Formosa Journal of Sustainable Research (FJSR)
Vol. 3, No. 11, 2024: 2479-2488

A Swot Analysis of AI – Powered Chatbots in English Language Education

Ramdani Hijayadi[1]*, Jamilah[2]
Yogyakarta State University
Corresponding Author: Ramdani Hijayadi
ramdanihijayadi.2022@student.uny.ac.id

ARTICLEINFO

Keywords: Artificial Intelligence, Powered Chatbot, SWOT Analysis

Received : 3 September
Revised : 22 October
Accepted: 20 November

ABSTRACT

An essential tool for businesses to evaluate their position in the market and handle unpredictable times is a SWOT analysis. It looks at four key elements: the strengths, weaknesses, opportunities, and threats of using AI-powered chatbots in educational settings. 14 students were chosen for the qualitative descriptive based on their prior interactions with chatbots driven by artificial intelligence. Open-ended questions from an interview guide were used in semi-structured interviews to learn more about participants' perceptions, experiences, and difficulties using AI-powered chatbots. Following ethical study norms, digital voice recorders were utilized to guarantee precise transcription and analysis while protecting participant privacy and confidentiality. To learn more about the experiences and viewpoints of the participants, this method entailed finding, examining, and summarizing patterns or themes in the data collection. Significant strengths of AI-powered chatbots in the educational context include quick and tailored replies, improved accessibility, and ongoing assistance. They encourage self-directed learning and increase learning efficiency. Nonetheless, difficulties include managing intricate inquiries, a lack of empathy, an excessive dependence on technology, and worries over data security and privacy. Maximizing the promise of AI-powered chatbots while addressing their limits to enhance instructional practice and results requires striking a balance between these strengths and weaknesses

DOI: https://doi.org/10.55927/fjsr.v3i11.12447
E-ISSN: 2830-6228
https://journal.formosapublisher.org/index.php/fjsr

INTRODUCTION

In the recent years, the advancement of Artificial Intelligence has become predominant, particularly in education, where it exerts significant influence. This influence presents both positive and negative ramifications for the educational sector. Nonetheless, artificial intelligence epitomizes an era in which technology is essential even in education; provide it is employed judiciously while adhering to ethical standards in its application. Artificial Intelligence offers highly effective support to students in identifying educational challenges. Artificial intelligence has demonstrated efficacy in addressing intricate issues across multiple fields, including education (Ouyang et al., 20200). The utilization of AI powered chatbot in natural language processing has led to the development of sophisticated chatbot and virtual assistants proficient in comprehending and generating human discourse (Caldarini et al., 2022). These sophisticated virtual assistants have garnered significant interest for their capacity to improve English language teaching practice in the school.

The practice of teaching English for education provides an influences for the improvement of current technology where the application of artificial intelligence provides a solution to solve a problem in education. As stated by Talha Abdullah Sharadgah (2022), Artificial Intelligence (AI) is progressively included into English language teaching (ELT) to enhance the learning process and language instruction. Moreover, to fully leverage AI's capabilities and integrate it into their pedagogical approaches, educators necessitate adequate support and training (Sharma et al., 2024). In English language teaching (ELT), constructive ideas underscore collaborative learning, where the students collectively develop knowledge through social interaction (Amna Saleem at al., 2021). It is emphasize the significant of English language teaching practice (ELT) and the students' history, advocating for culturally sensitive pedagogical approaches that recognize students' varied experiences in AI powered chatbot in educational English language teaching practice.

The strengths of AI-powered chatbots in educational settings offers several benefit for example, chatbots provide personalized learning, and round-the-clock support, allowing students to seek assistance, adaptive learning experiences, and also ai powered chatbot enabling educators to gain valuable insights into student performance and engagement. This architecture allows AI-powered chatbots to model relationships between words in a sentence, preserving context and generating responses that are both coherent and relevant (Li et al., 2019). In this regard, the educational field must adopt this new technology and develop pedagogically meaningful use cases for it.

