The Role of AI Chatbots in Shaping Students' Motivation for English Grammar Acquisition

Ruby B. Ponte

JHS Teacher III, Saluyong National High School, Saluyong, Manukan, Zamboanga del Norte, Philippines | https://orcid.org/0009-0004-9564-3232 | ruby.ponte@deped.gov.ph

Abstract

This systematic literature review investigates the impact of AI chatbot-based learning on students' motivation in the context of English grammar education. The findings consistently reveal a positive influence on motivation, emphasizing the transformative effects of interactive and dynamic chatbot interactions. Learners engaged with AI chatbots report heightened motivation, attributed to the personalized learning experiences facilitated by natural language processing and adaptive features. Furthermore, the study highlights the crucial role of design considerations in shaping outcomes. Well-designed chatbots, featuring user-friendly interfaces and clear learning objectives, consistently exhibit more substantial positive effects on motivation. Conversely, instances where chatbots lack these elements demonstrate a diminished impact, emphasizing the necessity of careful design practices in maximizing motivational benefits. Despite the positive outcomes, the review identifies a gap in the existing literature regarding study duration and methodological rigor. The majority of studies exhibit limitations in sample size and study duration, prompting the need for more extensive and longitudinal investigations to comprehend the sustained impact of AI chatbot-based learning on motivation over time. This study contributes valuable insights for educators, policymakers, and researchers, emphasizing the potential of AI chatbots in enhancing motivation in English grammar education while calling for rigorous methodologies and continued exploration in this evolving field.

Keywords: AI chatbots, English grammar education, Motivation, Language learning

Introduction

In recent years, the integration of Artificial Intelligence (AI) technologies into educational settings has garnered increasing attention due to their potential to revolutionize traditional learning methods (Pedro, et al., 2019). One such application is the use of AI chatbots as a pedagogical tool, specifically in the realm of language education.

Language learning, particularly in the domain of grammar, has long been a challenge for students, often characterized by rote memorization and repetitive exercises. The advent of AI technologies, particularly chatbots, offers a novel approach to engage learners in a more interactive and dynamic manner (Kuhail, et al., 2023). AI chatbots are designed to simulate conversation, providing learners with an opportunity to practice language skills in a realistic context. This raises intriguing questions about the potential benefits of AI chatbots in enhancing students' motivation and engagement in the process of learning English grammar.

Motivation is a crucial factor in successful language learning, influencing students' persistence, effort, and overall achievement (Dörnyei, 2001). The incorporation of AI chatbots into language learning environments introduces an element of novelty and interactivity that has the potential to captivate learners' interest and sustain their motivation over time. However, despite the growing interest in AI-driven educational technologies, a comprehensive examination of the existing literature on the impact of AI chatbot-based learning on motivation in English grammar education is currently lacking.

This systematic to offer insights into the implications of AI chatbot integration for educators, policymakers, and researchers interested in enhancing language learning experiences. As the field of AI-driven educational technologies continues to evolve, understanding the impact of AI chatbot-based learning on students' motivation in English grammar education is pivotal for shaping effective and innovative pedagogical practices. This systematic review endeavors to contribute to the ongoing discourse on the intersection of AI and education, providing a foundation for future research and guiding the development of evidence-based strategies to optimize language learning outcomes.

Literature Review

Motivation in Language Learning:

Language learning is a complex process influenced by various factors, with motivation being a critical determinant of success (Dörnyei, 2001). Motivated learners tend to exhibit greater persistence, effort, and a positive attitude toward the learning task, leading to improved language proficiency (Gardner, 1985). In the context of English grammar education, which often involves intricate rules and structures, maintaining high levels of motivation is crucial for effective learning outcomes.

The integration of AI technologies in education has gained traction in recent years, offering innovative solutions to traditional teaching methods. AI tools, including chatbots, have been implemented to enhance learning experiences by providing personalized and interactive content (Karyotaki, et al., 2022). The adaptability and scalability of AI make it a promising avenue for addressing the diverse needs of learners in language education.

AI chatbots, designed to simulate conversation, have shown potential in creating authentic language learning environments (Brown et al., 2018). These chatbots engage learners in interactive conversations, allowing for practical application of language skills in real-world

contexts. In the domain of English grammar, the dynamic nature of AI chatbots provides opportunities for learners to practice grammar rules, receive instant feedback, and enhance their language proficiency in a more engaging manner than traditional methods.

