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AI-Assisted Learning: How a Customised ChatGPT Supports ODL Postgraduate Students in Research Methodology

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Abstract

The integration of Artificial Intelligence (AI) in education has given rise to AI-assisted learning, where AI applications should be used to facilitate students' learning. However, concerns have emerged regarding the misuse of AI tools as a replacement for students' cognitive efforts. AI in learning should be leveraged as a tool to stimulate critical thinking and enhance cognitive understanding rather than replace intellectual engagement. ChatGPT has been recognised as a potential AI tool for assisting learning, but its general version may lead to broad, unfocused usage. Therefore, customisation is necessary to align ChatGPT with the specific learning objectives of a course. This study explored the role of a customised ChatGPT, Edu-Research Buddy, in supporting Open and Distance Learning (ODL) postgraduate students in a Research Methodology course, a subject often perceived as abstract and challenging. The study investigated how this customised chatbot aided students' understanding and assisted students' learning. Over a one-month period, Edu-Research Buddy, a customised version of ChatGPT, was deployed among students, and its role was explored using a descriptive case study design involving a single cohort of 20 ODL postgraduate students. Quantitative data were analysed descriptively, while qualitative data were examined thematically. Findings indicated that the customised ChatGPT acted as a learning facilitator, particularly in clarifying complex course topics. Students reported feeling less isolated, as the chatbot provided continuous support, guidance, and encouragement throughout their learning journey. The chatbot played key roles in enhancing understanding, offering academic assistance, and providing emotional support to students experiencing stress. This study is unique in its focus on a Malaysian university's customised ChatGPT for research methodology education, offering valuable insights for improving AI-assisted learning among ODL postgraduate students facing similar challenges.

Keywords: AI-assisted Learning, Chatgpt, Customised Chatgpt, Chatbot, Research Methodology, ODL

Introduction

Artificial Intelligence (AI) continues to transform educational practices, offering new ways to enhance learning experiences, particularly in higher education. AI-assisted learning, exemplified by tools like ChatGPT, represents a transformative approach to education and skill acquisition. These advanced language models can provide personalized learning experiences, offering explanations, answering questions, and generating practice exercises tailored to individual learners' needs (Sağın et al., 2023). By leveraging natural language processing and machine learning algorithms, AI-assisted learning tools can adapt to different learning styles, paces, and levels of understanding, making education more accessible and effective for a diverse range of students (Sandhu et al., 2024). The integration of AI-assisted learning tools in educational settings has the potential to revolutionize traditional teaching methods. These tools can supplement classroom instruction, provide additional support outside of formal learning environments, and offer continuous learning opportunities.

Moreover, AI-assisted learning can help address challenges in education, such as teacher shortages (Jain, 2025; Malik & Shah, 2025), by providing scalable solutions for delivering educational content and support. As these technologies continue to evolve, they may play an increasingly important role in shaping the future of education, fostering lifelong learning (Romero, 2024), and preparing individuals for the rapidly changing demands of the modern workforce (Chakraborty, 2024). However, despite the benefits, concerns have arisen regarding the misuse of AI applications, especially when they are perceived as substitutes for cognitive engagement. Instead, AI should act as a cognitive partner that promotes critical thinking and supports deeper understanding, while maintaining the primacy of human judgment and ethics in its deployment.

Open and Distance Learning (ODL) postgraduate students often encounter challenges in comprehending complex courses such as Research Methodology, which is frequently viewed as abstract and difficult. These challenges are amplified by the limited real-time interaction and reduced peer collaboration typically found in ODL environments. ChatGPT, an advanced language model developed by OpenAI, holds promise as a tool to support such learners, yet its general-purpose nature may hinder focused application. While ChatGPT has been widely adopted in educational settings for generating content, clarifying concepts, and assisting with writing tasks (Rejeb et al., 2024), studies have noted that the lack of discipline-specific tailoring can limit its pedagogical effectiveness (Mai et al., 2024). Therefore, exploring the potential of a customised version of ChatGPT, aligned with course objectives and learner needs, is essential to maximize its instructional value in specialised domains like Research Methodology.

