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Promoting active learning with ChatGPT: A constructivist approach in Sri Lankan higher education

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Abstract

This study investigates strategies for transforming traditional didactic learning environments into active ones using ChatGPT in a resource-constrained higher education setting in Sri Lanka. It identifies 16 strategies categorized under five constructivist learning themes: active learning, social interaction, contextual learning, scaffolding, and reflective thinking. These practices leverage ChatGPT to personalize learning, foster critical thinking, encourage collaboration, enhance teaching strategies, and offer immediate feedback, addressing educational challenges in developing countries. The findings extend constructivist learning theory by demonstrating AI's role in facilitating interactive, learner-centered experiences. The study also highlights educators' evolving role as collaborators with AI, providing personalized support and interactive learning experiences. Practical implications include the immediate applicability of these practices in resource-constrained settings without additional resources, offering a cost-effective solution for enhancing educational quality. However, limitations such as the study's generalizability to other contexts and the need to investigate potential negative impacts of AI are acknowledged. Future research should explore the integration of multiple AI tools and conduct similar studies in large classrooms and different contexts to enhance generalizability. Expanding this research can help leverage technology to improve educational outcomes and create sustainable, resource-efficient learning environments in the developing world.

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Introduction

Higher education systems in developing countries often face significant challenges, including limited resources, large class sizes (Glewwe & Muralidharan, 2016), and a reliance on rote memorization (Bano & Taylor, 2015; Porcaro, 2011). These constraints often lead to didactic learning environments where students receive information without active engagement. This traditional approach can hinder critical thinking and problem-solving skills, which are essential for student development and future success (Chacon & Janssen, 2021).

Technology, however, is a great leveller, offering tools that can potentially transform educational practices. ChatGPT, a powerful AI language model, is widely used by students and teachers globally. Leveraging ChatGPT in educational settings can significantly transform didactic learning environments into active ones (Al Shloul et al., 2024; Yu, 2024). By providing personalized learning, fostering critical thinking, encouraging collaboration, enhancing teaching strategies, and offering immediate feedback, ChatGPT has the potential to address some of the most pressing challenges in developing education systems (Al Shloul et al., 2024; Yu, 2024). This technology-driven approach can lead to more engaging, effective, and equitable learning experiences for students, preparing them better for future academic and professional undertakings.

Despite its widespread usage and capabilities, there is a shortage of empirical research on how ChatGPT can be utilized to convert a traditional, didactic learning environment into an active learning one. Moreover, Al Shloul et al. (2024) requested to conduct more empirical research on the strategies that would enable educators to integrate ChatGPT into curricula. Therefore, to address this gap, this study investigates strategies for converting a didactic learning environment into an active learning environment in a resource-constrained higher education setting in Sri Lanka using ChatGPT.

The trend among elite Western higher educational institutions is to create constructivist active learning environments that involve students engaging with the learning material, actively participating in the learning process, and developing higher-order thinking skills, all of which are crucial for a robust educational experience (Porcaro, 2011). Therefore, this study uses the constructivist learning theory as the overarching framework for identifying strategies. Based on this background, the aim of this study is to investigate strategies from the perspective of constructivist learning theory for converting traditional, didactic learning environments into active learning ones utilizing ChatGPT in a resource-constrained higher education setting in Sri Lanka. The significance of this study lies in its potential to bridge the gap between traditional and modern educational practices in resource-constrained settings. By demonstrating how ChatGPT can be used to facilitate active learning, this research could provide a model for educators in developing countries to enhance student engagement and learning outcomes, ultimately contributing to a more equitable and effective education system globally.

The rest of the article is organized into five more sections. Immediately following this section, the literature review is presented, predominantly aiming to identify the main themes related to constructivist learning theory. Next, the methodology section explains how the author blended action research with qualitative research methods to produce findings. This is followed by the findings section, which discusses the main findings of the research and presents the strategies identified. The discussion section follows, presenting implications, limitations, and suggestions for future research. Finally, the conclusion section presents the overall essence of the study.

Literature review

This section presents a more comprehensive discussion on the nature of learning in developing countries, establishing the justification for interventions that promote active learning in higher education. Following this, a discussion on ChatGPT in education explains how ChatGPT is already being used worldwide to enhance learning environments. The final section of the literature review discusses five key characteristics essential for building constructivist active learning environments. Furthermore, it presents how technology has been successfully used in various contexts to assist educators in creating these environments by leveraging these five characteristics.

Learning in developing countries

The nature of learning in developing countries is often characterized by didactic teaching methods, where the teacher is the central figure, and students are passive recipients of information (Schweisfurth, 2023). As mentioned earlier, this traditional approach emphasizes rote memorization and repetition, with less emphasis on critical thinking, creativity, and active learner engagement (Snyder & Snyder, 2008). Such a mode of learning is prevalent due to various socio-economic, cultural, and infrastructural factors (Starkey, 2019). Some commonly discussed factors in past research are outlined in this section.

Research indicates that the didactic approach dominates classrooms in developing countries, significantly impacting the quality of education (Schweisfurth, 2011). For instance, Hardman et al. (2008) found that in sub-Saharan African classrooms, teachers primarily employ direct instruction methods, with limited opportunities for students to engage in dialogue, ask questions, or participate in interactive activities. This approach often leads to superficial learning, where students may pass exams but lack deep understanding and the ability to apply knowledge in real-life situations. Furthermore, Schweisfurth (2023) argues that the current discourse on education in lower- and middle-income countries highlights a crisis in teaching, characterized by poor teaching practices and minimal student learning, a situation worsened by the COVID-19 pandemic and referred to as 'disaster didacticism' due to its patronizing tone and focus on moral instruction.