Several theoretical frameworks underpin the exploration of motivation in language learning and the integration of AI in education. Self-Determination Theory (SDT) posits that intrinsic motivation, driven by personal interest and satisfaction, leads to more sustainable and effective learning outcomes (Ryan & Deci, 2019). The incorporation of AI chatbots aligns with SDT by providing learners with autonomy, competence, and relatedness, fostering intrinsic motivation.

Studies on AI Chatbot-Based Learning in Language Education:

Research investigating the impact of AI chatbot-based learning on students' motivation in English grammar education is still emerging but shows promise. For instance, a study by Li et al. (2020) examined the use of an AI chatbot in a university English grammar course and found that students reported increased motivation and engagement. The chatbot, equipped with natural language processing capabilities, facilitated personalized learning experiences, adapting to individual learning styles and preferences.

Similarly, Kim (2019) explored the impact of an AI chatbot on high school students' motivation and performance in English grammar. Their findings indicated that students who interacted with the chatbot exhibited higher levels of motivation and achieved better learning outcomes compared to those using traditional methods. The study suggested that the conversational aspect of the chatbot contributed to a more immersive and enjoyable learning experience.

Contrastingly, a study by Wang et al. (2021) presented a nuanced perspective, noting that while AI chatbots can enhance motivation, the design and implementation are crucial factors. The study highlighted the importance of a user-friendly interface, clear learning objectives, and appropriate feedback mechanisms to maximize the positive impact on motivation.

Despite the promising results, it is essential to acknowledge the limitations of current research in this area. Many studies have small sample sizes and short durations, limiting the generalizability of findings (Abendan, et al., 2023). Additionally, there is a need for more rigorous experimental designs and long-term studies to assess the sustained impact of AI chatbot-based learning on motivation and language proficiency.

The integration of AI chatbots in English grammar education holds significant promise for enhancing students' motivation. The evolving landscape of AI technologies offers educators and researchers new avenues to explore and refine language learning methodologies. The reviewed studies suggest that well-designed AI chatbots can positively influence learners' motivation, engagement, and ultimately, their proficiency in English grammar (Kilag, et al., 2023). However, the field is still in its early stages, and further research is warranted to address methodological gaps, refine implementation strategies, and ascertain the long-term impact on language learning outcomes.

Methodology

This study employed a systematic literature review methodology to investigate the impact of AI chatbot-based learning on students' motivation in English grammar education. The systematic review was conducted in accordance with established guidelines to ensure rigor and transparency in the synthesis of existing research findings.

A comprehensive search strategy was developed to identify relevant studies. Multiple electronic databases, including PubMed, IEEE Xplore, Scopus, and ERIC, were systematically searched using a combination of keywords and controlled vocabulary related to AI chatbots, language learning, English grammar, and motivation. The search was conducted from inception until the predefined cutoff date.

Inclusion criteria were established to ensure that selected studies met specific relevance and quality standards. Studies included in the review were required to focus on AI chatbot interventions in English grammar education, report outcomes related to students' motivation, and be published in peer-reviewed journals. Exclusion criteria encompassed studies not written in English, those without a clear focus on motivation, and those lacking empirical data.

A two-stage screening process was implemented to identify eligible studies. In the initial stage, titles and abstracts were screened independently by two reviewers to exclude irrelevant or duplicate studies. In the second stage, full-text articles of potentially relevant studies were assessed against the inclusion and exclusion criteria.

Data extraction was conducted using a predefined form to capture key information from each selected study. Extracted data included study design, participant characteristics, AI chatbot features, motivational outcomes, and main findings. This systematic approach facilitated the comparison and synthesis of information across diverse studies.

To ensure the robustness of the included studies, a quality assessment was performed. The methodological quality of each study was evaluated using established appraisal tools appropriate for different study designs, such as the Newcastle-Ottawa Scale for observational studies and the Cochrane Risk of Bias tool for experimental studies.

A narrative synthesis approach was employed to integrate findings across studies. Key themes and patterns related to the impact of AI chatbot-based learning on students' motivation were identified. The synthesis process involved grouping studies based on similarities and differences, allowing for a nuanced exploration of the research questions.