Therefore, this study aimed to explore the educational potential of a customised version of ChatGPT, called Edu-Research Buddy, in aiding ODL postgraduate students in a Research Methodology course. The objectives of this study are:

1. To assess the frequency of Edu-Research Buddy usage among ODL postgraduate students.
2. To evaluate the impact of Edu-Research Buddy on students' comprehension of complex Research Methodology topics.
3. To explore the influence of Edu-Research Buddy on students' emotional well-being, particularly in alleviating feelings of isolation in an ODL environment.

Literature Review

AI in Education (AIEd)

AI in education is rapidly transforming the learning landscape, offering numerous benefits and challenges. Artificial Intelligence technologies, including machine learning, natural language processing, and algorithm production, are being applied to create personalized learning platforms, automated assessment systems, and intelligent tutoring systems (Akgun & Greenhow, 2021; Nasir et al., 2024). The integration of AI in education has shown significant potential in enhancing personalized learning experiences, enabling students to learn at their own pace and in ways that suit their individual learning styles (Harry & Sayudin, 2023). AI-powered tools such as intelligent tutoring systems, chatbots, and automated grading systems can increase efficiency, save teachers' time, and provide more accurate and consistent feedback (Harry & Sayudin, 2023; Lin et al., 2023).

Furthermore, the convergence of AI with other technologies like Augmented Reality (AR) can lead to the development of more interactive and immersive learning environments (Lampropoulos, 2023). However, the implementation of AI in education also presents ethical challenges and societal drawbacks that need to be addressed. Privacy concerns, potential bias, and the need for transparency in AI-based education systems are among the issues that require careful consideration (Harry & Sayudin, 2023). Despite these challenges, the potential of AI to revolutionize education remains promising. As AI continues to evolve, it is crucial for educators, policymakers, and stakeholders to work together to maximize the benefits of AI in education while mitigating associated risks (Owan et al., 2023). This includes developing strategies to ensure the effective use of AI-supported language learning and teaching in AI-powered contexts (Son et al., 2023) and exploring innovative applications such as AI-powered interactive virtual tutors to enhance personalized learning experiences (Rathika et al., 2024).

ChatGPT in Teaching and Learning

ChatGPT offers numerous opportunities to enhance pedagogical practices across diverse educational settings. Several strategies can be employed to effectively integrate this AI tool into teaching and learning processes. Personalized learning is a key strategy that can be implemented using ChatGPT. The AI can provide tailored content and feedback based on individual student needs, increasing engagement and knowledge acquisition (Adel et al., 2024; Liu & Liu, 2023). This approach aligns with constructivist learning theory, allowing students to actively engage with concepts and experiments, particularly beneficial in subjects like physics (Kotsis, 2024). Additionally, ChatGPT can facilitate inquiry-based learning and simulate real-world problems, promoting critical thinking and experiential learning (Kotsis, 2024).

Interestingly, while ChatGPT offers significant advantages, it also presents challenges that need to be addressed. For instance, the lack of human interaction and potential biases in AI algorithms may distort educational content (Adel et al., 2024). To mitigate these issues, educators should validate and verify information provided by ChatGPT, complement it with human interaction, and promote diversity in its use (Liu & Liu, 2023). Another way to address the issue is developing a customised chatbot in ChatGPT that mimicking the human mind and thinking. Customized chatbots have emerged as powerful tools in enhancing teaching and learning experiences across various educational settings. These AI-driven assistants offer personalized support, interactive learning environments, and 24/7 accessibility, significantly

improving student engagement and learning outcomes (Çobanoğulları, 2024). The integration of chatbots in education platforms allows for tailored learning experiences, helping students improve their thinking abilities and expectations in higher education (Liu et al., 2022). Interestingly, while chatbots show great promise in education, there are ongoing debates about their potential impact on learners' critical thinking skills and the evolving role of educators (Çobanoğulları, 2024).

Through a customised chatbot, concerns about accuracy, currency, and reliability of information provided by chatbots like ChatGPT that need to be addressed (Baidoo-Anu & Ansah, 2023) have been tackled. Despite these challenges, studies have shown that chatbots can effectively provide personalized feedback, and create practical learning experiences, particularly in applied sciences (Çobanoğulları, 2024).

