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Deploying Educational Chatbots as Virtual Assistants for Language Teaching and Learning in Malaysian Tertiary Education

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ABSTRACT

The integration of artificial intelligence (AI) in education has brought forward new pedagogical opportunities, especially through the use of chatbots as virtual assistants. This study explores the role and impact of educational chatbots in supporting language teaching and learning within Malaysian tertiary institutions. A quantitative, cross-sectional survey was conducted involving 101 students from various public universities across Malaysia. The research focused on two key questions: (1) What is the role of chatbots in students' lives? and (2) How do chatbots impact students' learning activities? Findings reveal that chatbots are increasingly used for academic support, particularly in language practice, revision, and communication. Students reported that chatbots provided immediate feedback, fostered autonomous learning, and reduced language anxiety. However, concerns about limited functionality and lack of contextual understanding were also noted. The study concludes that educational chatbots have significant potential to complement language instruction in higher education, provided their design is aligned with learners' needs. The results offer practical implications for educators, instructional designers, and policymakers seeking to implement chatbot technology in tertiary language education settings

1. Introduction

There has been a significant rise in public interest in chatbots in recent years, largely due to their ability to simulate human conversation and deliver interactive, personalised experiences. As artificial intelligence (AI), machine learning, and natural language processing technologies continue to advance, chatbots have evolved into versatile tools that support a wide range of sectors, including e-commerce, customer service, healthcare, and, more recently, education [1-3]. Their ease of use, immediate responsiveness [4], and capacity to operate beyond time and geographical boundaries [5] make them particularly valuable in today's mobile and digitally driven learning environments

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In the field of education, chatbots are increasingly being recognised for their potential to act as virtual teaching assistants [4]. Unlike traditional static content, chatbots offer real-time, interactive communication that can adapt to learners' responses [5]. Research has shown that educational chatbots can enhance the learning experience by providing immediate feedback, supporting microlearning, and increasing student engagement [5,6]. They can serve multiple functions, ranging from answering frequently asked questions to assisting with content revision, language practice, and even mental health support.

Several studies highlight the benefits of chatbot use in educational settings. For instance, chatbots have been found to enhance communication skills through simulated conversations [7], improve grammar and vocabulary acquisition [4], and support personalised learning by responding to individual student needs [8]. The integration of machine learning and natural language processing allows chatbots to mimic more human-like interactions, which contributes to more meaningful and personalised learning experiences. Chatbots can also reduce the cognitive overload experienced in traditional classroom settings by delivering bite-sized content, a microlearning strategy that has been associated with improved retention and reduced fatigue [9,10].

In language learning specifically, chatbots can play a vital role in repetitive practice, conversational fluency, and low-anxiety environments for learners to engage with the target language. They provide immediate and judgement-free feedback, which is crucial for second language learners who may hesitate to speak in front of peers or instructors. Research has shown that students learning English as a second language benefit from chatbots that assist in pronunciation, vocabulary expansion, and grammatical correction [5,9,11], . This is particularly valuable in contexts where access to native speakers or language experts may be limited [12,13].

Despite these advantages, the adoption of chatbots in Malaysian higher education, particularly in the context of language learning, is still in its infancy [14]. Most Malaysian tertiary institutions are still exploring or piloting chatbot integration, and many educators lack sufficient exposure or training to incorporate chatbots meaningfully into their pedagogical practices. Moreover, there is limited empirical data on how Malaysian students perceive, use, and benefit from educational chatbots, especially within language-related courses.

A recent systematic review emphasises the need for more context-specific and evidence-based studies on chatbot applications in education, particularly in developing or Southeast Asian contexts [15]. While many global reviews focus on healthcare or general service industries, there is a noticeable gap in literature concerning educational chatbots in multilingual learning environments such as Malaysia. Furthermore, research must not only assess the effectiveness of chatbots as tools but also explore students' attitudes, expectations, and behavioural engagement when using such technology.

Given these research gaps, this study investigates the deployment of educational chatbots as virtual assistants for language teaching and learning in Malaysian tertiary education. It aims to understand students' perspectives on the relevance and usability of chatbots in supporting their learning activities. To guide this investigation, the study addresses the following research questions: 1) *What is the role of chatbots in students' lives?* And *2) How does chatbot impact students' learning activity?* This study, therefore, contributes to the growing body of research by examining how chatbots are experienced by students within Malaysian tertiary institutions and evaluating their impact on language learning activities. The findings are expected to provide practical implications for educators, curriculum designers, and policymakers aiming to integrate chatbot technology into educational settings.

2. Methodology

2.1 Researh Methods and Research Participants

This empirical study explores both quantitative data gathered from 101 students (N = 101)who had exposure to the use of educational chatbots as virtual assistants for language teaching and learning in Malaysian tertiary institutions. Among them, 70 were undergraduate students from seven different universities across Malaysia, representing a variety of faculties including Architecture (19), Science (23), Education (20), and Sports and Recreation (8). The remaining 31 participants were postgraduate students enrolled in three public universities. Of these, 27 were pursuing a Master's degree in TESL, while 4 were enrolled in Mass Communication programmes.