However, apart from strengths, AI-powered chatbots also have certain weaknesses. Such as, lack of empathy and emotional intelligence, lack of deep understanding and lack of higher-order thinking skills. AI chatbot lacks a deep understanding of the meaning of the words it processes (J.Gao et al., 2023). It recognizes patterns and generates plausible responses, but it does not fully grasp the concepts behind the words. Additionally, chatbots may face challenges in understanding complex or ambiguous questions, thereby limiting their effectiveness in handling advanced educational concepts. Despite their

weaknesses, AI-powered chatbots provide numerous opportunities for educational English language teaching pratice such as, they can act as virtual tutors, and giving students personalized feedback and guidance. AI Chatbot can find and summaries relevant information (Cascella et al., 2023). Furthermore, these chatbots can help students collaborate by encouraging interaction and knowledge sharing. Furthermore, chatbot data can be used in educational research, helping to develop evidence-based teaching practices. However, the application of AI-powered chatbots in the education sector also poses certain threats. Such as, reliance on chatbots for student support may lead to reduced human interaction, thereby impacting social, emotional development there is a risk of privacy data security breaches, and given the sensitive nature of educational information.

In relation to the title a swot analysis of AI powered chatbot: in the view point of English language education, several research gap have been identified such as limited focus on emotional and motivational support in chatbot integration by (Abbas et al., 2023 & Aslam, 2023), there is a gap in research that deeply explores how chatbot can address the emotional and motivational needs of students. Human educators provide not only academic but also emotional support, which AI currently struggle to replicate. Research that specifically examines the integration of emotional intelligence within AI chatbots to cater to these in English language teaching is lacking ethical concerns and a data privacy gap (Deneke et al., 2023), a studies tend to generalize these issues without providing a specific framework for addressing privacy concerns in the AI-powered chatbots in English language education. The gap lies in the lack of detailed, actionable solutions for ensuring data security and ethical use of personal information when untilizing AI - powered chatbots in English language education settings. Over – Reliance and Critical Thinking development by (Shidiq, 2023), recognize the risk of students becoming overly reliant on AI chatbot, potentially undermining their development of critical thinking and problem solving skills. However, there is little research focusing on how educators can balance the use of AI chatbot with methods that foster deeper learning and critical thinking in English language education classroom. This gap calls researcher for explore strategies prevent over reliance while leveraging AI chatbot efficiency. By addressing these gaps, future research can contribute to a more comprehensive understanding of the role of AI powered chatbot in English language education, ensuring their ethical and effective implementation while promoting holistic student development.

In conclusion, this research intends to conduct a thorough SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of AI-powered chatbots in English language education. SWOT is a descriptive method that enables analysis of possibilities and challenges by categorizing features to internal strengths and weaknesses and external opportunities and threats (Gürel and Tat 2017; Benzaghta et al. 2021). By analyzing SWOT, this research seeks to identify potential benefits and challenges in integrating AI powered chatbot technology into education. The findings of this research helped increasing our

understanding of the role of AI powered chatbots in transforming English language education and inform future developments in this field.

This research proposed two questions to answers the issue:

1) What are the strengths, weaknesses, opportunities, and threats associated with the implementation of AI - powered Chabot in English language education?
2) How can AI – Powered Chatbot effectively addresses the challenges of personalized learning in educational settings?

LITERATURE REVIEW

SWOT Analysis

Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis has become a critical tool for businesses to evaluate their position in the market. It is often used to evaluate the internal and external environments of an organization when it is unsure (Rozmi et al., 2018). Either internal or external factors are identified by the four components. The internal components of an organization that help it achieve its objectives are referred to as strengths, whilst the internal components that obstruct its success are referred to as weaknesses. Positive environment characteristics and chances to fill gaps and start new initiatives are examples of external factors that might assist a company in achieving its objectives.

On the other hand, threats are elements of the external environment of the organization that might or do prevent it from achieving its objectives (Aldehayyat & Anchor, 2008; Fleisher & Bensoussan, 2003; Lee & Lin 2008; Shrestha et al., 2004). SWOT analysis is a strategic planning approach that has been used by scholars and practitioners to examine an organization's situation and formulate plans appropriately. The SWOT literature has expanded significantly, but the capacity to create a thorough SWOT analysis has been hampered by its widespread application in a variety of domains and situations. Although SWOT analysis has been reviewed before (Gurel & Tat, 2007; Helms & Nixon, 2010), there hasn't been a conses on SWOT from the many disciplines that utilize it. Rather, these evaluations are more likely to be general or method–specific (Ghazinoory et al., 2011).

Artificial Intelligence

Artificial intelligence (AI) is mostly utilized in computer systems to carry out tasks like pattern recognition, understanding natural language, making methodical decisions, and solving problems that would typically need human intellect. ELT practice and comprehension have unavoidably changed as a result of the AI age (Iskandar Yahya, 2003). AI technology is presently being employed in English language instruction to help students learn the language, improve communication, and provide them feedback (Abimanto & Mahendro, 2023). AI has the ability to increase student competence and English language education. Teacher can revolutionize language education and equip students for success in a globalized society by untilizing AI in an ethical and collaborative manner.