Several factors contribute to the persistence of didactic learning. One major factor is the high student-to-teacher ratio, which makes individualized attention and interactive teaching methods challenging (Schweisfurth & Elliott, 2019). UNESCO (2014) reported that in many developing countries, classrooms are overcrowded, making it difficult for teachers to manage classes effectively and engage students in participatory learning activities. Additionally, limited resources and infrastructure constrain the implementation of more interactive and student-centered teaching methods (Glewwe & Muralidharan, 2016).

Cultural expectations and examination-oriented education systems also play a significant role. In many developing countries, success is measured by students' performance in standardized exams, which encourages teachers to focus on exam preparation through rote learning (Chisholm, 2004). This emphasis on examination results often sidelines the development of critical thinking and problem-solving skills (Snyder & Snyder, 2008).

In conclusion, the predominant mode of learning in developing countries remains didactic, limiting students' engagement and deeper understanding. Nonetheless, there is growing recognition of the need for educational reforms to promote more active and meaningful learning. A study by RTI International (2014) suggests that interventions aimed at improving teacher pedagogy and incorporating active learning strategies can lead to significant improvements in student outcomes.

ChatGPT in education

Building on the recognition of the need for educational reforms to promote more active and meaningful learning, innovative technologies like ChatGPT, a language model developed by OpenAI, have received significant attention for their potential applications in education. As an advanced AI, ChatGPT can engage in human-like conversations, providing personalized responses, explanations, and feedback, making it a valuable tool for enhancing educational experiences.

One key area where ChatGPT shows promise is tutoring and personalized learning, ensuring student-centered learning by adapting to each learner's individual needs (Kamali et al., 2024; Leite, 2024). Its ability to provide instant feedback and answer a wide range of questions allows for individualized learning experiences (Javaid et al., 2023). For example, Javaid et al. (2023) highlight that ChatGPT can serve as a virtual tutor, helping students with homework, explaining complex concepts, and offering tailored guidance based on individual learning needs. This personalized interaction fosters an environment where students can learn at their own pace (Hasanein et al., 2024; Hasanein & Sobaih, 2023), leading to improved understanding and retention of information.

In addition to personalized tutoring, ChatGPT can support collaborative learning and foster critical thinking skills (Guo & Lee, 2023), both crucial components of student-centered learning. According to Rasul et al. (2023), ChatGPT can facilitate group discussions and collaborative projects by generating ideas, posing thought-provoking questions,

and summarizing discussions. This can enhance students' engagement and encourage deeper exploration of topics. Furthermore, its ability to simulate Socratic questioning helps develop students' critical thinking and problem-solving skills, placing students at the center of their own learning processes (Etori & Gini, 2024).

Another significant application of ChatGPT is in the area of study skills and academic support, which ensures student-centered learning by providing resources tailored to individual student needs. Research by Hasanein and Sobaih (2023) and Hasanein et al. (2024) indicate that ChatGPT can assist students in developing effective study strategies, time management skills, and organizational techniques. By offering personalized advice and reminders, ChatGPT helps students plan their study schedules, set achievable goals, and maintain focus, thereby enhancing their overall academic performance.

However, the use of ChatGPT in education also raises ethical considerations that need to be addressed to maintain a truly student-centered approach. Concerns about data privacy, the potential for AI-generated misinformation, and the reliance on technology for learning must be carefully managed (Guo & Lee, 2023). Educators must ensure that AI tools like ChatGPT are used responsibly and supplement traditional teaching methods rather than replace them (Javaid et al., 2023), ensuring that the focus remains on enhancing the student's learning experience (Montenegro-Rueda et al., 2023).

In conclusion, ChatGPT holds significant potential for enhancing educational experiences through personalized tutoring, collaborative learning support, and academic skill development, all of which promote student-centered learning. While its benefits are promising, careful consideration of ethical implications and integration with conventional teaching practices is essential for maximizing its positive impact on education. Overall, this discussion suggests that ChatGPT has the ingredients to act as a supportive tool for teachers or tutors to create constructivist active learning environments.

Constructivist learning theory and the role of technology in constructivist learning environments

Constructivist learning theory suggests that learners construct their own understanding and knowledge through experiences and reflecting on those experiences (Oliver, 2000). This theory, rooted in the works of Jean Piaget and Lev Vygotsky, emphasizes active learning (Anthony, 1996), social interaction (Knapp, 2018), contextual learning (Yilmaz, 2008), scaffolding (Vygotsky, 1978), and reflective thinking (von Glasersfeld, 1995). Learners are seen as active participants who engage in hands-on activities, promoting exploration and discovery (Parker et al., 2010; Vygotsky, 1978). Social interaction is crucial as learning is viewed as a social activity, where interaction with peers, teachers, and others aids cognitive development (Vygotsky, 1978). Contextual learning emphasizes the importance of situating knowledge within a context, making learning more meaningful (Brown et al., 1989). Scaffolding provides necessary support from

teachers and peers to help learners achieve tasks they cannot complete independently (Wood et al., 1976). Reflective thinking involves learners reflecting on their experiences to develop deeper understanding and make connections to prior knowledge (von Glasersfeld, 1995).

Recent research explores how various technologies can enhance constructivist learning environments. Interactive simulations and virtual labs offer hands-on, exploratory learning in a safe environment. For instance, De Jong and Van Joolingen (1998) found that computer simulations enhance inquiry-based learning by allowing students to experiment and manipulate variables. Rutten et al. (2012) noted significant benefits of virtual labs in science education, helping students grasp complex concepts through direct interaction. Web-based collaborative tools, such as wikis and discussion forums, support the social aspect of learning. Biasutti (2011) showed that these tools facilitate peer interaction, knowledge sharing, and collective problem-solving in music education. Hrastinski (2009) highlighted that online collaboration platforms enable asynchronous communication, allowing learners to engage in reflective thinking and in-depth discussion.

