstract

In the contemporary era, chatbots handle diverse tasks, ranging from addressing frequently asked questions (FAQs) and performing administrative and managerial duties to offering student mentoring, motivation, and assessments of learning progress. The primary purpose of this research was to explore teachers' behavioral acceptance of using chatbots in education. The researcher used a descriptive research design for this study. All the University of Sialkot teachers comprised the study population. The total sample of the study was 100 teachers. The researcher developed a questionnaire by reviewing the related literature to achieve his objectives. Ten subject matter experts evaluated the questionnaires' content validity, while the questionnaires' overall reliability was found to be 0.878 coefficient Alpha. Statistical techniques of frequency, percentage, mean score, standard deviation, and t-test were used to elaborate on the concept of the collected data. The study established that teachers have a high acceptance of using chatbots. It was found that the difference between male and female responses was not statistically significant. The study concluded that chatbots are valuable in teaching. The study recommends that universities invest in ongoing professional development for educators to maximize the benefits of chatbots in teaching.

Keywords: Chatbots, Assessments, Behavioral Acceptance, Professional Development.

Introduction

Chatbots are artificial intelligence technologies that use deep learning algorithms to respond to text-based inputs that resemble a human's. Chatbots are a collection of computer programs intentionally crafted to exhibit social and interactive behavior. These Chatbots interact with humans through responsive and interactive queries, creating a dynamic exchange (Gupta et al., 2020). AI-driven chatbots are made to mimic human speech or text communication and present information in a conversational style (Labadze et al., 2023). Their main goal is to simulate intelligent human language contact, verbally or through text, by having informal conversations using natural language between a human user and a computer. Chatbots designed for educational purposes are essential for streamlining the teaching and learning process. There are chatbots in this category that create the academic experience. They curate and organize educational content to suit student needs and pacing, fostering reflection and learning motivation. These chatbots act as learning companions, facilitating dialogue, collaboration, and introspection (Sandu & Gide, 2019).

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These chatbots encourage introspection and motivation by selecting and arranging content to fit each student's unique requirements and learning style. They serve as partners for learning, facilitating discussion, cooperation, and introspection (Durak & Onan, 2023). Apart from answering common questions, some chatbots are like teaching helpers. They can help teachers by taking care of tasks or assisting students to learn differently. Standardized information like course content, practice questions and answers, evaluation standards, assignment due dates, guidance, and study materials can be instantaneously sent to teachers and students via chatbots. Chatbot technology offers a more individualized and engaging learning environment (Okonkwo & Ade-Ibijola, 2021).

As an information producer, a teacher can create supplementary materials outside of regular class sessions for one or more courses. These materials can be collaborative efforts among multiple teachers, contributing to a comprehensive set of resources associated with a particular course. These supplementary materials may include links to websites, cloud-based files, and YouTube videos, allowing for diverse information. To promote reusability, all components of these materials can be shared across different supplementary resources. A teacher can generate announcements for events related to exams, homework assignments, or class projects. Each announcement specifies the location and time of the event, providing clear information about where and when it will occur. Typically tied to a specific course, an event announcement may have multiple associated events (Mendoza et al., 2022).

The instructor can create reminders about an event inside a notice. The teacher can set up an automated reminder system that sends reminders every week until a deadline is 24 hours away. Although a reminder is usually connected to a single event, it can also include announcements of multiple events if the receivers stay the same and the deadlines and periodicity line up. A teacher can take on the role of an information consumer by accepting assignments for one or more courses. Typically, homework assignments are assigned to a particular teacher, who will review and grade them. Teachers can choose to obtain statistical statistics on their students' success in their courses as information consumers. This allows for a comprehensive understanding of students' progress, enabling educators to make informed decisions based on the provided data (Mendoza et al., 2022).

Statement of the Problem
Despite the growing integration of chatbot technology in educational settings, there remains a significant gap in understanding teachers' behavioral acceptance of using chatbots in teaching. While chatbot technology has the potential to enhance teaching practices, improve student engagement, and streamline administrative tasks, the extent to which teachers perceive and accept its benefits remains underexplored. Therefore, this research aims to address the problem of exploring teachers' behavioral acceptance of chatbots in teaching.

Research Objective
1. To understand teachers' behavior acceptance level towards using chatbots.
2. To compare gender-wise perceptions of teachers' behavioral acceptance towards using chatbots.