In conclusion, customized chatbots offer significant benefits in education, including personalized learning pathways, interactive simulations, multilingual support, and real-time assessment capabilities (Kotsis, 2024; Thorat et al., 2024). To maximize their potential, it is crucial to focus on responsible use, bolster tech-literacy among educators and students, and integrate novel technological skills into educational curricula (Baidoo-Anu & Ansah, 2023; Çobanoğulları, 2024). As the field evolves, collaboration between policymakers, researchers, educators, and technology experts will be essential to leverage these AI tools safely and constructively to improve education and support students' learning (Baidoo-Anu & Ansah, 2023; Baskara, 2023).

Critical Analysis of Previous Research on ChatGPT

There's a growing number of studies exploring the role of ChatGPT in education, and overall, the findings are promising. However, looking closely at these studies reveals a clear gap: very few have explored how customised versions of ChatGPT, tailored specifically for certain subjects or learning contexts, can impact students differently from general-purpose tools. Table 1 presents the critical analysis of the previous research on ChatGPT.

Table 1
Critical Analysis of Previous Research on ChatGPT

Author (year)	Scope	Findings
Montenegro-Rueda et al. (2023)	Analysed the impact of ChatGPT in education through a review of 12 studies.	The integration of ChatGPT positively influenced the teaching and learning process. However, the findings also emphasize the need for proper teacher training to maximise its effectiveness.
Aziz et al. (2024)	Conducted a systematic literature review of 25 articles to examine ChatGPT's impact on teaching, learning, and research in higher education.	ChatGPT can enhance student learning by providing personalised feedback, fostering interactive learning environments, and supporting creative content generation.
Mai et al. (2024)	Reviewed the integration of ChatGPT in education through a systematic analysis of 51 articles published between 2022 and 2023.	Both educators and students reported that ChatGPT contributes to improved learning efficiency and effectiveness.
Mahapatra (2024)	Investigated ChatGPT's impact on ESL students' academic writing skills and their perceptions of ChatGPT as a feedback tool.	ChatGPT had a significant positive effect on students' writing skills. Students perceived it as a helpful feedback tool, particularly in large writing classes.
Rejeb et al. (2024)	Utilised web mining and natural language processing (NLP) to analyse public opinions on ChatGPT's role in education.	ChatGPT was identified as a valuable resource for enhancing students' writing abilities, particularly in tasks such as essay composition and written assignments.
Isiaku et al. (2024)	Conducted a literature review of 29 studies to explore ChatGPT's evolving role, benefits, and challenges in higher education.	ChatGPT can significantly enhance personalised learning by providing tailored feedback and support that aligns with individual student needs.
Shalong et al. (2024)	Examined the use of a specialised ChatGPT tool to support self-directed learning among medical students.	The tool significantly improved students' self-directed learning, critical thinking, and engagement (flow experience).

One of the earliest studies, by Montenegro-Rueda et al. (2023), provided a broad overview of how ChatGPT was used in educational settings. They found that ChatGPT generally improved

the teaching and learning experience but also highlighted the importance of training teachers to use it effectively. This suggests that generic AI tools might not always be intuitive or sufficient for everyone.

Building on that initial research, Aziz et al. (2024) looked at a wider range of studies and found that ChatGPT was helpful for providing personalised feedback and generating creative content. However, their focus remained quite general, without deeply exploring specific subjects or unique learning challenges, particularly those faced by students in Open and Distance Learning (ODL) environments. Mai et al. (2024) conducted an even more extensive review of 51 studies and consistently found that ChatGPT improved learning efficiency and effectiveness. Yet, again, their analysis was limited to ChatGPT as a general tool, rather than examining customised applications tailored to specific courses or student needs.

Taking a slightly different angle, Mahapatra (2024) studied how ChatGPT impacted ESL students' academic writing. They found significant improvements in writing skills and positive student attitudes towards using ChatGPT for feedback. While targeted, this study was still limited to writing contexts and didn't explore broader cognitive or emotional aspects of learning. Meanwhile, Rejeb et al. (2024) introduced an innovative approach, using web mining and natural language processing (NLP) to understand public opinions about ChatGPT. Their findings emphasised the tool's usefulness in essay writing. However, their insights were based on secondary data and public discussions, lacking direct evidence from real educational settings.