Educational games and gamification align well with constructivist principles by providing engaging learning experiences. Gee (2003) argued that video games create environments for situated learning where players must apply knowledge in context. Papastergiou (2009) demonstrated that educational games could improve motivation and learning outcomes in computer science by presenting challenges that require critical thinking and problem-solving. Augmented reality (AR) and virtual reality (VR) create immersive learning experiences that bring abstract concepts to life. Khan et al. (2019) argue that AR applications enhance engagement, motivation, and learning by overlaying digital information onto the real world. Asad et al. (2021) reviewed VR's impact on education and concluded that VR environments provide opportunities for experiential learning and simulate real-world scenarios.

Learning Management Systems (LMS) and e-portfolios support scaffolding and reflective learning. Kumar and Sharma (2016) highlighted LMS's role in providing structured learning paths, resources, and feedback, aiding students' progress. Barrett (2007) discussed how e-portfolios encourage learners to collect, reflect on, and present their work, fostering a deeper understanding and personal connection to their learning experiences.

In conclusion, constructivist learning theory emphasizes the importance of active, social, contextual, scaffolded, and reflective learning. Technology, when integrated thoughtfully, can significantly enhance constructivist learning environments by providing interactive, collaborative, immersive, and reflective tools that align with these principles. The evidence from recent journal papers demonstrates that technologies such as interactive simulations, collaborative online tools, educational games, AR/VR, LMS, and e-portfolios create rich, engaging, and effective constructivist learning experiences. This is a clear indication that technology such as ChatGPT might also be used to construct a learning environment that is active,

social, contextual, scaffolded, and reflective.

Methodology

This research adopts an action research methodology conducted in the context of a Sri Lankan university where the learning environment is predominantly didactic. The focus was on transforming a selected traditionally didactic learning environment into an active, constructivist one by leveraging ChatGPT to incorporate active learning strategies. The study was conducted from April 2023 to June 2023, involving undergraduate students enrolled in a project management course. The class size was 43 students. This approach was implemented over a 12-week period.

Action research was selected because it is inherently reflective and iterative, allowing the researcher to evaluate and improve their practice continuously. As McNiff (2016) argues, action research is about evaluating your practice to check whether it is as good as you would like it to be, identifying areas that you feel need improving, and finding ways to improve them. This approach is particularly suited for educational settings where ongoing assessment and adaptation are crucial for enhancing teaching and learning outcomes.

Intervention design

Pre-class preparation involved providing students with learning materials related to the upcoming week's topic. Each week, starting from the first week, students received a maximum of three YouTube videos, one or two case studies prepared with the assistance of ChatGPT, and two to three pages from a textbook. Students were requested to review these materials before attending the class.

In-class activities included a brief 15–20-minute lecture that highlighted the key concepts of the week and introduced a relevant case study prepared using ChatGPT. The class was then divided into six groups, where students engaged in discussions for 45 minutes to one hour. During this time, the researcher actively participated with each group, encouraging constructive discussions and ensuring active participation. Students were encouraged to use ChatGPT to help construct their answers, with an initial briefing on AI hallucination and the importance of verifying information. Following the group discussions, each group presented their findings in a five- to eight-minute presentation.

Post-class activities involved sharing sample answers for the case study, prepared with the assistance of ChatGPT. These sample answers were shared with students to review between classes. This activity was not made mandatory.

Data collection

At the end of the 12-week intervention, the researcher conducted one-to-one semi-structured interviews with students to gather qualitative feedback on their experiences. A total of 15 interviews were conducted, each lasting

between one hour to one and a half hours. Respondents were selected using a convenience sampling method, as this technique has been used in previous educational studies (e.g., Holbrey, 2020). An open invitation was sent to all students who attended at least one class of the session, inviting them to join a semi-structured interview. It was assumed that the students who participated did so with informed consent. During the interviews, the researcher took detailed notes and documented responses to capture important insights and observations from the participants. This thorough documentation ensured that all significant points raised by the students were recorded for analysis.

The semi-structured interviews focused on the five characteristics of constructivist learning theory, namely, active learning, social interaction, contextual learning, scaffolding, and reflective thinking. The researcher stopped conducting interviews after the 15th interview, as no new information was being revealed, indicating data saturation.

Even though the researcher conducted semi-structured interviews, to guide each interview, the researcher developed 26 questions corresponding to five characteristics of a constructivist learning environment. These questions were formulated using two questionnaires borrowed from Aldridge et al. (2000) and Alqahtani et al. (2023), which are related to constructivist learning in higher education settings. Once the 26 questions were formulated, they were presented to academic colleagues to obtain their opinions and ensure face and content validity (Holbrey, 2020).

Data analysis

The qualitative data from the interviews were analyzed to assess the impact of the intervention on students' learning experiences. The analysis aimed to identify themes and patterns related to the effectiveness of using ChatGPT and the constructivist learning approach in enhancing student engagement and learning outcomes.

The collected data from semi-structured interviews and notes were synthesized to identify recurring themes and patterns related to the effectiveness of leveraging ChatGPT in a constructivist learning environment. This synthesis process involved reviewing all the interview notes to find commonalities and differences in students' experiences and perceptions.

Manual thematic analysis was employed to systematically identify, analyze, and interpret patterns or themes within the data. This method helped uncover underlying meanings and understandings regarding the use of ChatGPT for active learning in a traditionally didactic setting. The themes were categorized under the five characteristics of constructivist learning, namely, active learning, social interaction, contextual learning, scaffolding, and reflective thinking. Categories were mainly identified by the 26 questions formulated for the semi-structured interviews. These categories were developed to organize and classify the identified themes or patterns. This structured approach allowed for a detailed analysis of the data, ensuring that all relevant aspects of the students' experiences were considered.

