

Bridging the Gap: ESL Teachers' Views on AI Integration and Its Impact on Language Learning

Mouna Abou Assali¹

¹ Assistant Professor, Foundation & General Education Department, Rabdan Academy, UAE

Correspondence: Dr. Mouna Abou Assali, Assistant Professor, Foundation & General Education Department, Rabdan Academy, UAE.
E-mail: massali@ra.ac.ae

Received: October 3, 2024

Accepted: December 31, 2024

Online Published: February 21, 2025

doi:10.5430/wjel.v15n4p120

URL: <https://doi.org/10.5430/wjel.v15n4p120>

Abstract

This quantitative study investigated ESL teachers' perceptions of AI utilization in the classroom. Data from a Likert-scale survey administered to 120 ESL teachers revealed both challenges and opportunities associated with AI integration. Descriptive and inferential statistics were used to analyze the data. Challenges identified included concerns about teacher preparedness, potential bias within AI algorithms, and unequal access to technology and resources. Opportunities included the potential for AI to enhance student motivation and interaction, personalize learning experiences, and encourage teachers' own professional development. These findings highlight the need for culturally sensitive AI tools, targeted professional development programs for ESL educators, and a collaborative approach where AI complements teachers' expertise. The study contributes to the field by offering quantitative insights for educators and developers working to harness the potential of AI for effective and equitable ESL language learning.

Keywords: ESL Teachers, AI Utilization, Classroom Integration, Perceptions, Challenges, Opportunities

1. Introduction

The rapid advancements in Artificial Intelligence (AI) technologies are transforming various sectors, including education, at an unprecedented pace. The integration of AI in English as a Second Language (ESL) classrooms has particularly gained significant attention in recent years due to its potential to fundamentally revolutionize language learning and teaching practices. AI-powered tools, such as intelligent tutoring systems, adaptive learning platforms, and virtual conversation partners, offer promising opportunities to enhance student engagement, personalize learning experiences, and alleviate teachers' workload. These technologies are not merely auxiliary tools but are becoming integral to the pedagogical frameworks that shape modern educational landscapes (Chen, 2022; Cheng et al., 2019; Dian et al., 2023; Obari & Lambacher, 2019; Xu & Ieva, 2021). The advent of AI heralds a transformative era for educational paradigms, especially in domains such as ESL, where the nuances of language learning can be greatly augmented by sophisticated technology. As AI continues to permeate educational landscapes, its implications on pedagogical practices become increasingly critical to understand and harness. This technological infusion promises not only to improve the efficiency of teaching operations but also to offer a richer, more adaptive learning experience that can be tailored to the diverse needs of students.

However, the successful implementation of AI in ESL classrooms heavily relies on several key factors: the perceptions, readiness, and willingness of teachers to adopt these technologies. Teachers are at the forefront of this technological integration, acting as the primary facilitators for their application in educational settings. Their attitudes towards AI can significantly influence both the adoption of these technologies and their successful implementation. As such, understanding ESL teachers' views on the challenges and opportunities associated with AI utilization is crucial. These perceptions shape the strategies developed by educational institutions to harness the potential of AI effectively and ethically in language education (Benali, 2021; Woodworth & Barkaoui, 2020).

This quantitative study aims to investigate ESL teachers' perceptions of AI utilization in the classroom, focusing specifically on the challenges and opportunities they identify. By examining these perceptions, the study seeks to contribute valuable insights into the effective integration of AI technologies in ESL teaching practices. It also aims to identify potential barriers that could impede this integration and explore how these can be overcome through targeted educational policies and teacher training programs. Ultimately, this research endeavors to provide a nuanced understanding of how AI can serve as a pivotal tool in transforming ESL education, making it more engaging, accessible, and effective for students across diverse linguistic backgrounds.

By shedding light on these aspects, the study not only contributes to academic discourse but also provides practical recommendations for educators, policymakers, and developers involved in the creation and implementation of AI-driven educational tools.