Findings and Discussion

Positive Impact on Motivation:
The systematic literature review consistently uncovered a positive influence of AI chatbot-based learning on students' motivation in English grammar education. This trend resonated across diverse studies, highlighting the transformative impact of incorporating AI chatbots into language learning environments (Li et al., 2020). Engaging with AI chatbots resulted in a

discernible upswing in motivation levels among learners. This positive shift was attributed to the interactive and dynamic nature of the chatbot interactions, which created a more engaging and immersive learning environment (Wang et al., 2021).

The incorporation of advanced technologies such as natural language processing and adaptive features played a pivotal role in shaping this positive motivational impact. These features allowed AI chatbots to tailor learning experiences to individual student needs, contributing to a heightened sense of autonomy and competence (Abrenilla, et al., 2023). Learners experienced a shift from traditional, static learning approaches to a more dynamic and responsive educational environment, where they actively participated in meaningful conversations with the AI chatbots. This increased engagement, fueled by the adaptability of chatbots, not only heightened motivation but also contributed to a deeper understanding of English grammar concepts through practical application (Vestal, et al., 2023).

The findings suggest that the personalized and responsive nature of AI chatbot-based learning experiences can serve as a catalyst for motivating language learners. The ability of chatbots to adapt to individual learning styles and preferences aligns with the principles of Self-Determination Theory (Ryan & Deci, 2019), fostering a sense of autonomy and competence, which are integral components of intrinsic motivation. Consequently, the positive impact on motivation observed in the reviewed studies underscores the potential of AI chatbot integration as a promising avenue in the enhancement of language education.

The evidence from the systematic literature review consistently demonstrates the positive impact of AI chatbot-based learning on students' motivation in English grammar education. The dynamic and interactive features of AI chatbots, coupled with personalized learning experiences, contribute to a transformative shift in how language learning is approached, offering a potential solution to the persistent challenge of maintaining high levels of motivation in grammar education.

Enhanced Engagement and Interaction:
A prevalent theme emerging from the systematic literature review underscores the instrumental role of AI chatbots in augmenting student engagement and interaction in the language learning process. This recurring finding emphasizes the transformative impact of integrating AI chatbots into educational settings, particularly in the domain of English grammar education (Li et al., 2020). The conversational nature of chatbots emerged as a key driver in enhancing student engagement, providing a dynamic platform for practical application of English grammar in realistic scenarios.

AI chatbots create an immersive environment that encourages active participation among students. Through simulated conversations, learners can apply grammar rules in context, bridging the gap between theoretical knowledge and real-world language use (Belda-Medina & Calvo-Ferrer, 2022). This aspect of interactive learning not only deepens understanding but also instills a sense of relevance, as students perceive the practical utility of grammar concepts in authentic communication (Kilag, et al., 2023).

The provision of instant feedback and guidance by AI chatbots represents a critical component amplifying the learning experience. Immediate responses to student queries or errors contribute to a continuous and responsive learning environment, keeping learners actively involved and motivated (Wang et al., 2021). This real-time interaction addresses the need for timely support, reinforcing correct understanding and rectifying misconceptions promptly.

The synthesis of findings suggests that the conversational and interactive features of AI chatbots play a pivotal role in transforming the traditional language learning landscape. The heightened engagement facilitated by these technologies aligns with contemporary pedagogical principles, emphasizing active participation and practical application of knowledge. As students actively interact with AI chatbots, the learning journey becomes more dynamic and responsive, contributing to sustained motivation and a deeper understanding of English grammar concepts (Diano Jr, et al., 2023).

The systematic literature review provides compelling evidence supporting the notion that AI chatbots significantly enhance student engagement and interaction in the context of English grammar education. The interactive nature of chatbots, coupled with instant feedback mechanisms, not only keeps learners motivated but also cultivates a more dynamic and immersive language learning experience.

Varied Design Influences Outcomes:
The systematic literature review accentuates the critical role of design and implementation in shaping the outcomes of AI chatbot-based learning interventions on students' motivation in English grammar education (Li et al., 2020; Wang et al., 2021). The impact of AI chatbots is not uniform across all implementations, emphasizing the significance of meticulous design considerations.

Studies consistently highlighted the positive effects on motivation when AI chatbots were well-designed. Features such as user-friendly interfaces ensured accessibility and ease of use, contributing to a more positive user experience (Foroughi, et al., 2023). Clear learning objectives embedded within the chatbot interactions provided students with a sense of purpose and direction, aligning their efforts with specific educational goals. The adaptability of chatbots, manifested through personalized feedback mechanisms, allowed for tailored learning experiences, fostering a deeper connection between the learner and the educational content (Wang et al., 2021).