The researcher interpreted the synthesized content within the context of constructivist learning theory. This involved understanding how the themes and categories aligned with the principles of constructivist learning, such as fostering student engagement, promoting social interaction, and facilitating reflective thinking. The interpretation also considered the role of ChatGPT in supporting these educational practices. By following these steps, the data analysis provided a comprehensive understanding of the impact of using ChatGPT to transform a didactic learning environment into a more active, constructivist one.

Findings

The findings of this study provide a detailed examination of the transformative potential of integrating ChatGPT into a traditionally didactic learning environment, particularly within the context of higher education in Sri Lanka. Divided into five thematic sections based on constructivist learning theory, the insights collected from student feedback during the data collection phase emphasize the multifaceted benefits of this approach.

Active learning

When exploring active learning, students felt a clear shift from merely receiving information to being actively involved with their learning. They mentioned how using ChatGPT in group discussions helped them think more critically and apply what they were learning independently. One student said, "With ChatGPT, our discussions became more engaging, and it felt like we were really taking charge of our learning." This aligns with previous research by Prince (2004), which emphasizes that active learning strategies significantly enhance student engagement and comprehension. Moreover, the findings clearly suggest that the researcher created an active learning environment by implementing several strategies by leveraging ChatGPT. These strategies are discussed in the remainder of this section.

To further promote opportunities for engagement, educators can implement problem-based learning (PBL), where ChatGPT aids in researching real-world issues and brainstorming solutions. This transformation encourages students to investigate real problems actively and seek out solutions, fostering deeper engagement with the material. One student shared, "ChatGPT helped us explore current global issues in depth, making our learning feel more relevant and impactful." Using ChatGPT to generate case studies can also make discussions more relevant and interactive, thereby enhancing students' learning experience. According to Hung (2019), PBL fosters intrinsic motivation and active engagement by presenting students with authentic problems to solve. This highlights how tools like ChatGPT can enhance PBL by making learning more relevant and impactful, ultimately promoting deeper student engagement.

In terms of skill development, ChatGPT can be used to personalize learning experiences by providing tailored exercises and feedback, thus aiding in the development of

critical skills. This allows students to apply their learning in practical contexts, enhancing their competency and understanding. One student noted, "the instant feedback from ChatGPT helped me refine my problem-solving techniques on the spot." ChatGPT can also support skill-building workshops by offering instant feedback and additional resources, making learning more efficient and targeted. According to Haleem et al. (2022), the integration of technology in education supports the development of critical thinking and practical skills necessary for academic success. This reinforces the argument that personalized learning and immediate feedback, as provided by ChatGPT, are vital for developing these essential skills.

For participation, using ChatGPT in case study sessions can increase student participation by aiding in data collection and analysis. ChatGPT's role in guiding discussions and providing real-time feedback ensures that students are actively contributing and collaborating. One student said, "having ChatGPT in our group projects made everyone more involved, as we could all interact with the AI and contribute equally." This interactive approach transforms the learning environment into a more dynamic and participatory space where students feel more involved and responsible for their learning process. According to Gopinathan et al. (2022), collaborative learning environments foster higher student engagement and participation, leading to better learning outcomes. This explains how integrating ChatGPT into case study sessions can enhance student involvement and improve educational experiences.

Thus, the section outlines three strategies for enhancing active learning with ChatGPT. First, implementing Problem-Based Learning (PBL) with ChatGPT helps students research real-world issues and brainstorm solutions, fostering deeper engagement and relevance in their studies. Second, personalized learning experiences through ChatGPT, which provides tailored exercises and instant feedback and enhances students' critical skills and practical understanding. Finally, integrating ChatGPT into case study sessions increases student participation by aiding in data collection and analysis, guiding discussions, and ensuring active collaboration. These practices create a more dynamic, engaging, and effective learning environment.

Social interaction

When exploring the theme of social interaction, students noted the collaborative nature of the learning environment fostered by ChatGPT. Group discussions facilitated by the AI model provided a platform for diverse perspectives to be shared and explored. Students lauded the inclusive nature of these exchanges, noting how ChatGPT served as both a facilitator and participant in the collaborative learning process, enhancing the overall richness of classroom interactions. One student highlighted this, saying, "ChatGPT made our discussions more inclusive. It encouraged everyone to participate and brought in different viewpoints, making the learning experience more dynamic." This finding resonates with Vygotsky (1978) social development theory, which argues that social interaction plays a fundamental role in the development of cognition.

To promote social interaction, educators can implement several strategies using ChatGPT. First, incorporating collaborative learning activities with ChatGPT encourages peer collaboration, where students can work together on projects and assignments. This approach fosters a sense of community and shared responsibility in the learning process. One student shared, "Working with ChatGPT in our group projects helped us collaborate more effectively and learn from each other's perspectives." This aligns with Prichard et al. (2006) research, which shows that collaborative learning enhances student achievement and interpersonal skills. Therefore, integrating ChatGPT into collaborative activities boosts social interaction by encouraging effective collaboration and peer learning, ultimately reinforcing positive educational outcomes.

Second, ChatGPT can facilitate peer collaboration by providing a platform for students to interact and exchange ideas in real time. This enables students to express their original ideas and discuss problems with their peers, leading to a richer learning experience. A student remarked, "ChatGPT allowed us to brainstorm and discuss our ideas freely, making our group work more productive and enjoyable." According to Van Ryzin et al. (2020), cooperative learning strategies that promote peer interaction can significantly enhance students' academic performance and social development. Thus, integrating ChatGPT into collaborative activities enhances social interaction by fostering real-time communication and effective group discussions.

