Personalized AI in Higher Education: Development and Evaluation of a Course-Specific Chatgpt Tutor

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ABSTRACT

The integration of artificial intelligence into education has opened new avenues for personalized and widespread learning assistance. This paper focuses on the design and development of a custom ChatGPT tailored for tertiary education settings. The main objective is to investigate how generative AI customized to align with subject materials, intended outcomes, and how to actively involve learners can be of benefit. For this study, a special chatbot was built with OpenAI's GPT framework to work as a tutor available at any time for the subject International Business (IBUS 201D). The design and testing of this ChatGPT tutor followed a Design Science Research method. A quantitative study was done conducted with 35 undergraduate students, using a pre–post-test to see the effectiveness of new developed GPT for the specific subject. The findings show that this type of ChatGPT tutor can be a helpful support alongside normal teaching. The results indicate that the custom ChatGPT tutor can be a meaningful addition to traditional teaching methods.

Keywords: Custom ChatGPT, Tertiary Education, AI in Higher Education, Personalized Learning, Educational Technology.

INTRODUCTION

Higher education around the world is going through a big change, mainly because digital technologies are blending more into the system. This blending is creating chances for better access, fairness, and learning outcomes (Mohamed Hashim, Tlemsani, & Matthews, 2022). As a result of this shift, Artificial Intelligence (AI) is becoming a strong influence, bringing new ways to improve traditional education (Leong et al., 2024). AI is now used globally in many forms like automated grading and checking for plagiarism but also in more advanced roles such as adaptive learning systems and intelligent tutors. These tools are gaining attention because they can adjust to each student's learning needs, offering more personalized education (Sun et al., 2023).

Personalized learning focuses on changing teaching methods to match each student's ability, interests, and pace. It is becoming more necessary because not all students learn the same way (Shemsack & Spector, 2020). But even with this importance, many universities still find it hard to apply personalized learning properly. The reasons include limited time for teachers, large class sizes, and unequal support systems (Bingham et al., 2018). These challenges show a clear need for solutions that are not only scalable and responsive but also easy to manage for teachers while still supporting students effectively.

Another important trend is the growing number of international students studying in universities worldwide (Dennis,2022). This brings positive cross-cultural exchange, but it also adds academic challenges. Many international students must deal with new education styles, unfamiliar systems, and different languages. While universities try to be welcoming and helpful, they often find it difficult to support students who are still getting used to local academic ways and language demands.

This situation brings attention to ChatGPT, a new AI chatbot developed by OpenAI, which could act as a flexible and helpful tutor (Feng, 2024). Unlike older learning systems, ChatGPT uses natural language, can talk with

students in multiple languages, and gives support based on real-time conversation(Yu et al., 2024). These features make it especially useful for international students who may feel nervous about communication or lack support in their new academic surroundings. Because it is available all day and night, gives easy-to-understand responses, and works in different languages, ChatGPT becomes like a personal learning assistant for these students.

However, even though ChatGPT has strong potential in education, its use especially for international students has not been deeply explored (Raitskaya & Lambovska, 2023). Much of the research so far only looks at general uses or how schools are starting to use the tool. There is not much focus on how AI chatbots like ChatGPT can really meet the needs of students facing both language and cultural learning differences (Abdaljaleel et al., 2024). This study wants to fill that gap by looking at how ChatGPT might work as a personal tutor, especially in multilingual settings in universities. The goal is to develop a clear understanding of how this kind of tool can improve access, understanding, and success not only for international students but also for a wider group of learners.

Problem Statement

As higher education continues to develop, one major change that educators have embraced is the use of Artificial Intelligence (AI) tools to design more personalized learning experiences (Dumbuya, 2024). These tools are especially helpful because they adjust based on each student's individual context. This kind of flexibility helps fill common gaps in engagement, understanding, and academic performance. In classrooms where students from different linguistic and cultural backgrounds are learning together, such personalized support becomes even more important to address shared learning challenges (Jiao, 2024). However, the use of AI tools in education is still not equal across institutions. Many universities face practical difficulties like weak digital infrastructure, lack of trained staff, and concerns related to data privacy and ethical usage (Wulandani & Mu'ti, 2024; Funda & Francke, 2024; Ojha, 2024).