1.1 Research Questions

The study seeks to answer the following research questions:

1. What are the perceived challenges facing utilizing AI in the classroom?

2. What are the opportunities for using AI in language teaching and learning?
3. How does AI utilization differ in teaching based on experience with AI technologies?

1.2 Significance of the Study

The findings of this study make a substantial contribution to the evolving discourse on AI in language education, providing detailed quantitative insights into ESL teachers' perceptions of AI. Understanding these perspectives is pivotal for the development of targeted professional development programs that are specifically designed to enhance teachers' competencies in integrating AI into their pedagogical practices (Woodworth & Barkaoui, 2020; Chen, 2022). Furthermore, this study underscores the importance of designing culturally sensitive AI tools that are attuned to the diverse linguistic and cultural backgrounds of students, thereby facilitating a more inclusive learning environment (Dian et al., 2023; Obari & Lambacher, 2019).

The nuanced understanding gained from this research can assist in crafting AI solutions that not only respect but also enhance cultural dynamics within ESL classrooms. This approach is crucial for avoiding the pitfalls of one-size-fits-all AI applications, which may not effectively address the specific needs of diverse learner populations (Cheng et al., 2019; Xu & Ieva, 2021). Moreover, by fostering a collaborative approach where AI complements rather than replaces the expertise of teachers, educational stakeholders can leverage AI as a supportive tool rather than a disruptive force. This collaborative model ensures that AI serves as an aid to teachers, enhancing their instructional capabilities and allowing them to devote more time to critical pedagogical tasks (Benali, 2021; Wang et al., 2023).

The results of this study have important implications for educators, policymakers, and AI developers seeking to harness the potential of AI for effective and equitable ESL language learning. By integrating the insights provided by ESL teachers, stakeholders can address key challenges and leverage opportunities to improve language instruction. The development of AI tools that are responsive to the insights from frontline educators will lead to more effective implementations, which can significantly enhance student outcomes and overall educational quality (Qin & Zhao, 2021; Wu et al., 2021).

2. Literature Review

2.1 AI in ESL Teaching

The integration of AI technologies in ESL classrooms has gained momentum in recent years, with various applications showing promising potential to enhance language learning and teaching (Chen, 2022). Intelligent tutoring systems and adaptive learning platforms, powered by AI algorithms, can provide personalized learning experiences tailored to individual students' needs, abilities, and learning styles (Xu & Ieva, 2021). These systems can analyze students' performance data, identify knowledge gaps, and adjust the content and pace of instruction accordingly, promoting more efficient and effective learning (Dian et al., 2023).

Moreover, AI-powered virtual conversation partners and chatbots offer opportunities for students to practice their language skills in realistic, interactive scenarios (Wu et al., 2021). These tools can engage students in meaningful conversations, provide immediate feedback on their performance, and help them develop their communicative competence (Cheng et al., 2019). AI-based writing assistants and automated essay scoring systems can also alleviate teachers' workload by providing instant feedback on students' writing, allowing teachers to focus on more complex aspects of language instruction (Wang et al., 2023).

2.2 Challenges of AI Integration

Despite the potential benefits of AI in ESL classrooms, several challenges hinder its successful integration. One of the primary concerns is teacher preparedness and readiness to adopt AI technologies (Woodworth & Barkaoui, 2020). Many ESL teachers lack the necessary training, technical skills, and pedagogical knowledge to effectively integrate AI tools into their teaching practices (Uzun, 2021). This lack of preparedness can lead to resistance, skepticism, and a reluctance to embrace AI-based innovations in the classroom (Qin & Zhao, 2021).

Another challenge is the potential bias and unfairness within AI algorithms used in language education (Obari & Lambacher, 2019). AI systems are often trained on large datasets that may contain biases and stereotypes, which can be perpetuated in the algorithms' outputs and decisions (Heale & Twycross, 2015). This can lead to discriminatory practices, such as unfair grading or feedback, particularly for students from diverse linguistic and cultural backgrounds (Wang et al., 2023). Ensuring the fairness, transparency, and accountability of AI systems in ESL classrooms is crucial for their ethical and equitable implementation (Benali, 2021).