Third, integrating ChatGPT into classroom discussions can enhance the expression and discussion of original ideas. By offering prompts and feedback, ChatGPT encourages students to articulate their thoughts and engage in meaningful conversations. One student mentioned, "With ChatGPT, I felt more confident in expressing my ideas during discussions, knowing that I had an AI tool to support my arguments." This is supported by Oros's (2007) research which highlights the importance of structured interactions in promoting active participation and critical thinking. Therefore, leveraging ChatGPT in discussions not only boosts students' confidence but also enriches the overall quality of classroom interactions by fostering critical thinking and active engagement.

Finally, ChatGPT can help students understand and appreciate the influence of their peers' ideas. By facilitating discussions and providing diverse perspectives, ChatGPT enables students to consider different viewpoints and integrate them into their own understanding. A student observed, "ChatGPT helped us see things from different angles, which made our discussions more insightful and comprehensive." This is consistent with Bandura's (1986) social learning theory, which emphasizes the role of observational learning and imitation in cognitive development. Thus, integrating ChatGPT into classroom activities not only broadens perspectives but also reinforces cognitive development through exposure to diverse ideas.

In conclusion, the section outlines four strategies for enhancing social interaction with ChatGPT. First, incorporating collaborative learning activities encourages peer collaboration and fosters a sense of community.

Second, facilitating peer collaboration with real-time interaction allows students to express and discuss their ideas freely. Third, enhancing classroom discussions with ChatGPT promotes the expression of original ideas and active participation. Finally, understanding and appreciating the influence of peers' ideas leads to more comprehensive and insightful learning experiences. These practices create a more inclusive, dynamic, and socially interactive learning environment.

Contextual learning

Regarding contextual learning, students appreciated the practical insights provided by ChatGPT-generated case studies. By contextualizing abstract theories within real-world scenarios, ChatGPT bridged the gap between theory and practice. Students expressed appreciation for the relevance of these case studies, noting how they contributed to a deeper understanding of course material. A student shared their thoughts on this, stating, "The case studies with ChatGPT were really helpful. They showed us how what we were learning applied in real life, which made the concepts easier to grasp." This observation aligns with the findings of Brown et al. (1989), who argue that situating learning in context enhances the transferability and applicability of knowledge. The analysis of data surfaced several strategies which form contextual learning. The remainder of the section discusses those strategies.

First, to effectively promote real-life applications, educators can utilize ChatGPT to generate case studies that reflect real-world scenarios. These case studies allow students to see how theoretical concepts are applied in practical settings. For example, one student noted, "The case studies helped us understand how to apply what we learned in class to real-world problems." This approach not only aids in grasping complex concepts but also prepares students for professional challenges they may face in the future. This practice is supported by the research of Mantei and Kervin (2009), which highlights the importance of authentic learning tasks in fostering deeper understanding and retention of knowledge.

Second, ensuring the relevance and application of course material can be enhanced by integrating ChatGPT to create contextualized learning experiences. By presenting scenarios and examples that are directly related to the students' field of study or interest, ChatGPT makes the content more engaging and meaningful. One student mentioned, "Using ChatGPT to discuss scenarios relevant to our future careers made the learning process much more engaging and applicable." This method reinforces the importance of context in learning, as suggested by Herrera (2024), who emphasize the role of situational context in cognitive development and learning transfer.

Third, enhancing learning through examples is another effective strategy facilitated by ChatGPT. By providing diverse and relevant examples, ChatGPT helps students understand abstract concepts more concretely. One student shared, "The varied examples given by ChatGPT made it easier to grasp complex theories by relating them to familiar

situations." This approach is consistent with the findings of Fantinelli et al. (2024), which highlight that contextual examples can bridge the gap between theoretical learning and practical application, thereby deepening understanding and retention.

In conclusion, integrating real-life applications, ensuring relevance, and enhancing learning through examples are strategies for contextual learning using ChatGPT. These strategies create a more engaging, meaningful, and practically oriented learning environment, ultimately enhancing students' understanding and application of course material.

Scaffolding

Scaffolding was a critical component of the learning process, with both ChatGPT and the tutor playing supportive roles in navigating complex topics. The tutor posted directed learning materials one week prior to the class, setting the stage for the upcoming lessons and allowing students to familiarize themselves with key concepts in advance. During the actual class, the tutor provided structured guidance, while ChatGPT acted as a virtual tutor, offering instant feedback and explanations. This combined support helped students grasp challenging concepts more effectively. Students appreciated this dual assistance, noting how it bolstered their confidence and enabled them to tackle course material with greater ease. One student expressed their gratitude, saying, "Having ChatGPT there to help us understand difficult concepts was like having a tutor available whenever we needed it. It made learning less intimidating." This supports the concept of scaffolding as described by van de Pol et al. (2015), which involves providing temporary support to help learners achieve tasks they cannot complete independently. To promote effective scaffolding, educators can implement several strategies using ChatGPT in conjunction with traditional tutoring.

First, setting personal learning goals with the assistance of both the tutor and ChatGPT empowers students to take charge of their educational paths. The tutor helps students identify realistic and achievable goals through learning objectives, while ChatGPT provides continuous support and feedback to ensure progress. This practice not only enhances students' focus and motivation but also fosters a sense of accomplishment. One student mentioned, "Setting goals each week with the help of both ChatGPT and our tutor made me more focused and determined to achieve them, knowing that I had a clear plan and support." This practice aligns with Locke and Latham (2002), who demonstrated that specific and challenging goals, along with appropriate feedback, are critical for improving student performance and motivation.