Research Question
1. What is the level of teachers' acceptance behavior towards using chatbots?
2. Are the differences in behavioral acceptance between male and female teachers statistically significant?

Scope of the Study
This study has a broad and fast-moving scope, examining how diversely and effectively chatbots can be used in various educational fields, levels, and contexts. Through the implementation of AI technologies, educators can maximize their intellectual capabilities. As a result, the entire teaching-learning process becomes a lot more challenging and fun for them. Such a methodology not only stimulates curiosity among the teachers but also helps enhance their motivation and zeal to go for innovative education right there.

Literature Review
Concept of Chatbot Technology
Around the world, technology is used in many different ways and for various reasons in everyday routines and sectors. One recent technological advancement that has captivated the public's imagination is Artificial Intelligence (AI). AI seeks to replicate human cognitive abilities, and within this realm, AI Chatbots have gained prominence, gradually replacing human interactions with software-driven responses (Gupta et al., 2020). A chatbot is a computer program that communicates with people as a virtual assistant. Due in large part to essential developments in artificial intelligence, machine learning, and related fields like neural networks and natural language processing, this trend has become increasingly popular. These Chatbots interact with humans through responsive and interactive queries, creating a dynamic exchange. Notably, there has been a substantial rise in cloud-based chatbot services, contributing to developing and enhancing the chatbot sector. Examples of such services include IBM Watson, Cleverbot, ELIZA chatbot, and numerous others. These conversational agents have become increasingly responsive, marking a significant improvement in interactions between humans and robots in recent years (Gupta et al., 2020).

Benefits of Chatbots
The benefits of chatbots for businesses are diverse and contingent on the kinds of chatterbots and their deployment. There are three main types of chatbots: intelligent chatbots utilizing artificial intelligence (AI), rule-based chatbots, and hybrid models combining both approaches. These chatbots provide numerous benefits to users (McConnell, 2023).

24/7 Customer Support
AI chatbots, particularly those utilizing advanced artificial intelligence like Heyday, bring the invaluable advantage of providing uninterrupted customer support. Unlike human agents who need rest, chatbots operate tirelessly, ensuring that assistance is available to customers at any time of the day. This capability enables businesses to offer support outside regular business hours, catering to a global audience in different time zones. Consequently, this leads to increased customer satisfaction, stronger brand affinity, and a boost in customer lifetime value (McConnell, 2023).

Automated FAQ Responses
One of AI chatbots' noteworthy advantages is their capacity to automatically respond to commonly asked questions (FAQs). Businesses can streamline customer interactions by programming chatbots to handle common queries with natural and friendly language. This increases the possibility of conversions while also saving time for both support staff and clients. For instance, Major Tom effectively employs an FAQ chatbot to engage with visitors, swiftly providing relevant information and guiding them toward desired actions (McConnell, 2023).

Time Savings for Teams
In an era where customer service teams face increasing pressure, AI chatbots come to the rescue by efficiently handling routine queries. According to McKinsey, the surge in support calls has strained contact centers, leading to higher employee attrition. Chatbots alleviate this burden by addressing every day and repetitive tasks and lowering call or chat volumes. This newfound efficiency allows support teams to allocate more time to personalized, high-impact conversations, ultimately improving employee retention (McConnell, 2023).

Direct Sales in Direct Messages (DMs)
The rise of social commerce necessitates businesses to engage with customers on social media platforms. AI chatbots seamlessly integrate into platforms like Instagram and Facebook, providing automated support comparable to that on e-commerce websites. This ensures an omnichannel experience and allows businesses to connect with their audience where they spend a significant amount of time. Garage Clothing's use of an AI chatbot on Facebook Messenger exemplifies how this technology can guide users through buying and boost sales (McConnell, 2023).

Enhanced Customer Journey
AI chatbots are pivotal in crafting a smooth and seamless customer journey. By offering always-on support, providing product recommendations, presenting automated prompts, delivering premium content, and offering relevant promotions, chatbots address various aspects of the user experience. This comprehensive approach eliminates many barriers that might deter users from purchasing, contributing to a positive customer journey (McConnell, 2023).