Isiaku et al. (2024) critically reviewed ChatGPT's use in higher education, highlighting its potential for personalised learning. Still, they didn't explore any customised versions of ChatGPT specifically built for different academic disciplines or student profiles. Only one study, by Shalong et al. (2024), explicitly examined a customised ChatGPT tool developed specifically for medical students. They found that this tailored version significantly boosted self-directed learning, critical thinking, and student engagement. This study stood out because it bridged the gap between general AI applications and subject-specific enhancements, although it remained limited to medical education.

Across these studies, a common limitation emerges: most research either relies on general-purpose ChatGPT tools or provides broad thematic reviews. While these studies clearly show that ChatGPT has educational benefits, they haven't adequately explored the potential of customised tools specifically designed to support particular courses or student needs, especially important in ODL contexts, where students often grapple with isolation and difficulties understanding complex topics, such as research methodology. Moreover, none of the studies explored how a customised ChatGPT tool could simultaneously support students cognitively (helping them understand content) and emotionally (providing reassurance and reducing isolation), a dual role particularly valuable for ODL students tackling challenging academic material independently.

This gap highlights the importance of the current study, which introduces "Edu-Research Buddy," a customised ChatGPT tailored specifically for a Research Methodology course. Unlike previous research, this study assesses both cognitive and emotional outcomes, providing concrete evidence on how customised AI tools can enhance student engagement,

improve conceptual understanding, and support psychological well-being in ODL environments.

Methods

This study adopted a descriptive case study design, focusing on a single cohort of postgraduate ODL students enrolled in a Research Methodology course at a university in Malaysia. Data were collected via a structured questionnaire comprising both quantitative and open-ended qualitative questions. The case study approach allowed for an in-depth examination of students' interactions with Edu-Research Buddy within a specific instructional context. The customised ChatGPT, Edu-Research Buddy, was developed to align specifically with the learning outcomes of the Research Methodology course offered at the chosen university. The chatbot was integrated into the students' learning environment and used over a one-month period. A total of 20 postgraduate ODL students voluntarily participated in the study, selected through convenience sampling.

Data collection involved both quantitative and qualitative methods through the use of a questionnaire through google form. Quantitative data, such as frequency of chatbot usage, were collected via structured surveys and analysed descriptively. Qualitative data were gathered through open-ended questions were analysed thematically to identify key patterns in user experience and perceived impact.

Results

The analysis revealed that the Edu-Research Buddy significantly contributed to the students' learning process. Quantitatively, a high frequency of use and satisfaction with the chatbot's assistance were reported. Students indicated that the tool was effective in simplifying complex concepts and promoting consistent academic engagement.

Frequency of Edu-Research Buddy Usage

Figure 1 illustrates the frequency of chatbot usage among the 20 ODL students. Quantitative analysis revealed that the majority of respondents engaged with Edu-Research Buddy on a regular basis. Specifically, over 70% of participants reported accessing the chatbot either weekly or several times per week. This high frequency of usage suggests strong engagement and reflects the chatbot's perceived relevance and accessibility within the students' learning routine. Moreover, students indicated a preference for using the chatbot during evenings and weekends, highlighting its utility in offering support beyond normal instructional hours.