Meanwhile, international students face these challenges in an even stronger way. Many of them struggle with language barriers, unfamiliar academic traditions, and limited chances to receive one-on-one academic support in their host universities (Abdaljaleel et al., 2024). While traditional tutoring services are available, they are often not easy to reach, and they usually do not take into account the multilingual and cultural differences that shape how students learn and seek help.

In this context, ChatGPT can be seen as a very helpful option. It can use many languages, give quick answers to what the student needs, and explain academic content in a way that matches the student's own language (Feng, 2024; Silva & Janes, 2021; Li, 2023). This kind of support can reduce stress, make learning easier to follow, and help students feel more confident in their studies. During the pandemic, many local students already used such tools, but this study focuses more on how ChatGPT can become a personal study assistant for international students, who often face more difficulties in their learning

This paper explores how ChatGPT may change the usual idea of tutoring. The focus is on how this tool can support international students not only in learning course content but also in adapting to the academic environment in a more fair and supportive way. Because it can communicate across different languages and cultures, ChatGPT shows strong potential as a tool that can help teachers meet the needs of students from many different backgrounds.

LITERATURE REVIEW

AI and Personalized Learning in Higher Education

Artificial intelligence (AI) is becoming an important force in higher education, especially in making learning more personalized for students (Hrytsenko et al., 2024; Susilo, 2024; Shvardak & Popovych, 2025). However, even with this potential, many universities remain careful in how they use AI. As Sun, Dayo, Jun, Liu, and Najam (2024) point out, there is still hesitation to apply AI for creating learning environments that truly match the individual needs and preferences of each student.

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AI technologies are capable of adjusting instruction in real-time by tracking the learner's progress, offering a powerful way to deliver personalized education on a large scale. Yet, most educators continue to rely on conventional teaching methods, which are designed more for managing large groups than for supporting students one by one (Ribarić & Avramović, 2021; Maheswara & Rifai, 2023; Asad & Suleman, 2025). If effectively implemented, AI tools could offer each student a pathway tailored to their strengths and learning style (Lokare & Jadhav, 2023; Katiyar & Awasthi, 2024; Jiao, 2024). However, deep-rooted academic traditions, limited digital infrastructure, and gaps in digital skills remain major barriers to the wider use of AI in classrooms ((Festus & Emmanuel, 2024). So, although the technology holds great promise, its role in helping students become more independent and motivated in their learning is still far from being fully realized.

Chatbots in Education: A New Frontier

In recent years, AI-powered chatbots have emerged as important tools to address the growing demand for academic support (Gonzales-Reyna, 2025). One such innovation is ChatGPT, built by OpenAI which is among the best-known efforts in this area. Using natural language processing, it engages users through interactive dialogues providing them assistance and explanations in real-time .ChatGPT used in educational places had been found to help in autonomous learning and ease access to academic help beyond the class hours (Gonzales-Reyna, 2025). In practice, AI chatbots have been deployed at universities to automate the answering of student questions. A teaching assistant chatbot, for instance, was able to process thousands of enquiries resulted in greater access to assistance for (Alsafari et al., 2024; Gonzales-Reyna, 2025; Kothawade, 2025). These initiatives suggest growing acceptance for chatbot technologies within academic settings.Below is the example of the chatbot created by the corresponding author.