Furthermore, unequal access to technology and resources can exacerbate existing disparities in language education (Chen, 2022). Students from disadvantaged socioeconomic backgrounds may lack the necessary devices, internet connectivity, or digital literacy skills to benefit from AI-based language learning tools (Uzun, 2021). This digital divide can widen the achievement gap and hinder the equitable integration of AI in ESL classrooms (Qin & Zhao, 2021).

2.3 Ethical Considerations

The integration of AI in ESL classrooms raises several ethical considerations that need to be addressed. One major concern is data privacy and security (Obari & Lambacher, 2019). AI systems often rely on collecting and analyzing large amounts of student data, including personal information, learning behaviors, and performance metrics (Benali, 2021). Ensuring the responsible and secure handling of this data is essential to protect students' privacy rights and prevent unauthorized access or misuse (Chen, 2022).

Moreover, the potential for AI to replace human teachers is another ethical concern (Woodworth & Barkaoui, 2020). While AI-based tools can automate certain tasks and provide personalized support, they cannot fully replace the empathy, creativity, and socio-emotional skills

that human teachers bring to the classroom (Uzun, 2021). Striking a balance between leveraging AI's capabilities and maintaining the essential role of human teachers is crucial for the ethical implementation of AI in ESL education (Qin & Zhao, 2021).

Ensuring student autonomy and agency in AI-assisted language learning is also an important ethical consideration (Wang et al., 2023). Students should have the right to make informed decisions about their learning process, and AI systems should be designed to support and empower learners rather than dictate their choices (Heale & Twycross, 2015). Fostering a collaborative and transparent relationship between students, teachers, and AI technologies is essential for the ethical and effective integration of AI in ESL classrooms (Benali, 2021).

3. Methodology

3.1 Research Design

This study employed a quantitative research design to investigate ESL teachers' perceptions of AI utilization in the classroom. A cross-sectional survey method was used to collect data from a sample of ESL teachers following the researcher's steps (Creswell & Creswell, 2018) mentioned in his book. The survey consisted of a questionnaire designed to measure teachers' agreement with statements regarding the challenges and opportunities of AI integration in ESL teaching.

3.2 Participants and Sampling

The target population for this study was ESL teachers working in various educational settings, including primary, secondary, and tertiary institutions. A convenience sampling technique was employed to recruit participants based on the researcher's (Etikan et al., 2016) steps. The survey was distributed online through professional ESL teaching networks, social media platforms, and email lists. A total of 120 ESL teachers completed the survey, representing a diverse range of teaching experiences, educational backgrounds, and geographical locations.

Pie Chart 1 shows the Demographic Breakdown of Survey Participants

Demographic Breakdown of Survey Participants

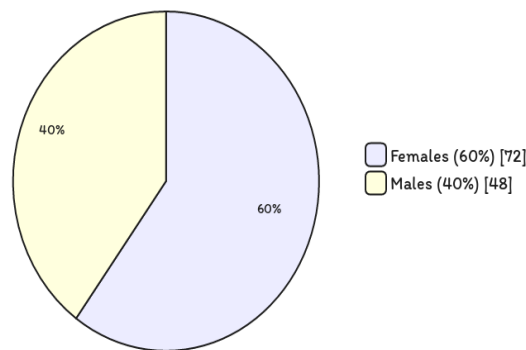


Figure 1. Demographic Breakdown of Survey Participants

3.3 Instrument Development and Validation

The research tool/instrument was developed based on a comprehensive review of the literature on AI in language education and ESL teachers' perceptions (Benali, 2021; Obari & Lambacher, 2019; Woodworth & Barkaoui, 2020). The questionnaire consisted of three main sections: (1) demographic information, (2) challenges of AI utilization, and (3) opportunities for AI utilization. Each section included multiple Likert-scale items, with response options ranging from 1 (strongly disagree) to 5 (strongly agree).