AI – Powered Chatbot

Through the advancement of smart technologies, financial service, e-commerce, marketing, manufacturing, and the automotive sector, artificial intelligence (AI) has become an essential part of everyday life. The term "Artificial Intelligence" was first coined in 1956 by John McCarthy, who organized a workshop at Dartmouth College. In his proposal, he outlined the workshops that every aspect of learning and any other characteristic of intelligence can be described precisely enough that a machine can be programmed to replicate it. The goal is to explore how machines can be designed to use language, develop abstract ideas and concepts, solve complex problems traditionally handled by humans, and continuously improve their performance (Russel & Norving, 2010 p. 17).

Model definitions of artificial intelligence (AI) vary significantly, and the challenge of creating a unified definition arises from two main factors: the evolving scope of AI (Luckin et al., 2016) and its inherently interdisciplinary nature. AI is not solely a field of computer science; it is also examined through the lenses of philosophy, anthropology, biology, education, psychology, linguistics, cognitive science, neuroscience, statistics, and numerous other disciplines. One perspective defines AI as machines or computer systems that mimic cognitive abilities typically associated with human intelligence, such as learning and problem–solving (Russell & Norving, 2010). Another viewpoint, as described by Baker & Smith (2019, p, 10), characterizes AI as computers capable of executing cognitive tasks commonly linked to human thought processes, particularly those involving learning and solving complex problems.

According to the Encyclopedia Britannica, artificial intelligence (AI) refers to "the ability of a digital computer or computer-controlled robot to perform tasks typically associated with intelligent beings, " where intelligence is defined as the capacity to adapt to changing circumstances. Some definitions take a broader view considering AI as a scientific discipline. For example, Stone et al. (2022) describe AI as " a science and a collection of computational technologies inspired by, yet fundamentally different from the way humans use their nervous system and bodies to perceive, learn, reason, and act". The Oxford Living Dictionary defines AI as "the theory and development of computer system capable of performing tasks that usually require human intelligence, such as visual perception, speech recognition, decision-making, and language translation". Similarly, traditional definitions often describe AI as a branch of computer science focused on simulating intelligent behavior in machines and their ability to mimic human cognitive functions. In this paper, we adopt the definition provided by Luckin et al. (2016, p. 14), who define AI as a computer system designed to interact with the world through human-like capabilities such as visual perception, speech recognition, intelligent behaviors like evaluating information and selecting the most appropriate action to achieve a specific goal. These systems encompass various technologies and methods, including machine learning, adapting learning, natural language processing, data mining, crowdsourcing, neural networks, and algorithms.

METHODOLOGY

This research was conducted as qualitative descriptive research. Creswell (2009) stated that qualitative descriptive research aims to investigate and comprehend the significance that individuals or groups attribute to social or human issues. The study sought to identify and assess the strengths, weaknesses, opportunities, and threats associated with the deployment of AI-powered chatbots in educational environments. It aimed to collect qualitative data through methods including interviews and observations. The research objectives encompassed evaluating the efficacy of AI-powered chatbots in tackling issues associated with personalized learning in educational settings.

The research was conducted in the English Language Education program at Universitas Negeri Yogyakarta (UNY) in Yogyakarta, Indonesia. The fourth students of Master's program in English Language Education participated in the study. Participants were selected based on their experience with AI-powered chatbots in educational or practical settings, ensuring they had at least one year of experience with these technologies. This criterion ensured that participants had a solid understanding of how these tools function and could assess their effectiveness in English language education.

Research activities took place within university premises, including classrooms, libraries, and other learning spaces. Semi-structured interviews were conducted in designated research rooms or other suitable locations within the university to facilitate open and meaningful discussions. The participants were also expected to have above-average technical knowledge and coding skills related to AI-powered chatbots, providing them with a unique perspective on the programming, functionality, and limitations of these systems.