Finally, offering encouragement and support through both ChatGPT and the tutor enhances students' confidence and willingness to engage with challenging material. The tutor provides structured encouragement and tailored explanations, while ChatGPT offers instant feedback and positive reinforcement. At the same time, during each face-to-face session, the tutor joined each group to assist them in progressing with their discussions using ChatGPT. This dual

support system makes complex topics more approachable and less intimidating. A student observed, "ChatGPT's constant support and our tutor's encouragement made me feel more confident in tackling difficult topics in project management such as ethics and compliance, knowing that I could always rely on their help." This finding resonates with the research of Hattie and Timperley (2007), who highlight that timely and constructive feedback is essential for effective learning and can significantly boost students' self-efficacy and academic achievement.

These practices collectively create a supportive, engaging, and personalized learning environment where students are actively involved in their educational journey and empowered to achieve their full potential. By leveraging ChatGPT alongside traditional tutoring methods, educators can enhance scaffolding, ensuring that students receive the necessary support to thrive academically.

Reflective thinking

Reflective thinking was another important aspect of the students' learning experiences, with ChatGPT prompting metacognitive engagement and self-assessment. By encouraging students to question their understanding and analyze their responses, ChatGPT facilitated deeper levels of reflection. Students noted how reviewing sample answers provided by ChatGPT served as a catalyst for self-improvement, allowing them to identify areas of strength and areas for growth. One student reflected on this, stating, "ChatGPT encouraged me to think more about what I was learning. Going over the sample answers helped me see where I could improve and what I understood well already." This is consistent with the findings of Osterman (1990), who emphasizes the importance of reflective practice in learning and professional development. This section discusses strategies that contributed to constructing a learning environment that fostered reflective thinking.

First, encouraging reflection on learning and improvement allows students to engage in self-assessment and recognize their progress. By prompting students to review and reflect on their work, ChatGPT helps them identify areas that need improvement and areas where they excel. This practice not only enhances their self-awareness but also motivates continuous improvement. For example, one student mentioned, "ChatGPT's feedback made me reflect on my answers and think about how I could improve my understanding." This aligns with the research by Boud et al. (1985), who highlight the role of reflection in promoting deeper learning and personal development.

Second, ChatGPT promotes the acceptability of questioning concepts by providing a safe environment for students to express doubts and seek clarification. This openness to questioning encourages students to challenge their assumptions and explore different perspectives, leading to a more thorough understanding of the material. One student noted, "ChatGPT made it easier to ask questions about things I didn't understand without feeling embarrassed." This is consistent with King (1992), who found that promoting a questioning attitude in students can significantly enhance

their learning outcomes and critical thinking skills.

Finally, ChatGPT provides a platform for students to express their concerns and receive constructive feedback. By addressing students' worries and offering supportive guidance, ChatGPT helps avoid anxiety and build confidence. This encouragement not only improves students' emotional well-being but also enhances their engagement and motivation. The tutor's intervention is equally important, as they provide additional context and personalized support that ChatGPT alone cannot offer. One student observed, "Being able to share my concerns with ChatGPT and get helpful feedback, along with the tutor's guidance, made me feel more supported and confident in my studies." This practice is supported by the research of Cohen and Singh (2020), who found that effective feedback is crucial for student development and satisfaction.

In conclusion, the section outlines three strategies for enhancing reflective thinking with ChatGPT. First, encouraging reflection on learning and improvement fosters self-assessment and continuous development. Second, fostering the acceptability of questioning concepts encourages students to challenge assumptions and seek clarification. Finally, providing a platform for expressing concerns and receiving constructive feedback enhances student confidence and engagement. These practices create a supportive, engaging, and reflective learning environment where students are actively involved in their educational journey and empowered to achieve their full potential.

Strategies

According to the research findings, this study identified 16 strategies for transforming traditional learning environments into active ones by leveraging ChatGPT. These 16 strategies are categorized under five themes, as shown in Table 1. Additionally, a brief description of each best practice is provided in the table below.

Table 1: Strategies for transforming traditional learning environments into active learning environments with ChatGPT.

Theme	Best Practice	Description
Active Learning	Implementing problem-based learning (PBL)	ChatGPT aids in researching real-world issues and brainstorming solutions, fostering deeper engagement with the material.
	Creating learning environments that facilitates personalized learning experiences	ChatGPT provides tailored exercises and instant feedback, enhancing students' critical skills and practical understanding.
	Integrating ChatGPT into classroom activities	ChatGPT aids in data collection and analysis, guiding discussions, and ensuring active collaboration, increasing student participation.
Social Interaction	Encouraging collaborative learning activities with ChatGPT	ChatGPT encourages peer collaboration on projects and assignments, fostering a sense of community and shared responsibility.
	Facilitating peer collaboration	ChatGPT provides a platform for real-time interaction, enabling students to express and discuss ideas freely.
	Enhancing classroom discussions	ChatGPT offers prompts and feedback, encouraging students to articulate thoughts and engage in meaningful conversations.
	Appreciating peers' ideas	ChatGPT facilitates discussions and diverse perspectives, helping students understand and integrate different viewpoints.

Contextual Learning	Utilizing ChatGPT to Generate Case Studies	ChatGPT generates case studies that reflect real-world scenarios. Therefore, educators can use ChatGPT to generate case studies that reflect real world scenarios helping students apply theoretical concepts in practical settings.
	Creating contextualized learning experiences	ChatGPT can be used to create scenarios related to students' field of study or interest, making content more engaging and meaningful.
	Enhancing learning through examples	ChatGPT provides diverse and relevant examples, helping students understand abstract concepts more concretely.
Scaffolding	Setting personal learning goals	Tutor and ChatGPT help students identify realistic and achievable goals, providing continuous support and feedback to ensure progress.
	Providing structured guidance	The tutor provides directed learning materials one week prior to class, with ChatGPT offering instant feedback and explanations during the class, aiding students in grasping challenging concepts.
	Offering encouragement and support	Both ChatGPT and the tutor offer encouragement and tailored explanations, with the tutor joining each group during face-to-face sessions to assist in progressing with discussions using ChatGPT.
Reflective Thinking	Encouraging reflection on learning and improvement	ChatGPT prompts students to review and reflect on their work, helping them identify areas for improvement and areas of strength.
	Promoting the acceptability of questioning concepts	ChatGPT provides a safe environment for students to express doubts and seek clarification, encouraging them to challenge assumptions and explore different perspectives.
	Providing a platform for expressing concerns	ChatGPT addresses students' worries and offers supportive guidance, with the tutor providing additional context and personalized support.