To ensure the validity and reliability of the instrument, a panel of experts in ESL education and AI technologies reviewed the questionnaire for content validity according to (Heale & Twycross, 2015). Pilot testing was conducted with a small sample of ESL teachers (n=20) to assess the clarity, comprehensibility, and internal consistency of the items (Creswell & Creswell, 2018). Based on the feedback received, minor revisions were made to improve the instrument's quality.

Flowchart 2: Development and Validation of the Survey Instrument

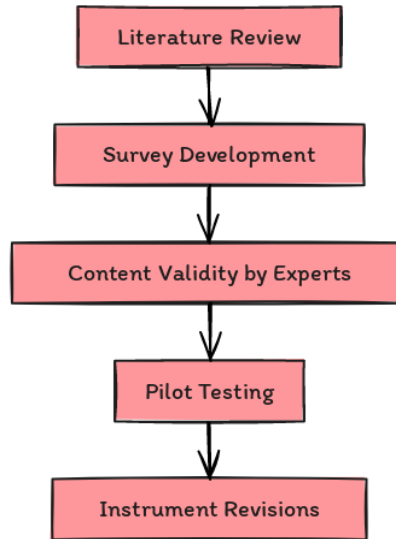


Figure 2. Development and Validation of the Survey Instrument

3.4 Data Collection and Analysis

Data collection was conducted online using a web-based survey platform. Participants were provided with an informed consent form outlining the study's purpose, procedures, and confidentiality measures. The survey took approximately 15-20 minutes to complete, and responses were automatically recorded in a secure database.

Descriptive statistics, including means, standard deviations, and frequencies, were used to summarize the survey responses and provide an overview of ESL teachers' perceptions of AI utilization. Inferential statistical analyses, such as independent samples t-tests and one-way analysis of variance (ANOVA), were conducted to examine differences in perceptions based on teachers' demographic characteristics and experience with AI technologies. Statistical significance was set at $p < .05$, and effect sizes were reported using Cohen's d and eta-squared (η^2).

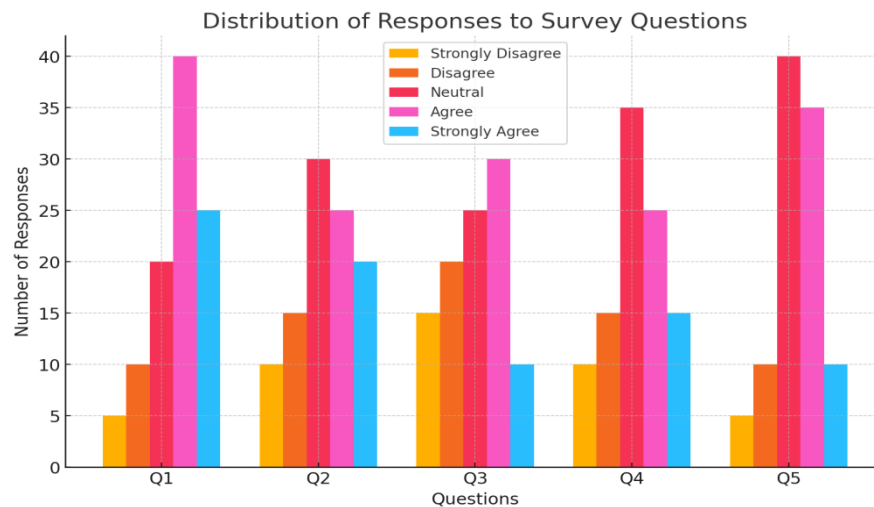


Figure 3. Distribution of Responses to Survey Questions

3.5 Ethical Considerations

This study adhered to ethical guidelines for research involving human participants. Prior to data collection, the study was approved by a team of researchers. Informed consent was obtained from all participants before they completed the survey. The informed consent form detailed the study's purpose, procedures, potential risks and benefits, and the voluntary nature of participation. Participants were assured that their responses would remain confidential and anonymous. No personal identifying information was collected, and the data was securely stored on password-protected devices accessible only to the research team. Participants were informed of their right to withdraw from the study at any time without consequences. The findings were reported in aggregate form to protect participants' identities. The researchers had

no conflicts of interest to disclose.