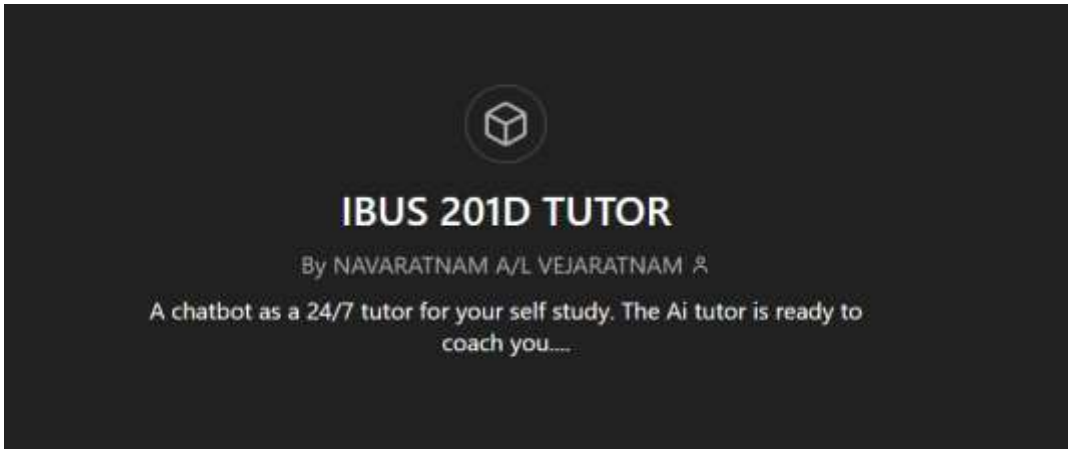

Figure 1: AI Chatbot for a Subject in the Diploma Program

The main purpose of developing this AI tutor chatbot is to serve as a supportive learning companion that remains accessible at any time of the day, throughout the week, offering guidance to students even beyond the classroom setting. For those who prefer studying at their own pace, it becomes especially useful, allowing them to revisit lessons, practice, or clear their doubts anytime they need (Alsafari et al., 2024). This constant availability plays an important role, especially in filling the gap between formal lectures and personal study time, which is essential in both blended and fully online learning settings.

Moreover, the 24/7 access to academic help without fear of being judged adds great value, particularly for international students. Many of them face language difficulties, cultural differences, and time zone challenges, so having such a tool that patiently supports them whenever they need can ease their learning journey. In this way, the chatbot supports a more inclusive and student-focused learning environment. It offers timely help beyond school hours and continuous academic guidance, helping to create a more balanced and learner-friendly education system (Fu & Liu, 2024; Wang et al., 2023; Mahant, 2025)

Building on this idea, Figure 2 provides a concise overview of the core functions offered by the IBUS 201D chatbot, highlighting its practical value for student learning and exam preparation. The chatbot supports topic comprehension through clear, student-friendly grammar and real lecture slide examples, making complex

international business concepts more accessible especially for non-native English speakers. In addition, the chatbot supports students in working through tutorials and past exam questions by using a clear table format together with a detailed marking scheme. This allows learners to see how marks are given for correct definitions and suitable examples. It also helps students prepare for exams by providing short quizzes and key summary points, which strengthen their understanding before the final test. Overall, the tool is created to improve academic performance and build student confidence in a more guided and exam-focused way.