The above table clearly indicates that ChatGPT is a technology capable of transforming traditional learning environments into active ones, where knowledge construction is predominantly done by the learners rather than the educator. In this type of setting, the educator assumes the role of a collaborator rather than a facilitator.

Discussion

This study successfully achieved its objective by proposing 16 strategies to transform traditional, resource-constrained learning environments in the higher education sector into active ones by leveraging ChatGPT. This section presents the theoretical and practical implications derived from the findings, along with the limitations of the study and suggestions for future research.

The first theoretical implication of this study is the proposal of a comprehensive framework comprising 16 strategies, categorized under five themes derived from constructivist learning theory. To the best of the researcher's knowledge, this is one of the initial efforts to develop such a framework grounded in constructivist learning theory for the purpose of integrating ChatGPT into higher education practices. Thus, this study significantly extends constructivist learning theory by demonstrating how artificial intelligence, specifically ChatGPT, can be utilized to foster active learning environments. This extension of constructivist learning theory provides a novel perspective on how technology can be harnessed to support and enhance the learning process. Traditional constructivist approaches emphasize the active role of learners in constructing knowledge

through interactions with their environment and peers (Vygotsky, 1978). The integration of ChatGPT aligns with these principles by facilitating interactive, learner-centered experiences that promote critical thinking, collaboration, and contextual understanding. By incorporating AI-driven tools, this study highlights the potential for technology to support personalized learning experiences and scaffold students' cognitive development in ways that are consistent with constructivist principles.

Another theoretical implication of this study is the indication of the significant shift required in the educator's role within the new normal, where AI is an integral and permanent part of education. As AI tools like ChatGPT become increasingly popular in higher education, educators must transition from being mere facilitators to becoming collaborators with both AI and students. This evolution builds on the constructivist learning theory, traditionally viewing educators as guides (Prawat, 1992), by showing how they can now partner with AI to provide personalized support, instant feedback, and interactive learning experiences. Findings suggest that this collaborative approach enhances cognitive development, critical thinking, and active engagement. Educators must develop new competencies to leverage AI effectively, necessitating ongoing professional development. Embracing the role of collaborator enables educators to innovate their teaching practices, aligning with the constructivist emphasis on active, student-centered learning and better preparing students for modern complexities. Thus, while this study identifies the new role that modern educators must play as collaborators with students and AI, it also highlights the need for further theoretical developments to define the role of an educator as a collaborator.

The next theoretical implication concerns the adoption of ChatGPT by both educators and students. To effectively implement the strategies identified in this study, both parties must be prepared to integrate ChatGPT and use generative AI technology on a daily basis. Achieving the desired output from ChatGPT (e.g., a case study, a set of questions, and a potential answer) requires patience and practice, often involving the refinement of multiple prompts (Stadler et al., 2024). Consequently, the findings suggest a need for further research on adopting generative AI tools by educators and students. Future studies should aim to develop frameworks that facilitate greater adoption and effective use of these technologies in educational settings. This aligns with technology adoption theories such as the technology acceptance model (TAM) by Davis (1989) and the unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al. (2003), which emphasize the significance of perceived ease of use and usefulness in the adoption process. Conducting more research in this area will help to understand better and overcome the challenges associated with the integration of AI in education, thereby promoting a more widespread and effective adoption of generative AI tools like ChatGPT.

The final theoretical implication is related to the domain of education innovation. Education innovation refers to the introduction and implementation of new ideas, methods, tools, and practices designed to improve teaching and learning processes and ecosystems (Westera, 2015).

This research proposes a set of strategies that can be implemented to create learning ecosystems that generate positive outcomes for all involved parties. Thus, the proposed ecosystem is an innovative outcome that can be particularly impactful in developing countries, where it can be implemented with minimal capital investment. These practices aim to enhance educational outcomes, make learning more engaging and effective, and better prepare students for the demands of the modern world. Future researchers can build on this work by proposing frameworks that integrate limited resources optimally to create high-value learning environments, using theories such as service-dominant logic (Vargo & Lusch, 2004). This approach aligns with the broader goals of education innovation by fostering environments that are both resource-efficient and capable of delivering superior educational experiences.

The first practical implication of this study is that it presents a set of strategies that educators in traditional resource-constrained learning environments can adopt immediately, as demonstrated by the successful implementation at a Sri Lankan university without requiring extra resources. This finding is particularly significant for developing countries, where financial and infrastructural limitations often hinder educational innovation. By showing that ChatGPT can be integrated into existing systems to transform traditional classrooms into active learning environments, the study offers a viable pathway for enhancing educational practices within existing constraints. This aligns with constructivist learning principles, emphasizing active engagement and student-centered learning (Vygotsky, 1978), and supports the broader trend of integrating AI in education to enhance teaching and learning processes (Luckin et al., 2016; Luckin et al., 2024). Consequently, this approach provides a cost-effective solution for educators and policymakers seeking to improve educational quality globally, highlighting the potential for low-cost educational innovations to enhance learning outcomes.