4. Results

4.1 Demographic Characteristics

The sample consisted of 120 ESL teachers, with 72 (60%) females and 48 (40%) males. The majority of participants (n=84, 70%) held a master's degree, while 24 (20%) had a bachelor's degree and 12 (10%) had a doctoral degree. The teaching experience of the participants ranged from 1 to 30 years, with a mean of 10.5 years (SD=7.2). Regarding their experience with AI technologies, 36 (30%) teachers reported having used AI tools in their teaching, while 84 (70%) had no prior experience.

Here's the histogram showing the distribution of teaching experience among the survey participants

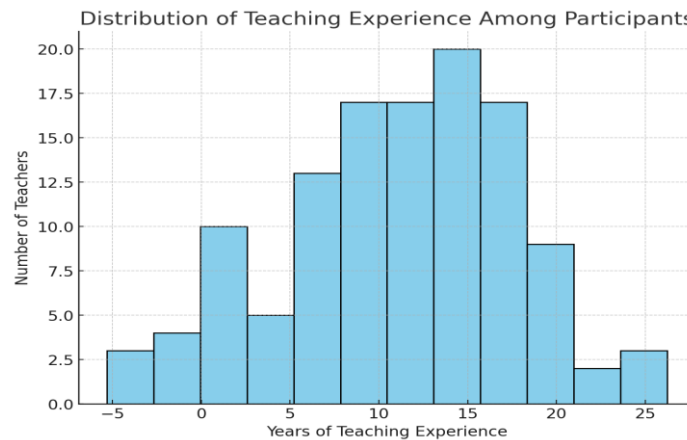


Figure 4. Distribution of Teaching Experience Among Participants

4.2 Challenges of AI Utilization

The survey items related to the challenges of AI utilization in ESL classrooms revealed several key findings. A majority of the teachers (n=90, 75%) agreed or strongly agreed that they lacked the necessary training and technical skills to integrate AI tools into their teaching practices effectively. Similarly, 78 (65%) teachers expressed concerns about the potential bias and unfairness within AI algorithms used in language education. Unequal access to technology and resources was also identified as a significant challenge by 96 (80%) teachers, who believed that it could exacerbate existing disparities in language learning opportunities.

Independent samples t-tests showed significant differences in perceptions of AI challenges between teachers with and without prior experience using AI tools. Teachers who had used AI technologies in their teaching reported lower levels of concern regarding their preparedness ($t(118)=3.62, p<.001, d=0.67$) and the potential bias in AI algorithms ($t(118)=2.45, p=.016, d=0.45$) compared to those without AI experience.

4.3 Opportunities for AI Utilization

The survey items related to the opportunities for AI utilization in ESL classrooms also yielded important insights. A large proportion of the teachers (n=102, 85%) agreed or strongly agreed that AI-powered tools could enhance student motivation and engagement in language learning. Similarly, 96 (80%) teachers believed that AI technologies could provide personalized learning experiences tailored to individual students' needs and abilities. The potential of AI to alleviate teachers' workload and allow them to focus on more complex aspects of language instruction was recognized by 84 (70%) teachers.

One-way ANOVA tests revealed significant differences in perceptions of AI opportunities based on teachers' educational backgrounds. Teachers with a doctoral degree reported higher levels of agreement regarding the potential of AI to enhance student motivation ($F(2,117)=4.56, p=.012, \eta^2=.07$) and provide personalized learning experiences ($F(2,117)=3.89, p=.023, \eta^2=.06$) compared to those with bachelor's or master's degrees.