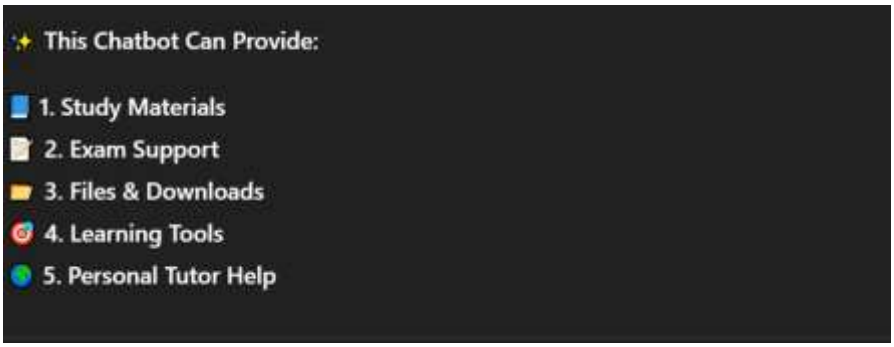

Figure 2: Overview of the chatbot

Figure 3 shows the way IBUS 201D chatbot gives support to international students by offering quiz material in English and also in Mandarin. This feature is very helpful for students whose first language is not English. It makes it easier for them to understand the main ideas of business without having to struggle with language barriers. The questions and answers can be given in more than one language. This makes it easy for students to follow along and helps them understand better. It also boosts test-taking confidence because students can practise in the language they know best while still staying connected to the English-based course material. So, the multilingual choice makes it easier for more people to participate, and in the end, it helps international students do better in school (Yu et al., 2024)

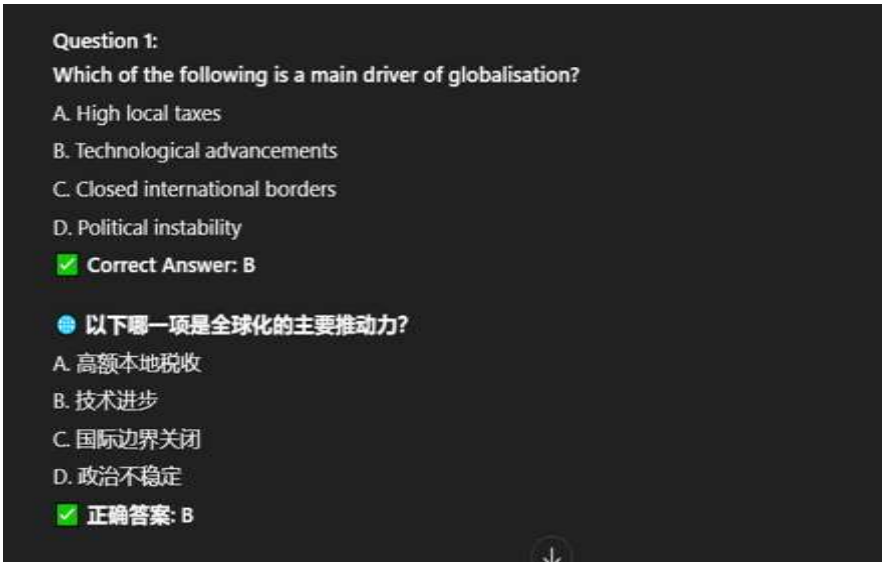

Figure 3: Sample Quiz That Students Can Develop Using the Chatbot in Multi- Language

METHODOLOGY

The methodology of this research was developed to provide a structured approach for examining the effectiveness of the AI tutor chatbot in the International Business (IBUS 201D) course. To select participants, a purposive sampling method was applied. This non-probability technique involves choosing respondents deliberately based on the specific goals of the study (Ahmad & Wilkins, 2024).

In this case, 35 undergraduate students enrolled in the IBUS 201D course were selected, as they represented the group most likely to benefit from the intervention. The sample included both local and international students,

with particular attention to international learners who often encounter language and cultural challenges in their academic work. Purposive sampling was considered appropriate here because the aim was to test the effectiveness of the ChatGPT tutor within a specific academic setting, rather than to generalize findings to the entire student population.

In addition to the sampling method, the study adopted a Design Science Research (DSR) approach. This framework is often applied when the purpose is to design, implement, and evaluate a new artifact (Haryanti, Rakhmawati, & Subriadi, 2023). Within this research, the artifact developed was a customized ChatGPT tutor created specifically for the International Business (IBUS 201D) course.

The first step in the process was to identify the main problem. The research pointed to the academic difficulties international students often encounter, particularly when trying to understand key concepts in International Business. Such difficulties are closely tied to language barriers and cultural differences, both of which strongly shape their learning experience.

The study was guided by the Design Science Research (DSR) framework, which provided a structured process for both building the artifact and evaluating its effectiveness in solving a real problem (Hevner et al., 2004; Peffers et al., 2007). In this case, the artifact created was a customized ChatGPT tutor tailored to the International Business (IBUS 201D) course.