Reduction in Abandoned Shopping Carts
Cart abandonment is a prevalent issue in e-commerce, with a significant percentage of online shopping carts left uncompleted. AI chatbots help mitigate this challenge by ensuring users receive crucial information throughout their shopping experience. By addressing common reasons for abandonment, such as unexpected costs or lack of information, chatbots contribute to a smoother customer journey and a reduction in abandoned carts (McConnell, 2023).

Stress Reduction for Employees and Customers
McKinsey's findings emphasize the impact of burnout, dissatisfaction, and poor work-life balance on support staff turnover. AI chatbots offer a remedy by handling routine tasks, reducing the workload on support teams, and decreasing call or chat volumes. This not only reduces stress for employees but also enhances the overall customer service experience. By streamlining interactions and minimizing wait times, chatbots improve job satisfaction for support staff and a more positive customer experience (McConnell, 2023).

In-Store Appointments via Chatbots
As highlighted in Shopify's Future of Commerce report, the trend of booking in-store appointments gained significant traction. Chatbots prove instrumental in managing appointment requests at scale, allowing users to transition seamlessly from online browsing to in-store experiences. This omnichannel approach aligns with evolving consumer preferences, providing flexibility and convenience in the shopping process (McConnell, 2023).

Consistent Brand Voice Across Channels

Maintaining a consistent brand voice is crucial for building brand identity and loyalty. AI chatbots enable businesses to deploy and uphold their brand voice across various online touchpoints. Whether interacting on a website or through social media platforms, chatbots ensure a cohesive brand experience, fostering customer familiarity and trust. Decathlon UK's use of an AI chatbot on Facebook Messenger exemplifies how brand personality can be effectively conveyed across channels (McConnell, 2023).

Multilingual Support

The global nature of online business requires communicating with customers in their preferred languages. AI chatbots address this need by offering multilingual support. This ensures that companies can provide consistent and practical support to a diverse customer base, regardless of language barriers. Merci Handy's bilingual chatbot conversation in English and French illustrates how chatbots facilitate seamless communication in multiple languages (McConnell, 2023).

Cost-Efficiency

AI chatbots present a cost-effective solution for businesses aiming to provide scalable support. While maintaining a 24/7 support system with human agents would require significant financial resources, chatbots operate efficiently at a fraction of the cost. This scalability ensures that businesses can meet customer demands without incurring excessive support team expenses, making chatbots a financially prudent choice for customer service management (McConnell, 2023).

Application of Chatbots in Classroom

Chatbots hold significant potential in various educational settings. They provide an interactive mechanism distinct from traditional e-learning systems, allowing students to engage continuously by posing queries related to specific areas. Despite existing since the 1960s, only a few chatbots have been applied for educational purposes, limited to particular subjects. According to this theoretical paradigm, chatbot technology can act as the cornerstone of a social-constructivist teaching-learning environment social-constructivist. It can offer a social context, improved engagement, teamwork, scaffolding, and performance support for students in the zone of proximal growth (Rane, 2023).

Teachers' Perceptions of Using Chatbots in Daily Instruction

Educators view technology, including chatbots, as advantageous for themselves and students. Recognizing teachers' positive perception of chatbot technology in education, it becomes crucial to leverage this viewpoint to transform teaching-learning environments. This transformation aims to shift from conventional approaches to adopting social-constructivist ideas, ultimately leading to improved educational outcomes. To achieve this shift, it is essential to provide teachers with training on effective educational technology integration strategies (Bii et al., 2018).

It is noteworthy that teacher ambivalence exists regarding the appropriate timing for incorporating chatbots into teaching practices. Teachers expressed concerns about potential time wastage, considering factors such as the desire for syllabus handling, a tightly full school schedule, and preparation for nationwide managed final exams. Addressing this concern requires finding ways to allocate sufficient time in schools for meaningful technology integration in teaching, possibly by addressing issues related to curriculum overload. Teachers desire chatbots to extend beyond

traditional subject matter and respond to topics beyond the immediate scope of school teaching and learning. By appropriately designing chatbots' knowledge base, they can serve as valuable tools for tutors and pupils to access info beyond the instant school curriculum, expanding their utility to broader educational content and affairs. This multifaceted approach involving training, addressing time constraints, and increasing the scope of chatbot functionality can contribute to a more effective and integrated use of technology in education (Bii, Too & Mukwa, 2018). Chatbots automate repetitive tasks for educators, letting them emphasize providing quality education and monitoring pupil progress. These bots can handle student queries related to courses, assignments, and deadlines, customize the content, provide personalized feedback, and even evaluate tests and quizzes, providing insightful analysis per student. Educational chatbots serve as valuable teaching assistants by conducting regular mock tests, ranking assessments, and tracking project and assignment progress. By automating these tasks, chatbots alleviate the load on tutors, allowing them to focus on delivering high-quality education. The chatbots also provide insights and data to help teachers tailor their approaches, ensuring a holistic teaching experience (Khan, 2023).