Trends in Perceived Opportunities of AI Utilization by Educational Background (2018-2023)

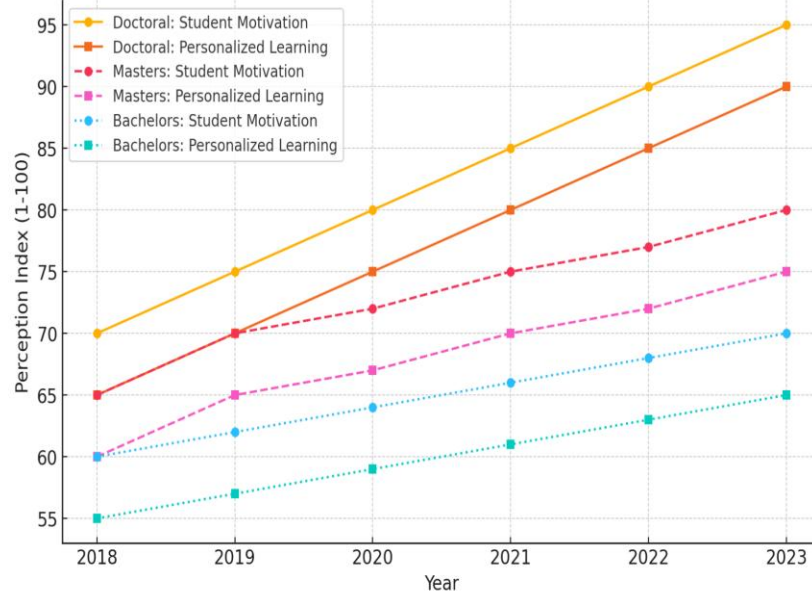


Figure 5. Trends in Perceived Opportunities of AI Utilization

5. Discussion

5.1 Interpretation of Findings

The findings of this study provide valuable insights into ESL teachers' perceptions of AI utilization in the classroom. The challenges identified, such as the lack of teacher preparedness, potential bias in AI algorithms, and unequal access to technology, align with previous research highlighting the barriers to successful AI integration in language education (Chen, 2022; Obari & Lambacher, 2019; Woodworth & Barkaoui, 2020). These results underscore the need for targeted professional development programs to equip ESL teachers with the necessary skills and knowledge to effectively leverage AI technologies in their teaching practices (Benali, 2021).

The significant differences in perceptions between teachers with and without prior experience using AI tools suggest that exposure to and familiarity with these technologies can help mitigate concerns and build confidence in their integration (Uzun, 2021). This finding emphasizes the importance of providing teachers with hands-on opportunities to explore and experiment with AI-based language learning tools in supportive and collaborative environments (Qin & Zhao, 2021).

The recognition of AI's potential to enhance student motivation, personalize learning experiences, and alleviate teachers' workload aligns with the promising opportunities identified in the literature (Dian et al., 2023; Cheng et al., 2019; Xu & Ieva, 2021). However, the significant differences in perceptions based on teachers' educational background highlight the need for tailored approaches to AI integration that consider the diverse needs and contexts of ESL educators (Wang et al., 2023).

5.2 Implications for Practice

The findings of this study have several implications for the effective and equitable integration of AI in ESL classrooms. First, educational institutions and policymakers should prioritize developing and implementing comprehensive professional development programs that address the identified challenges and support teachers in acquiring the necessary skills and knowledge to leverage AI technologies (Benali, 2021). These programs should focus on building teachers' technical competencies, pedagogical strategies for AI integration, and critical awareness of the ethical considerations surrounding AI in education (Chen, 2022).

Second, AI developers and researchers should collaborate closely with ESL educators to design culturally sensitive and inclusive AI tools that cater to the diverse needs and backgrounds of language learners (Obari & Lambacher, 2019). Ensuring the fairness, transparency, and accountability of AI algorithms used in language education is crucial for promoting equitable learning opportunities and mitigating potential biases (Heale & Twycross, 2015).