The process began by identifying the main challenge: many students, particularly international learners, struggled to understand complex concepts in International Business. Once this problem was recognized, the next step was to set the objectives for a possible solution. These objectives focused on improving access to learning materials, offering on-demand academic support, and reducing the difficulties caused by language barriers.

In the design and development stage, the ChatGPT tutor was built to align closely with the IBUS 201D course content. Lecture slides were used as the main reference, and the material was rewritten in a student-friendly style to make the concepts easier to understand. During the demonstration stage, the chatbot was introduced to a group of undergraduate students, who used it as an additional tool alongside their regular study.

After the intervention period, a post-test with similar content and difficulty level was administered to the same group of students. The difference between pre-test and post-test scores was analyzed quantitatively to determine the effectiveness of the chatbot in improving learning outcomes. Statistical analysis included descriptive statistics (mean, standard deviation) and paired-sample t-tests to examine whether there was a significant improvement in student performance after using the tool.

Finally, in the communication stage, the findings were reported in terms of statistical results, emphasizing the degree of improvement in test scores. By relying solely on pre- and post-test comparisons, the study provided clear and measurable evidence of the artifact's effectiveness in enhancing learning, which aligns with the core purpose of Design Science Research in educational technology.

FINDINGS

The results of the study provide clear evidence of improvement in student performance after the implementation of the ChatGPT tutor. Table 1 presents the descriptive statistics of the pre-test and post-test scores for 35 students enrolled in International Business (IBUS 201D).

Table 1: Descriptive Statistics of Pre-Test and Post-Test Scores (n = 35)

Test	Mean	SD	Minimum	Maximum
Pre-Test	48.9	4.34	42	57
Post-Test	66.5	4.89	58	75

As shown in Table 1, the average score in the pre-test was 48.9 (SD = 4.34), while the post-test average increased

to 66.5 (SD = 4.89). This represents an average improvement of 17.6 points, demonstrating a clear positive shift in student learning outcomes after exposure to the ChatGPT tutor. A paired-sample t-test was conducted to determine whether the difference between pre-test and post-test scores was statistically significant. The results indicated that students scored significantly higher on the post-test (M = 66.5, SD = 4.89) compared to the pre-test (M = 48.9, SD = 4.34), $t(34) = -28.42$, $p < .001$. The effect size, calculated using Cohen's d, was 4.8, which reflects a very large impact.

These findings suggest that the ChatGPT tutor served as an effective supplementary learning tool. The substantial improvement in scores indicates that the artifact not only enhanced comprehension of International Business concepts but also contributed to students' ability to apply the knowledge in assessments. The strong statistical evidence supports the use of AI-based tutoring systems as a practical educational intervention, particularly for international students facing language and cultural challenges.

Challenges in Implementing AI in Personalized Learning

The intervention revealed several challenges, one of the most significant being the chatbot's lack of emotional intelligence. Human instructors are able to recognize when students feel frustrated, confused, or anxious and can adjust their teaching approach to provide encouragement or clearer explanations. Emotional intelligence refers to this ability to notice and understand the emotions of others and respond in a supportive way. A chatbot, however, cannot interpret such emotional signals, as it only reacts to the text that students provide without understanding their feelings. As a result, while chatbots are effective in delivering information and practice exercises, they cannot replace the emotional support and motivation that many students require for successful learning (Kovačević et al., 2024; Majidi & Bahrami, 2023).

Another challenge is the limited ability of the chatbot to understand the full context of a question. When students ask something, the system often relies mainly on keywords to produce an answer instead of looking at the wider meaning of the inquiry. For example, if a student types "explain entry strategies," the chatbot may provide a general definition of market entry but may not consider whether the student wants to know about advantages, disadvantages, or practical applications in international business. In such cases, the response might seem correct on the surface but still lacks the depth or relevance that is needed for real learning. This weakness becomes more visible with complex topics, where a useful explanation requires not only accurate information but also an understanding of how different concepts are connected within the course content (K. R. Praneeth et al., 2024).