Need of ChatGPT for Industry 4.0
ChatGPT plays a crucial role in Industry 4.0 by assisting in selecting optimal test automation technologies, comparing tools, and offering guidance on their assessment. Industry 4.0 provides benefits for advanced customer care tasks, providing a personalized experience by connecting with customer relationship management systems. It can suggest services and promotions based on past interactions, identify issues, offer solutions, and ensure program alignment with user needs (Javaid et al., 2023).
ChatGPT helps teachers by making educational resources more efficient and freeing them time to concentrate on complex course designs and pedagogical approaches. Using ChatGPT as an ideation facilitator, educators can generate concepts for seminars, workshops, lectures, and hands-on training. Less experienced teachers can utilize ChatGPT for initial lesson planning, and it assists in the creation, assessment, and personalized feedback for quizzes and assignments. By enhancing access to information, ChatGPT proves more efficient than traditional search engines, offering relevant answers without overwhelming users with an extensive list of links. This streamlined process saves time and effort for users, who can then concentrate on critically evaluating and analyzing information credibility. ChatGPT integration fosters critical and creative thinking in students through conversations over AI-generated texts. It helps them develop their ability to propose and defend original ideas and locate relevant sources of information (Kiryakova & Angelova, 2023).

Challenges and Risks in Using ChatGPT
Despite the potential advantages of General Artificial Intelligence (GAI) tools, they pose numerous challenges that need careful consideration. Critical challenges have been identified by academics worldwide; these include concerns about potential misuse or over-reliance on AI tools, dangers to students' academic integrity, and reservations about undervaluing teachers' professional ability. Administrative difficulties have also been noted, including inadequate infrastructure, sluggish transitional steps, and unclear guidelines and curricula for AI integration. In addition, several technological drawbacks have been identified, such as bias and data quality, privacy concerns, insufficient capacity for explanation, production of irrelevant responses, limitations on accuracy, lack of commonsense reasoning, emotional intelligence deficit, and security risks. Excessive dependence on GAI tools may lead to an inability to participate in critical thinking or problem-

solving freely, ultimately inhibiting the development of crucial abilities like creativity, innovation, and critical thinking (Liu et al., 2023).

While ChatGPT offers numerous advantages in education, it also presents notable risks. The tool's capability to generate outputs based on user prompts, particularly by students, raises ethical concerns and may violate academic integrity standards. Using ChatGPT to produce responses or articles without proper acknowledgment or citation can lead to plagiarism, resulting in academic misconduct and potential long-term consequences for students (Sok & Heng, 2023).

Research Methodology

Research methodology is defined as a systematic procedure of doing research. This study was descriptive and used a survey method to collect teacher data. The study population consisted of all teachers at the University of Sialkot. One hundred teachers (100) were selected from the population for data collection. The researcher used a self-constructed questionnaire. Pilot testing was done to determine whether the questionnaire's items were pertinent, clear, and easy to grasp. The questionnaire was consulted with ten (10) experts in the field to check its content validity, and the overall value of the Cronbach Alpha coefficient was 0.857 for the questionnaire items. The researcher administered the questionnaire in the field and sent online Google form questionnaires through WhatsApp, Facebook, and Emails.

Data Analysis and Interpretation

The study's goals were achieved through descriptive statistics. The researcher employed frequency, percentage, mean score, standard deviation, and t-test statistical procedures to analyze the quantitative data.