The data collection and assessment process took place over the course of approximately two weeks. The target population consisted of tertiary-level students in Malaysia who fulfilled the following criteria: (1) they were currently enrolled in higher education institutions, and (2) they had some level of familiarity with chatbot use in teaching and learning contexts. To reach this specific group, the study employed a snowball sampling technique, where initial respondents helped recruit additional participants.

2.2 Research Instruments and Research Cycle

Quantitative data were collected through an online survey questionnaire consisting of 15 items, which focused on three main areas: (1) students' knowledge and awareness of chatbots, (2) the role of chatbots in education, and (3) students' views on the future potential of chatbots in teaching and learning. The responses provided a foundational understanding of students' experiences and attitudes toward chatbot integration in language education.

3. Results

3.1 Research Result

This section reports the findings of the study based solely on quantitative data collected from 101 students through an online survey. The results are presented in relation to the two research questions:

RQ1: What is the role of chatbots in students' lives?
RQ2: How does chatbot use impact students' learning activity?

Each research question is addressed in a dedicated subsection, with findings summarised using descriptive statistics to reflect students' responses across the 15 survey items. Percentages and frequencies are included to highlight key patterns in the data.

3.1.1 What is the role of chatbots in students' live?

Table 1
Role of chatbot in student lives

Survey item	Agree/Strogly Agree (n)	Slighty agree (%)
Chatbots help me access information easily	72	71.3
Chatbots are helpful for revising educational content	66	65.3
Chatbots make learning more interactive and engaging	62	61.4
Chatbots support my academic work on a regular basis	49	48.5
Chatbots reduce my anxiety in asking questions	59	58.4

Overall, students demonstrated a positive view of chatbots as academic tools. A majority (71.3%) agreed that chatbots help them access information easily, indicating their usefulness in providing quick, reliable support during studies. About 65.3% of students noted that chatbots are helpful for revising educational content, showing their potential for knowledge reinforcement.

Meanwhile, 61.4% of respondents felt that chatbots make learning more interactive and engaging, highlighting their role in transforming passive learning into a more dynamic experience. Interestingly, while only 48.5% stated that chatbots are regularly used by them for academic support, it suggests that although chatbots are perceived positively, regular usage may still be developing, possibly due to limited exposure or institutional adoption.

Furthermore, 58.4% of students believed that chatbots reduce their anxiety when asking questions, which points to one of the most impactful roles of chatbots, providing a non-threatening environment for learning, especially among language learners who may fear judgement from peers or instructors.

3.1.2 How does chatbot use impact students' learning activity?

Table 2
Impact the use of chatbot in student's learning activity

Survey item	Agree/Strogly Agree (n)	Slighty agree (%)
Chatbots improve my understanding of the subject	61	60.4
Chatbots provide useful feedback on my learning	58	57.4
Chatbots support self-paced and independent learning	64	63.4
Chatbots encourage me to practise more regularly	60	59.4
Chatbots make learning more efficient and time-saving	68	67.3

Regarding learning outcomes, the majority of respondents agreed that chatbots contributed meaningfully to their academic progress. 67.3% stated that chatbots make learning more efficient and time-saving, showing that students appreciate their ability to deliver quick and direct responses without waiting for teacher intervention.

Similarly, 63.4% indicated that chatbots support self-paced and independent learning, underscoring their value in autonomous learning environments. 60.4% agreed that chatbots improve their understanding of the subject, and 59.4% felt encouraged to practice more regularly with

chatbot support, especially useful in language learning contexts where consistent practice is key to fluency development.

Finally, 57.4% of students reported that chatbots provide useful feedback on their learning, reinforcing their potential as virtual tutors that support the formative learning process.

4. Conclusions

This study set out to examine the role and impact of chatbots as virtual assistants in language teaching and learning among students in Malaysian tertiary institutions. The findings reveal that students perceive chatbots as useful tools that support their academic needs, particularly in accessing information, revising content, and creating a more interactive learning environment. Many students also indicated that chatbots helped reduce the anxiety often associated with classroom participation, especially in language learning settings.

In terms of their impact on learning activities, students reported that chatbots contributed to better understanding of content, promoted independent and self-paced learning, and made the learning process more efficient. These insights point to the growing relevance of chatbot technology as a supportive mechanism in modern higher education.

Despite the positive perceptions, regular use of chatbots for academic purposes remains modest. This highlights a potential area for development, suggesting the need for greater institutional support, awareness, and integration of chatbot tools into the teaching and learning process.

Overall, the study concludes that chatbots hold strong potential as educational aids in Malaysian tertiary education, particularly in enhancing the language learning experience. With the right strategies and implementation, chatbots can serve as effective digital companions that bridge gaps in instruction, engagement, and learner confidence.

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