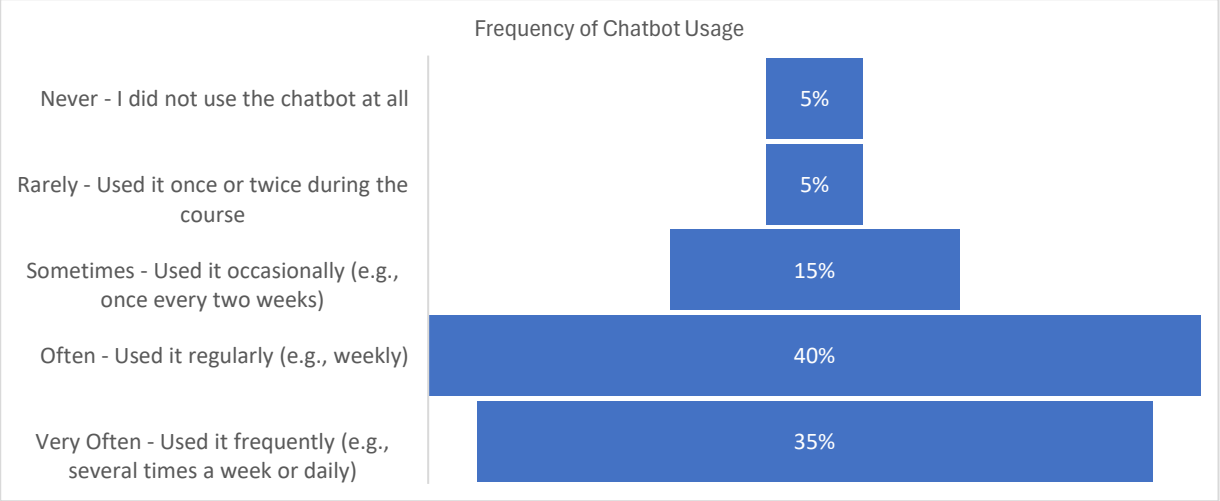

Figure 1. Frequency of Chatbot Usage

The Roles of Edu-Research Buddy Perceived by Students

Table 2 presents the themes and codes derived from the open-ended questionnaire responses, which revealed two primary roles of Edu-Research Buddy through thematic analysis: as a learning facilitator and as a tool for cognitive and emotional scaffolding. Students reported that the chatbot helped them navigate complex topics through structured questioning and encouraged critical thinking. It also supported independent learning by reducing stress, maintaining motivation, and promoting deeper reflection, positioning it as a valuable companion in mastering Research Methodology concepts.

Table 2
The Roles of Edu-Research Buddy

Themes	Codes	Samples of Excerpts
Learning Facilitator	Guided questioning, general-to-specific	S1: "Edu-Research Buddy asked general questions first, then guided me to narrow down my topic step-by-step." S2: "I liked how it started with broad questions and helped me refine what I was looking for."
	Stepwise clarification of concepts	S3: "Before getting the answer, it asked several questions to help me clarify what I was really asking." S4: "The chatbot walked me through the concept slowly until I understood it clearly."
	Encouraged critical thinking	S5: "It made me reflect and think deeper before giving a direct answer." S6: "Instead of giving answers immediately, it challenged me to think through my problem first."
Cognitive and Emotional Scaffolding	Self-paced learning	S1: "It allowed me to learn at my own speed with less stress." S8: "I didn't feel rushed, and I could revisit the responses when I needed."
	Motivation and reduced anxiety	S9: "The chatbot kept me motivated and made learning less overwhelming." S10: "I felt less alone when using it—like someone was guiding me through the process."
	Prompted reflective thinking	S11: "It asked questions that made me consider different perspectives before moving on." S12: "I realised I was thinking more deeply about my topic after answering the chatbot's questions."

The Influence of Edu-Research Buddy on Students' Emotional Well-being

Table 3 reports the themes and codes constructed through thematic analysis on the influence of Edu-Research Buddy on students' emotional well-being. The findings suggest that the chatbot helped students feel less isolated by offering continuous support, guidance, and encouragement. It also enhanced emotional comfort by clarifying complex topics, which reduced academic stress. Additionally, students described the chatbot as a supportive presence that helped them stay calm and motivated during challenging periods, reinforcing its role in providing emotional reassurance throughout their learning journey.

Table 3
The Influence of Edu-Research Buddy on Students' Emotional Well-being

Themes	Codes	Samples of Excerpts
Feeling less isolated	Provided continuous support, guidance, and encouragement	S1: "Whenever I felt stuck, the chatbot was always there to guide me through." S12: "It felt like I had a virtual mentor by my side." S13: "It gave me feedback and encouragement when I needed it most."
	Enhancing understanding and offering academic assistance	S14: "It helped me understand difficult topics, which reduced my stress." S17: "I felt more confident knowing I could ask it anything, anytime." S20: "It explained things clearly, making learning less overwhelming.
	Providing emotional support	S6: "When I was anxious about my assignments, it gave me reassuring answers." S8: "Even though it's a chatbot, it felt supportive and friendly." S10: "It kept me calm and focused during stressful weeks, knowing I had a personal buddy to support me."