Teachers' Behavioral Acceptance of Using Chatbots

Following are the tables and their interpretation regarding teachers' behavioral acceptance towards using chatbots:

Table 1: Overall Perceptions of Teachers Regarding their Behavioral Acceptance Towards Using Chatbots

Categories of Teachers Behavior	Frequency	Percent
Low Acceptance Behavior	16	16.0%
Moderate Acceptance Behavior	17	17.0%
High Acceptance Behavior	67	67.0%
		100.0%

The table 1 shows frequency, percentage, mean and standard deviation of overall three categories of teachers' perceptions regarding their behavior towards using chatbots. Table values show that 16% teachers are at low level of acceptance behavior, 17% teachers are at moderate level of acceptance behavior and 67% teachers have high level of acceptance behavior. The mean score (M) and standard deviation (SD) of responses are (2.510) and (0.7587). The standard deviation indicates that most of respondents' perceptions are around the mean. The mean value and percentage distribution displays that majority of teachers have high level of acceptance behavior towards using chatbots in their learning. The above categories of perceptions of teachers regarding their behavior towards using chatbots is graphically described as under:

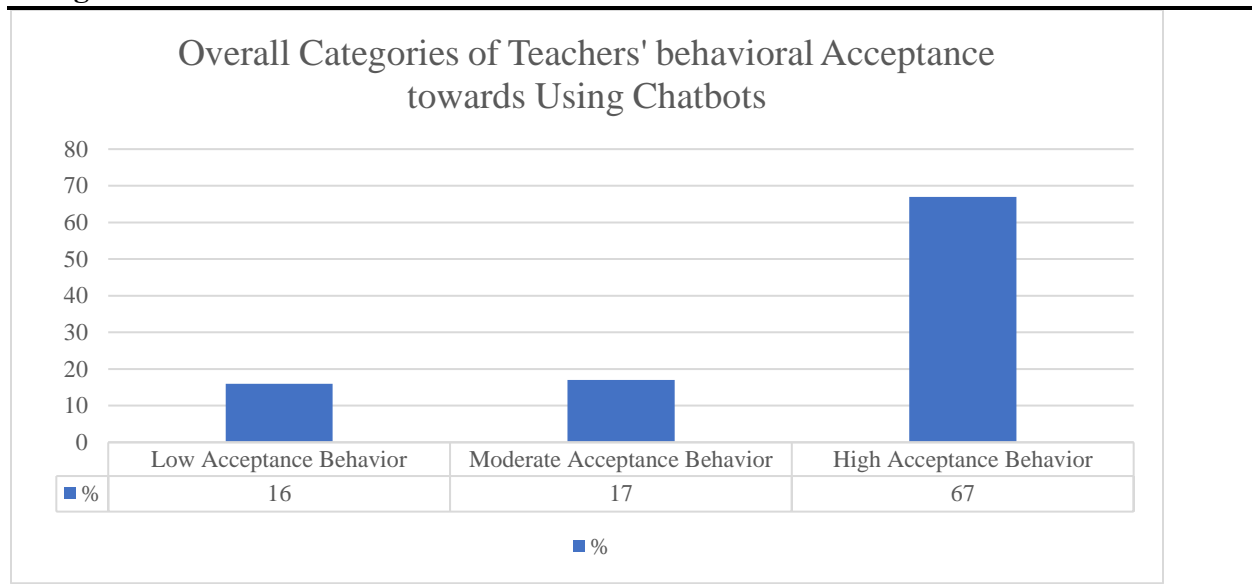**Figure 1**: **Overall Perceptions of Teachers Regarding their Behavioral Acceptance Towards Using Chatbots**

Overall Categories of Teachers' behavioral Acceptance towards Using Chatbots

	Low Acceptance Behavior	Moderate Acceptance Behavior	High Acceptance Behavior
%	16	17	67

Table 2: Perceptions of Male Teachers Regarding their Behavioral Acceptance Towards Using Chatbots

Categories of Teachers Behavior	Frequency	Percent	Mean	S. D
Low Acceptance Behavior	8	13.6	2.5085	.72808
Moderate Acceptance Behavior	13	22.0		
High Acceptance Behavior	38	64.4		

The table 2 shows frequency, percentage, mean and standard deviation of three categories of male teachers' perceptions regarding their behavior towards using chatbots. Table values show that 13.6% male teachers are at low level of acceptance Behavior, 22.0% male teachers are at moderate level of acceptance behavior and 64.4% male teachers have high level of acceptance behavior. The mean score (M) and standard deviation (SD) of responses are (2.5085) and (0.72808). The standard deviation indicates that most of respondents' perceptions are dispersed around the mean. The mean value and percentage distribution displays that majority of male teachers have high level of acceptance behavior towards using chatbots in their learning. The above categories of perceptions of male teachers regarding their behavior towards using chatbots is graphically described as under:

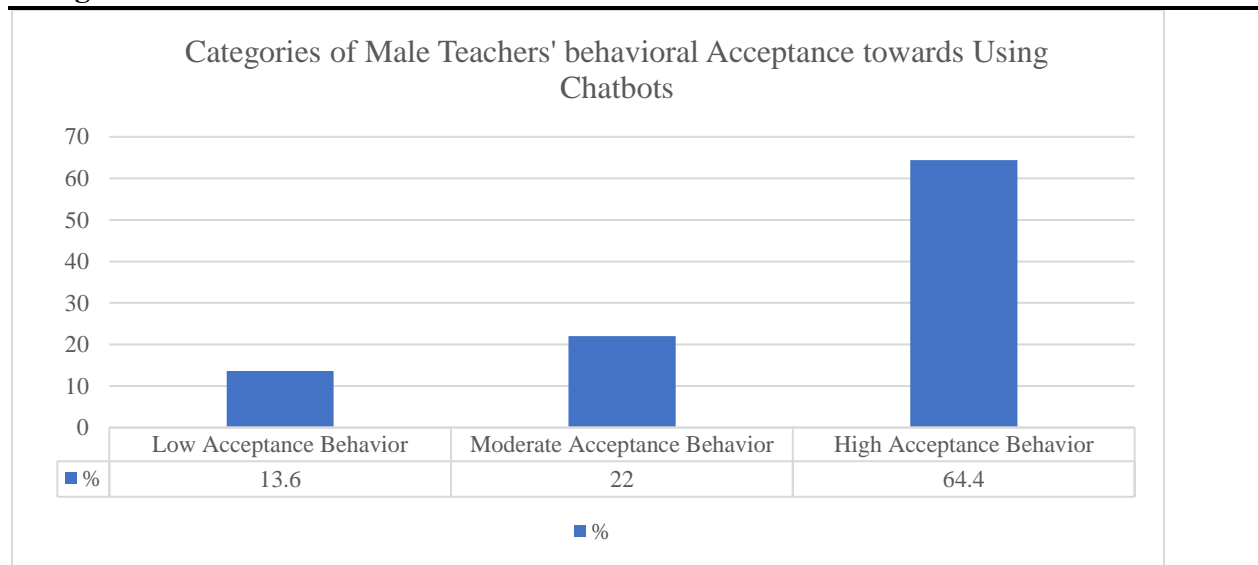**Figure 2: Perceptions of Male Teachers Regarding their Behavioral Acceptance Towards Using Chatbots**

Categories of Male Teachers' behavioral Acceptance towards Using Chatbots

%	Low Acceptance Behavior	Moderate Acceptance Behavior	High Acceptance Behavior
%	13.6	22	64.4

Table 3: Perceptions of Female Teachers Regarding their Behavior Acceptance Towards Using Chatbots

Categories of Teachers Behavior	Frequency	Percent	Mean	S. D
Low Acceptance Behavior	8	19.5%	2.5122	.8100
Moderate Acceptance Behavior	4	9.8%		
High Acceptance Behavior	29	70.7%		
		%		

The table 3 shows frequency, percentage, mean and standard deviation of three categories of Female teachers' perceptions regarding their behavior towards using chatbots. Table values show that 19.5% female teachers are at low level of acceptance behavior, 9.8% female teachers are at moderate level of acceptance behavior and 70.7% female teachers have high level of acceptance behavior. The mean score (M) and standard deviation (SD) of responses are (2.5122) and (0.8100). The standard deviation indicates that most of respondents' perceptions are dispersed around the mean. The mean value and percentage distribution displays that majority of female teachers have high level of acceptance behavior towards using chatbots in their learning. The above categories of perceptions of female teachers regarding their behavior towards using chatbots is graphically described as under:

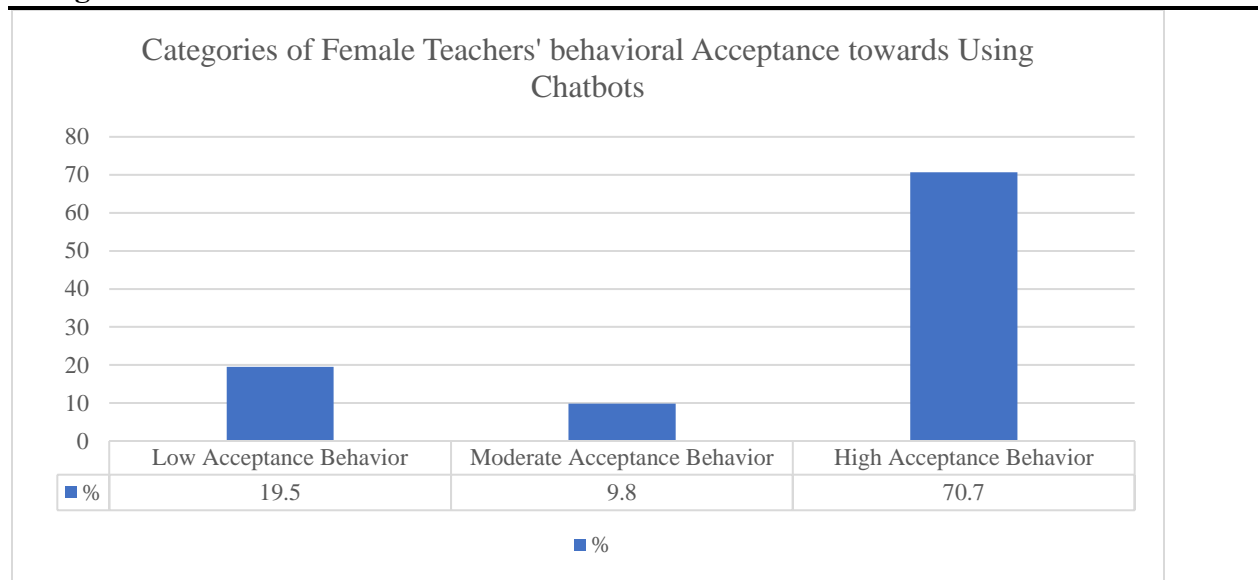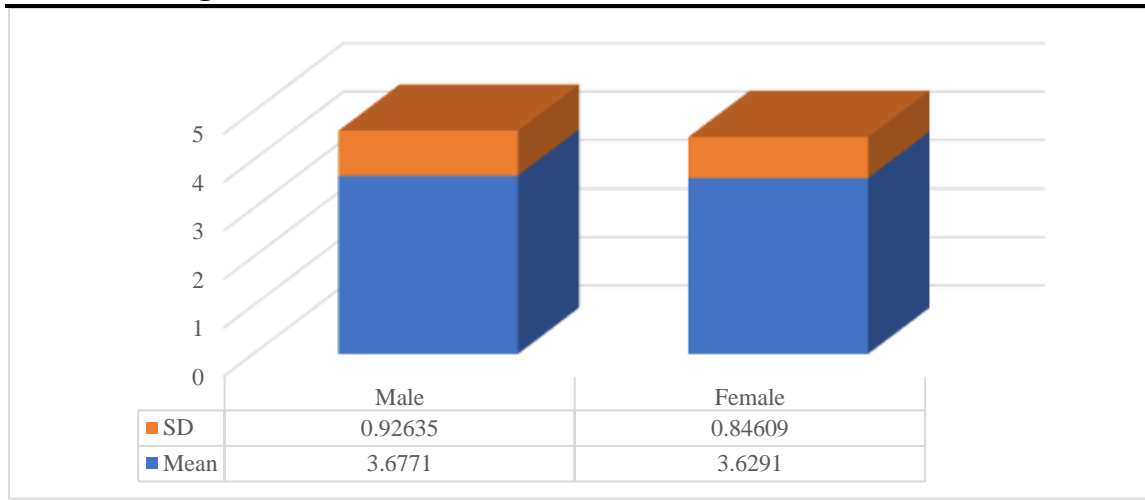**Figure 3: Perceptions of Female Teachers Regarding Their Behavioral Acceptance Towards Using Chatbots**

Categories of Female Teachers' behavioral Acceptance towards Using Chatbots

	Low Acceptance Behavior	Moderate Acceptance Behavior	High Acceptance Behavior
■ %	19.5	9.8	70.7