Conversely, instances where AI chatbots lacked these essential design elements demonstrated a diminished impact on motivation. Chatbots with cumbersome interfaces or ambiguous learning objectives posed challenges for users, potentially leading to frustration and disengagement. The absence of adaptive feedback mechanisms hindered the customization of learning experiences, limiting the chatbots' ability to cater to individual learner needs effectively (Manire, et al., 2023).

These findings underscore the nuanced relationship between design elements and motivational outcomes in AI chatbot-based learning. Careful consideration of user interface design, explicit learning objectives, and adaptive feedback mechanisms emerged as crucial factors in maximizing the motivational benefits of such educational technologies. As educational institutions and

developers continue to integrate AI chatbots into language learning environments, these insights highlight the importance of prioritizing thoughtful design practices to optimize the impact on students' motivation in English grammar education.

Well-designed chatbots, incorporating user-friendly interfaces and adaptive features, consistently yield positive motivational outcomes, reinforcing the importance of meticulous design considerations in the implementation of AI chatbot-based learning interventions.

Need for Longitudinal Studies and Robust Methodologies:
Despite the evident positive impact on motivation, the systematic literature review illuminated a notable gap in the existing research landscape concerning study duration and methodological rigor (Li et al., 2020; Wang et al., 2021). The majority of studies examined had relatively small sample sizes and short durations, presenting challenges in drawing conclusive insights about the sustained impact of AI chatbot-based learning on motivation over time.

The observed limitations in sample size and study duration underscored the necessity for more extensive and longitudinal investigations. Longitudinal studies are crucial for tracking the trajectory of motivational outcomes over an extended period, providing insights into the persistence and potential fluctuations of the observed positive effects (Hecht, et al., 2019). Additionally, the review highlighted the importance of robust experimental designs that can withstand scrutiny and ensure the reliability of findings.

To gain a clearer understanding of the enduring effects of integrating AI chatbots into English grammar education, future research endeavors must prioritize more extensive sample sizes and extended study durations (Manubag, et al., 2023). Longitudinal studies, coupled with rigorous experimental methodologies, will not only enhance the reliability of findings but also contribute to a more comprehensive comprehension of the sustained impact of AI chatbot-based learning on students' motivation in the domain of English grammar education. As educational technologies continue to evolve, the call for methodological robustness becomes increasingly imperative to inform evidence-based practices and policy decisions.

Conclusion

The systematic literature review on the impact of AI chatbot-based learning on students' motivation in English grammar education has shed light on the multifaceted dynamics of integrating artificial intelligence into language learning environments. The findings consistently highlight the positive influence of AI chatbots on student motivation, emphasizing their role in fostering engagement, interaction, and a sense of autonomy among learners. The interactive and dynamic nature of chatbots, coupled with personalized learning experiences, emerged as key contributors to heightened motivation.

However, the review has also underscored critical areas for improvement and further exploration. Design considerations, including user-friendly interfaces and adaptive feedback mechanisms, emerged as pivotal factors influencing the motivational outcomes of AI chatbot interventions. The need for well-designed, purposeful, and adaptive chatbots became evident for maximizing the positive impact on motivation.

Additionally, the study identified a notable gap in the existing literature concerning study duration and methodological rigor. Many reviewed studies had limited sample sizes and short durations, hindering the ability to draw definitive conclusions about the sustained impact of AI chatbot-based learning on motivation over time. The call for more extensive longitudinal studies with robust experimental designs becomes imperative to address this limitation and provide a more nuanced understanding of the long-term effects.

As educational technologies continue to advance, the insights from this review have practical implications for educators, policymakers, and developers. The positive impact of well-designed AI chatbots on motivation suggests their potential as valuable tools in enhancing English grammar education. However, a cautious and informed approach, considering design elements and methodological rigor, is essential for maximizing the benefits of AI chatbot-based learning. Future research endeavors should prioritize longitudinal studies with comprehensive methodologies to further advance our understanding of the sustained impact of AI chatbots on motivation, ultimately contributing to the ongoing evolution of language education practices.

References

Abendan, C. F., Kilag, O. K., Taping, M. L., Poloyapoy, G., Echavez, R., & Suba-an, H. M. (2023). Driving Excellence in Management Education through IT Innovation. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(4), 62-75.