Another concern is that students may become too dependent on the chatbot for support. Instead of practicing critical thinking or solving problems on their own, they may use the chatbot for quick answers. For example, rather than analyzing case studies or applying theoretical models to real business situations, students might prefer the chatbot's short explanations. While this reliance may offer short-term convenience, it can also reduce opportunities for deeper learning and slow the development of independent study skills, which are essential for long-term academic success (K. R. Praneeth et al., 2024).

Another limitation concerns the quality of the chatbot's responses. When the system is not well trained or updated with reliable academic content, it may produce answers that are inaccurate, unclear, or too simplified. Instead of supporting learning, such responses risk misleading students and weakening their understanding of the subject. A further issue relates to unequal access. Learners in regions or households with limited digital resources often struggle to use these tools effectively, while those with better access gain an advantage. This digital divide increases inequality in education and raises questions about fairness in the use of AI for learning (Parsakia, 2023).

In addition, the use of chatbots raises serious concerns about data privacy and ethics. These systems often collect personal data from users to improve their performance, but without clear regulation, there is a risk that this data could be misused or exposed. Students and educators may not always be aware of how their information is being stored or shared (Yang, Dong, & Yu, 2024).

RECOMMENDATION

From the findings of this study, some recommendations can be suggested for better use of AI chatbots in higher

education. First, development of chatbots should give more focus to improving contextual understanding. If more advanced natural language processing (NLP) is integrated and the system is trained with course-specific materials, the chatbot can provide answers that are not only correct but also more suitable for the study context. This would help students receive explanations with better depth and relevance in their learning. Another priority is to prevent students from becoming overly dependent on chatbot support. One way to address this is for instructors to design learning tasks that balance chatbot use with activities such as group discussions, reflective exercises, or direct feedback from teachers. Through this approach, the chatbot serves as additional help, but students continue to practice independent problem solving and critical thinking, which remain central to their academic growth.

Third, the content of the chatbot should be reviewed and updated on a regular basis. Instructors need to check the knowledge base and make adjustments so that it stays aligned with the latest syllabus, recent research, and practical examples from the field. This step reduces the risk of students receiving outdated or overly simplified information.Keeping the chatbot's content accurate and relevant requires ongoing review. Instructors should regularly check the knowledge base, making adjustments so that it reflects the current syllabus, new research, and practical examples from the field. Without this effort, students may receive outdated or overly simplified information, which could limit rather than support their learning.

CONCLUSION

Clearer understanding of course content, stronger exam preparation, and greater confidence in study were among the improvements reported by students after using the course-based ChatGPT tutor. These outcomes suggest that the tool can add value in higher education, but as a complement rather than a replacement for classroom instruction.The impact was especially noticeable for international learners. For this group, the chatbot reduced language barriers and offered access to academic support that is not always available in one-to-one teaching. Its multilingual functions, round-the-clock access, and focus on course-specific resources allowed students to engage with material in ways that traditional teaching often leaves uncovered.

The study also pointed to several weaknesses that need attention. Students may sometimes depend too much on the chatbot, using it for quick answers instead of building their own critical thinking skills. In addition, the system struggles to recognize context and lacks the ability to respond to emotions, making its guidance less flexible than that of a human instructor. These issues underline the need for continuous refinement of the tool, along with clear ethical policies to ensure that its role in teaching remains supportive rather than limiting.

The potential of a customized chatbot in higher education lies in its ability to make learning more personal, inclusive, and accessible. This study shows that, with responsible use, regular updates, and careful integration into teaching practice, such tools can provide fair and scalable support for different groups of students. Placed in the wider debate on AI in education, the findings suggest that chatbots like ChatGPT could become an important part of the academic environment, not as replacements for instructors but as supportive resources that extend learning opportunities.

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