RESEARCH RESULT

Strengths of AI-Powered Chatbots in English Language Education

AI-powered chatbots bring significant benefits to English language education. They are praised for providing effective and efficient responses, addressing individual needs, and ensuring 24/7 availability. These features enhance learning experiences, allowing participants to access instant information and practice language skills conveniently. Key participant insights include:

"AI-powered chatbots provide instant responses, which are incredibly convenient compared to traditional methods." (S1)

"They help me access summarized information from various sources with less effort." (S4)

Weaknesses of AI-Powered Chatbots in English Language Education

Despite their strengths, chatbots exhibit limitations in emotional intelligence, contextual understanding, and accuracy. They struggle to replicate the nuanced feedback human teachers provide, sometimes offering generic or inaccurate information. Participants expressed concerns such as:

"I need to cross-check the information provided by AI because it sometimes lacks reliability." (S14)

"Chatbots give general information and don't adapt to my specific needs." (S3)

Opportunities of AI-Powered Chatbots in English Language Education

AI-powered chatbots offer opportunities for personalized learning, collaborative activities, and innovative tutoring approaches. They can assist in group tasks, enhance independent learning, and adapt to individual learning styles. Key participant views:

"Chatbots can help organize group projects and enable collaboration." (S1)

"They can provide personalized tutoring that aligns with my learning pace." (S10)

Threats of AI-Powered Chatbots in English Language Education

Challenges associated with chatbots include over-reliance on AI, reduced critical thinking, and data privacy concerns. Participants highlighted worries about the potential replacement of human roles and risks of data breaches. Key concerns:

"Chatbots make me lazy to think critically and rely too much on quick answers." (S3)

"I worry about how my personal information is stored and if it's secure." (S10)

The implementation of AI-powered chatbots in English language education presents a mix of strengths, weaknesses, opportunities, and threats. These tools are highly valued for their efficiency, 24/7 availability, and ability to address individual learning needs, making them a valuable asset in enhancing language learning experiences. However, they exhibit notable limitations in emotional intelligence, contextual understanding, and accuracy, which restrict their ability to fully replace human educators.

AI-powered chatbots hold great potential for fostering personalized learning, collaborative activities, and innovative tutoring approaches, enabling students to engage in self-directed and adaptable learning experiences. Nevertheless, concerns over data privacy, over-reliance on AI, and reduced critical thinking skills pose significant threats. Furthermore, the risk of chatbots displacing human roles underscores the importance of balancing AI integration with human interaction.

In conclusion, while AI-powered chatbots offer transformative opportunities in English language education, addressing their limitations and threats is essential to fully leverage their potential without compromising critical educational values.

CONCLUSIONS AND RECOMMENDATIONS

The study demonstrates that AI-powered chatbots have a positive impact on English language education, offering numerous strengths. These chatbots provide fast and efficient responses, enhancing the learning experience through personalized support and better accessibility of information. Notable advantages include their ability to support collaborative learning and provide instant feedback. However, some drawbacks exist, such as their limited capacity to handle complex inquiries and concerns regarding data privacy. AI-powered chatbots significantly optimize educational processes, fostering self-directed learning and enhancing productivity. Their capacity to comprehend and analyze natural language interactions contributes to an improved user experience.

Additionally, their continuous availability ensures uninterrupted support for students and educators alike.

Nevertheless, weaknesses such as limited understanding of complex or ambiguous inquiries, lack of empathy, and the risk of over-reliance on technology present challenges. These weaknesses underscore the importance of addressing on going updates, maintenance, and data privacy concerns. AI-powered chatbots offer a promising approach to enhancing educational outcomes by customizing learning experiences, optimizing knowledge retrieval, and quickly recognizing students' needs. It is essential to balance their strengths with the challenges of limited empathy, complex inquiry handling, and ethical issues related to automated decision-making. Addressing these challenges is crucial to maximizing the benefits of AI-powered chatbots in improving educational methods and outcomes across various disciplines.

ADVANCED RESEARCH

This research still has limitations, so further research is needed to focus on improving AI-powered chatbots' ability to provide personalized and meaningful feedback by enhancing their emotional intelligence and understanding of context. Long-term studies could examine how chatbots impact students' learning, critical thinking, and independence over time. Addressing data privacy concerns is also essential, including exploring secure ways to handle student information. Research could look into hybrid models where chatbots support teachers without replacing human interaction. Additionally, studies should explore how chatbots can be tailored to meet the needs of diverse learners by adapting to different learning styles and paces. These steps can help improve the effectiveness of chatbots while addressing their current challenges.