Discussions

As shown in Figure 1, over 70% of participants reported using Edu-Research Buddy at least weekly, indicating consistent and active engagement. This high frequency is significant in the context of ODL, where students often lack real-time academic support. The chatbot's accessibility, particularly outside traditional instructional hours, demonstrates how AI tools can bridge the temporal gaps inherent in distance learning. These findings align with studies by Aziz et al. (2024) and Mai et al. (2024), which suggest that ChatGPT can foster learning by offering personalised, on-demand assistance. However, unlike general-purpose tools, Edu-Research Buddy's integration within the course design appears to have further reinforced its relevance and routine use.

Thematic analysis of open-ended responses (see Table 2) identified Edu-Research Buddy as both a learning facilitator and a source of cognitive and emotional scaffolding. Participants noted that the chatbot guided them through complex research topics using structured questioning and stepwise clarification. These features encouraged critical thinking, enabling learners to engage more deeply with abstract concepts such as research paradigms and methodological design. This is consistent with Mahapatra (2024), who highlighted ChatGPT's

potential as a feedback tool in enhancing writing skills, but extends the insight by demonstrating value beyond content output—into conceptual reasoning and reflective practice.

Importantly, students also appreciated the chatbot's flexibility in supporting self-paced learning, a vital element for adult learners in ODL settings. By allowing students to control the pace and depth of interaction, the chatbot reduced stress and cognitive overload, thus aligning with Vygotsky's principle of scaffolding in learner development, facilitated here through AI.

As shown in Table 3, participants perceived Edu-Research Buddy as an emotionally supportive tool that contributed to a sense of connection and reduced isolation. Students described the chatbot as a "learning facilitator," attributing to it not just academic assistance but emotional reassurance. These responses validate the importance of affective computing in educational AI, an area that is often overlooked in the design of digital tools.

This finding echoes those of Shalong et al. (2024), who found that a specialised ChatGPT fostered self-directed learning and flow states in medical students. In the current study, Edu-Research Buddy appeared to play a similar role, not only enhancing academic clarity but sustaining motivation and mental well-being—critical for postgraduate students balancing multiple life responsibilities.

What sets this study apart from prior research is its focus on a customised AI tool tailored to a specific academic discipline and student population. Most existing literature (e.g., Rejeb et al., 2024; Isiaku et al., 2024) investigated ChatGPT in general contexts, without examining its fit for purpose in specialised learning environments. This study demonstrates that aligning chatbot functionality with course objectives and student needs can significantly enhance learning effectiveness and emotional resilience.

Conclusion

This study explored the role of Edu-Research Buddy, a customised ChatGPT, in supporting ODL postgraduate students enrolled in a Research Methodology course. The findings demonstrated that the chatbot was actively used, with the majority of students engaging with it regularly, particularly outside standard instructional hours. Thematic analysis revealed two key roles of the chatbot: as a learning facilitator, guiding students through complex concepts with structured questioning, and as a cognitive and emotional scaffold that promoted self-paced learning, reduced stress, and enhanced motivation.

Importantly, students perceived Edu-Research Buddy not only as a source of academic assistance but also as a supportive presence that reduced feelings of isolation common in ODL environments. These outcomes highlight the potential of customised AI tools to meet both the cognitive and emotional needs of learners in specialised educational contexts. The study reinforces the value of context-specific AI integration and calls for further research into the long-term impact of tailored chatbot interventions across diverse academic disciplines.

Limitations and Future Studies

Despite promising findings, this study is limited by its small sample size and short implementation period. Future studies should adopt longitudinal designs to assess sustained impacts over time and explore how different levels of customisation affect student outcomes across various disciplines. Research should also consider testing the chatbot across different subjects and institutions to evaluate its broader applicability and generalisability. Additionally, future research could examine how chatbot design (e.g., tone, interface, question type) influences student trust and engagement.

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