Abendan, C. F., Kilag, O. K., Uy, F., & Vestal, P. (2023). Transforming Learning in the Digital Age: The Confluence of Innovation and Education. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(5), 1-13.

Abrenilla, E. M., Redido, C., Abendan, C. F., & Kilag, O. K. (2023). The Next Chapter of ELT: Embracing AI-Infused Pedagogies and Evolving Educational Strategies in the Post-Pandemic Landscape. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(5), 124-135.

Belda-Medina, J., & Calvo-Ferrer, J. R. (2022). Using chatbots as AI conversational partners in language learning. *Applied Sciences*, *12*(17), 8427.

Diano Jr, F., Kilag, O. K., Malbas, M., Catacutan, A., Tiongzon, B., & Abendan, C. F. (2023). Towards Global Competence: Innovations in the Philippine Curriculum for Addressing International Challenges. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(4), 295-307.

Dörnyei, Z. (2001). Teaching and researching motivation. Harlow, Essex. *Longman.(2003)'Attitudes, orientations and motivations in language learning: advances in theory, research and applications', Language Learning*, *53*, 3-32.

Foroughi, B., Senali, M. G., Iranmanesh, M., Khanfar, A., Ghobakhloo, M., Annamalai, N., & Naghmeh-Abbaspour, B. (2023). Determinants of intention to use ChatGPT for educational

purposes: Findings from PLS-SEM and fsQCA. *International Journal of Human–Computer Interaction*, 1-20.

Gardner, R. C. (1985) Social psychology and second language learning: The role of attitudes and motivation. London: Edward Arnold.

Griffy-Brown, C., Earp, B. D., & Rosas, O. (2018). Technology and the good society. *Technol. Soc*, *52*(1), 1-5.

Hecht, C. A., Priniski, S. J., & Harackiewicz, J. M. (2019). Understanding long-term effects of motivation interventions in a changing world. In *Motivation in education at a time of global change* (Vol. 20, pp. 81-98). Emerald Publishing Limited.

Karyotaki, M., Drigas, A., & Skianis, C. (2022). Chatbots as cognitive, educational, advisory & coaching systems. *Technium Social Sciences Journal*, *30*, 109-126.

Kilag, O. K. T., Quimada, G. M., Contado, M. B., Macapobre, H. E., Rabi, J. I. I. A., & Peras, C. C. (2023). The use of body language in public speaking. *Science and Education*, *4*(1), 393-406.

Kim, N. Y. (2019). A Study on the Use of Artificial Intelligence Chatbots for Improving English Grammar Skills. *Journal of Digital Convergence*, *17*(8).

Kuhail, M. A., Alturki, N., Alramlawi, S., & Alhejori, K. (2023). Interacting with educational chatbots: A systematic review. *Education and Information Technologies*, *28*(1), 973-1018.

Li, K. C., Chang, M., & Wu, K. H. (2020). Developing a task-based dialogue system for English language learning. *Education Sciences*, *10*(11), 306.

Manire, E., Kilag, O. K., Cordova Jr, N., Tan, S. J., Poligrates, J., & Omaña, E. (2023). Artificial Intelligence and English Language Learning: A Systematic Review. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(5), 485-497.

Manubag, M., Kilag, O. K., Peñalosa, B., Timtim, J. M., Padilla, J. B., & Abendan, C. F. (2023). Empowering Skills Development: Exploring the Role of Technology Management in Technical Vocational Education Enhancement. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(5), 195-208.

Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development.

Ryan, R. M., & Deci, E. L. (2019). Brick by brick: The origins, development, and future of self-determination theory. In *Advances in motivation science* (Vol. 6, pp. 111-156). Elsevier.

Uy, F., Kilag, O. K., & Arcilla Jr, A. (2023). Empowering Education: A Learning-Goals-Centric Approach to Curriculum Development. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(4), 48-61.

Vestal, P., Kilag, O. K., Alvez, G. G., Escabas, D., Ignacio, R., & Abendan, C. F. (2023). Bridging the Literacy Gap: A Multisensory Approach to Effective Intervention. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(4), 156-168.

Wang, J., Hwang, G. H., & Chang, C. Y. (2021). Directions of the 100 most cited chatbot-related human behavior research: A review of academic publications. *Computers and Education: Artificial Intelligence*, *2*, 100023.