■ %

Table 4: Comparison of Gender Wise Teachers perceptions regarding their Behavioral Acceptance towards Using Chatbots

Teachers Behavior Towards Using Chatbots	Gender	N	Mean	S. D.	t-value	*Sig.*
Overall	Male	105	3.6771	.92635	.264	.949
	Female	265	3.6291	.84609		

Table 4 shows the differences between perceptions of male and female teachers regarding their behavior towards using chatbots. Analysis shows that perceptions of male teachers (M=3.6771, SD=.92835) are relatively close with female teachers (M=3.6291, SD=.84609). These values offer insight into the central tendency of the responses, where higher values indicate more positive perceptions, while lower values suggest less positive perceptions. Furthermore, the t-value (.264) is associated with a significance level (0.949). The positive t-value suggests a slight tendency towards higher perceptions among male teachers, but the non-significant p-value (0.949) indicates that this difference may not be statistically significant. Essentially, any observed variations could be due to random chance rather than a meaningful difference. The graphical representation of above table is given below:

Figure 4: Comparison of Gender Wise Teachers Perceptions Regarding their Behavior Towards Using Chatbots

	Male	Female
■ SD	0.92635	0.84609
■ Mean	3.6771	3.6291

Findings

Following are findings of the study based on above results:

Overall Behavioral Acceptance Toward Chatbots

The study revealed that a significant majority of teachers (67%) exhibit a high level of behavioral acceptance towards using chatbots in their teaching practices. The mean score of 2.510 (SD = 0.7587) indicates that most responses are clustered around a moderate-to-high acceptance level, with low dispersion. This finding highlights the growing openness of educators to integrate AI technologies into pedagogical frameworks, reflecting their adaptability to technological advancements.

Male Teachers' Behavioral Acceptance

Among male teachers, 64.4% displayed a high level of acceptance behavior towards using chatbots, as indicated by the mean score of 2.5085 (SD = 0.72808). While 13.6% of male respondents reported low acceptance behavior, a notable proportion (22%) reflected moderate acceptance. These results suggest that male teachers are generally inclined toward embracing chatbots, though a small subset may require further awareness or training to increase their engagement.

Female Teachers' Behavioral Acceptance

The findings demonstrated that female teachers reported an even higher level of acceptance compared to their male counterparts, with 70.7% showing a high level of behavioral acceptance. The mean score of 2.5122 (SD = 0.8100) reflects slightly more variation in perceptions but still indicates a strong tendency toward chatbot integration. The data suggests that female educators are highly receptive to utilizing chatbots, potentially seeing them as a valuable tool for enhancing teaching effectiveness.

Gender-Based Comparison

The gender-based comparison revealed only a slight difference in behavioral acceptance levels, with male teachers (M = 3.6771, SD = 0.92635) showing marginally higher perceptions compared to female teachers (M = 3.6291, SD = 0.84609). However, the t-value (0.264) and the associated significance level (p = 0.949) indicate that this difference is not statistically significant. This suggests that both male and female teachers generally share similar levels of acceptance toward chatbots, reinforcing the conclusion that gender is not a decisive factor in behavioral acceptance.

Conclusion

It is concluded that chatbots have emerged as a significant tool in enhancing educational activities. Their ability to provide teachers with prompt, customized support has demonstrated their capacity to promote flexible and adaptive learning environments. By automating administrative tasks, chatbots free up educators to focus on the interactive and creative aspects of teaching, thereby improving the quality of education. The above findings underscore the universal potential of chatbots to transform teaching and learning processes. Educational institutions must strategically align the use of chatbots with specific learning goals and curriculum objectives to maximize their effectiveness. Investments in ongoing professional development for educators are crucial to ensuring that teachers are well-equipped to leverage chatbot capabilities fully. Training programs should focus on familiarizing teachers with chatbot functionalities and integration strategies, enabling them to optimize these tools for student engagement and learning outcomes. The integration of chatbots into education is not merely a supplement but a transformative force that can revolutionize teaching practices. By strengthening teachers' abilities and enhancing the overall learning process, chatbots hold immense potential to create a more personalized and efficient education system. Therefore, the adoption and strategic implementation of chatbots in education should be prioritized to realize their full potential in shaping the future of learning.

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