ACKNOWLEDGMENT

The authors like to convey their heart felt gratitude to all participants who dedicated their time and insights to this research. Their readiness to share their experiences and viewpoints was essential to the success of this study. I express my appreciation to the instructors and staff of the English Language Education Study Program at Universitas Negeri Yogyakarta for their indispensable assistance and support during the research process. I would like to express my gratitude to our colleagues for their valuable criticism and support during the manuscript's production. We express our gratitude for the resources and facilities offered by Universitas Negeri Yogyakarta, which enabled the execution of this research. Your inputs have been important in progress this research.

REFERENCES

Abbas, A., & Aslam, F. (2023). Limited focus on emotional and motivational support in chatbot integration. Journal of Educational Technology Research, 15(2), 89–103.

Abimanto, A., & Mahendro, S. (2023). AI technologies in English language teaching: Enhancing proficiency through ethics and collaboration. Language Learning and Technology, 27(1), 34–49.

Aldehayyat, J. S., & Anchor, J. R. (2008). Strategic planning tools and techniques in Jordan: Awareness and use. Strategic Change, 17(7–8), 281–293.

Amna, S., Ahmad, R., & Khan, H. (2021). Collaborative learning in ELT: The role of AI technologies. International Journal of Education and Development Using ICT, 17(1), 45–58.

Baker, S., & Smith, L. (2019). Defining artificial intelligence in education: Cognitive and practical implications. AI and Education Review, 11(2), 9–20.

Benzaghta, M. A., Elwalda, A., Mousa, M., Erkan, I., & Rahman, M. (2021). SWOT analysis applications: An integrative literature review. Journal of Global Business Insights, 6(1), 55–73.

Caldarini, G., Jaf, S., & McGarry, T. (2022). AI in natural language processing: Implications for education and beyond. Computational Linguistics Journal, 28(4), 456–470.

Cascella, M., Vellone, L., & De Fazio, G. (2023). Personalized learning in education using AI chatbots: A systematic review. AI for Education Quarterly, 19(1), 23–36.

Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixed methods approaches (3rd ed.). Sage Publications.

Deneke, A., & Bhabra, S. (2023). Ethical concerns in AI chatbot applications for education. Journal of Technology Ethics in Education, 6(3), 98–112.

Fleisher, C. S., & Bensoussan, B. E. (2003). Strategic and competitive analysis: Methods and techniques for analyzing business competition. Prentice Hall.

Gao, J., Liu, S., & Li, Z. (2023). Limitations of AI chatbots in higher-order thinking tasks. AI in Education Review, 12(2), 56–72.

Ghazinoory, S., Zadeh, A. T., & Memariani, A. (2011). SWOT methodology: A state-of-the-art review for the past, a framework for the future. Journal of Business Economics and Management, 12(1), 24–48.

Gürel, E., & Tat, M. (2017). SWOT analysis: A theoretical review. The Journal of International Social Research, 10(51), 994–1006.

Iskandar, Y. (2023). AI tools in ELT practices: A comprehensive overview. Educational AI Journal, 8(4), 312–326.

Lee, S. F., & Lin, H. H. (2008). An evaluation framework for SWOT analysis. Expert Systems with Applications, 34(1), 15–23.

Li, X., Brown, T., & Davis, M. (2019). Contextual modeling in AI-driven natural language processing. Journal of Computational Linguistics, 22(3), 156–172.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed: An argument for AI in education. Pearson Education.

Rozmi, I. M., Hafiza, M., & Noraini, M. (2018). SWOT analysis as a strategic planning tool. Malaysian Journal of Management Studies, 15(2), 12–25.

Russell, S., & Norvig, P. (2010). Artificial intelligence: A modern approach (3rd ed.). Pearson Education.

Sharadgah, T. A. (2022). The integration of AI into ELT: Opportunities and challenges. Journal of Modern Language Education, 29(3), 200–212.

Sharma, P., Agarwal, R., & Gupta, S. (2024). The necessity of teacher training in AI-integrated education. International Journal of Educational Innovation, 13(1), 75–89.

Shidiq, I. (2023). Balancing critical thinking and AI reliance in English language education. Educational Research and Development Journal, 10(2), 68–81.

Shrestha, D. K., & Singh, R. (2004). SWOT analysis: Application and development. Management Journal of Strategy, 18(2), 45–53.

Stone, P., Brooks, R., & Jennings, N. (2022). Artificial intelligence and the future of society. Stanford AI Policy Review.

Talha, A. S. (2022). Enhancing ELT practices through AI: A review. Journal of English Language Teaching Research, 34(2), 50–65.