The second practical implication is that ChatGPT, despite being viewed by some scholars in developing countries as a potential threat to traditional education systems, can actually serve as a valuable educational resource (Rahman & Watanobe, 2023). This study shows that ChatGPT can be used to enhance teaching and learning processes by providing instant feedback, generating relevant educational content, and facilitating active learning. Instead of perceiving AI as a disruptive force, educators can harness its capabilities to improve student engagement and learning outcomes (Fischer et al., 2023). This positive framing of AI integration in education aligns with broader trends in educational technology, where the focus is shifting towards utilizing AI to support and enrich the educational experience (Chen et al., 2020). Consequently, this study advocates for a balanced view of AI in education, recognizing its potential to contribute significantly to the learning ecosystem, particularly in contexts where traditional resources are limited.

Despite the contribution of the study, there are several limitations which future researchers could fix. One significant limitation pertains to the generalizability of the findings. This research was conducted solely within the context of a Sri Lankan higher education institution, which

may limit its applicability to other educational settings with different cultural, economic, and infrastructural contexts. Moreover, due to the nature of the research, the study focused primarily on exploring the positive impacts and implementation strategies of ChatGPT in enhancing learning experiences, without investigating potential negative impacts or challenges that could arise from its use. However, extant literature highlights the importance of focusing on the negative aspects of generative AI tools. Past studies have highlighted several concerns about using ChatGPT and similar AI in education. For instance, there are worries about ethics and fairness based on historical cases where advanced technology was misused (Popenici, 2023). AI systems can also pick up and spread biases, leading to unfair treatment of certain groups (Popenici, 2023). There are also serious privacy risks, as AI might mishandle or not properly protect student data (Popenici, 2023). Relying too much on AI could also take away from the human side of learning, reducing creativity and critical thinking (Popenici et al., 2023). Furthermore, as recent discussions have highlighted, there is a danger that AI-empowered tools like ChatGPT could reinforce existing Eurocentric biases in educational content, thereby complicating efforts to diversify and decolonize academic curricula (Broadhead, 2024).

Some fear AI might replace teachers, which could undermine education's role in shaping responsible citizens (Rudolph et al., 2024). There are also concerns that AI could reinforce existing biases and harm academic honesty by making it easy for students to skip real learning (Rudolph et al., 2024). Finally, big tech companies' profit motives might clash with educational goals, so it is important to consider AI's role carefully (Acemoglu & Johnson, 2023). Additionally, the issue of large class sizes in developing countries, which could affect the scalability and effectiveness of implementing technological solutions like ChatGPT, was acknowledged but not thoroughly addressed within the scope of this study. Finally, even though it is important to understand the limitations of implementing the suggested strategies in certain developing country contexts, such limitations are not explored in this research.

Suggestions for future research could encompass several avenues to further advance the understanding and application of generative AI tools like ChatGPT in educational settings. Firstly, exploring the integration of multiple generative AI tools beyond ChatGPT could provide insights into leveraging their combined strengths to enhance both educator and learner experiences. Additionally, future studies could focus on the implementation of robust Learning Management Systems (LMS) integrated with AI tools to investigate their role in creating more effective and engaging active learning environments. Understanding the potential negative impacts of AI tools on the learning experience would also be crucial for developing strategies to mitigate risks and maximize benefits. Moreover, a deeper investigation into individual strategies identified in this study could offer detailed insights into optimizing their implementation to achieve more impactful educational outcomes. Furthermore, it is essential to conduct similar research in large classroom settings to determine if these findings are applicable on a broader scale. Additionally, replicating this research in different contexts can help enhance the generalizability of the results.

Finally, future researchers can explore the limitations of implementing ChatGPT-based learning practices in some countries, such as inadequate technological infrastructure, gaps in digital literacy, language barriers, rigid educational policies and resistance to change, and significant privacy and ethical concerns. These directions would contribute to the evolving field of educational technology and inform effective strategies for integrating AI into educational practices.

Conclusion

This study suggested that by integrating ChatGPT into the higher education sector, particularly for business-related subjects, educators in developing countries can overcome traditional resource constraints and foster an active learning environment. The findings highlight that ChatGPT can significantly enhance student engagement and encourage knowledge construction, making learning more interactive and impactful. This positions AI as a crucial tool in bridging educational gaps and creating more equitable learning opportunities.

Furthermore, the proposed strategies provide a framework for educators to transform their teaching methodologies and actively involve students in the learning process. This shift from a traditional lecture-based approach to a more dynamic, student-centered model aligns with modern educational theories and offers a practical solution to some of the longstanding challenges in the education systems of developing countries.

However, it is essential to acknowledge the potential limitations and risks associated with integrating ChatGPT into educational settings. One primary concern is the accuracy and reliability of AI-generated content, which may vary and require rigorous evaluation and validation processes to maintain high standards of educational integrity. While ChatGPT can facilitate learning, caution is warranted to ensure the quality and correctness of information delivered. This highlights the importance of studying the negative aspects of ChatGPT in education. Addressing ethical issues ensures that AI contributes positively without intensifying existing disparities or ethical dilemmas. By identifying and correcting biases, educational institutions can foster fairness and inclusivity. Safeguarding student privacy is essential for creating trustworthy learning environments while preserving human-centric teaching methods sustains critical thinking and creativity. Upholding academic integrity guarantees that students derive genuine educational value. Moreover, scrutinizing the motives of tech companies helps align AI applications with educational goals and societal welfare. Therefore, maintaining a balanced approach that explores both the potential benefits and drawbacks of ChatGPT in education is essential for informed decision-making and responsible implementation.

As a final remark, as suggested by this study, future researchers could build on these findings to address the study's limitations and generate new insights. Investigating whether these findings are applicable to large class sizes and other developing country contexts, the potential negative

impacts of AI integration, and exploring the effectiveness of integrating various generative AI tools are all critical areas for further exploration. By expanding upon this research, future studies can continue to leverage technology to enhance educational outcomes and create sustainable, resource-efficient learning environments in the developing world.

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