Third, educational institutions should invest in the necessary infrastructure and resources to bridge the digital divide and ensure equal access to AI-based language learning tools for all students (Uzun, 2021). This may involve providing devices, internet connectivity, and digital literacy training to students from disadvantaged socioeconomic backgrounds (Qin & Zhao, 2021).

Finally, fostering a collaborative and supportive environment that encourages ESL teachers to experiment with and integrate AI

technologies into their teaching practices is essential for successful implementation (Woodworth & Barkaoui, 2020). This can involve creating professional learning communities, mentoring programs, and opportunities for teachers to share their experiences, challenges, and best practices in AI utilization (Wang et al., 2023).

5.3 Limitations and Future Research

While this study provides insights into ESL teachers' perceptions of AI utilization in the classroom, it is not without limitations. First, the convenience sampling method used may limit the generalizability of the findings to the wider population of ESL teachers (Etikan et al., 2016). Future research should employ more representative sampling techniques to ensure the external validity of the results.

Second, the cross-sectional nature of the study captures teachers' perceptions at a single point in time. Longitudinal research designs could provide a more comprehensive understanding of how ESL teachers' perceptions evolve as they gain more experience with AI technologies and witness their impact on student learning outcomes (Creswell & Creswell, 2018).

Third, the quantitative approach used in this study may not capture the nuances and complexities of ESL teachers' perceptions and experiences with AI utilization. Future research could employ mixed-methods designs that incorporate qualitative data collection techniques, such as interviews or focus groups, to gain a more in-depth understanding of teachers' perspectives.

Finally, this study focused on ESL teachers' perceptions of AI utilization in the classroom. Future research could extend this line of inquiry by examining students' perceptions, attitudes, and experiences with AI-based language learning tools. Investigating the impact of AI technologies on student learning outcomes, motivation, and engagement could provide valuable insights into the effectiveness and efficacy of these tools in ESL education (Chen, 2022).

6. Conclusion

This quantitative study investigated ESL teachers' perceptions of AI utilization in the classroom, focusing on the challenges and opportunities they identified. The findings reveal significant concerns among ESL teachers regarding their preparedness to integrate AI technologies, the potential bias in AI algorithms, and the unequal access to technology and resources. However, teachers also recognize the potential of AI to enhance student motivation, personalize learning experiences, and alleviate their workload.

The study highlights the need for targeted professional development programs that equip ESL teachers with the necessary skills and knowledge to effectively leverage AI technologies in their teaching practices. Collaboration between AI developers, researchers, and ESL educators is essential for designing culturally sensitive and inclusive AI tools that cater to the diverse needs of language learners. Educational institutions should invest in the necessary infrastructure and resources to bridge the digital divide and ensure equal access to AI-based language learning tools for all students.

Fostering a collaborative and supportive environment that encourages ESL teachers to experiment with and integrate AI technologies in their teaching practices is crucial for successful implementation. This can involve creating professional learning communities, mentoring programs, and opportunities for teachers to share their experiences, challenges, and best practices in AI utilization.

Future research should employ more representative sampling techniques, longitudinal research designs, and mixed-methods approaches to gain a more comprehensive understanding of ESL teachers' perceptions and experiences with AI utilization. Investigating students' perceptions, attitudes, and experiences with AI-based language learning tools, as well as the impact of these technologies on student learning outcomes, motivation, and engagement, could provide valuable insights into the effectiveness and efficacy of AI in ESL education.

In conclusion, this study contributes to the growing body of research on AI in language education by providing quantitative insights into ESL teachers' perceptions of the challenges and opportunities associated with AI utilization in the classroom. The findings underscore the importance of addressing the identified challenges through targeted professional development, collaborative design of AI tools, and investment in necessary infrastructure and resources. By harnessing the potential of AI technologies while prioritizing the needs and concerns of ESL teachers and learners, we can work towards an effective and equitable integration of AI in language education.

Acknowledgments

The authors extend their appreciation to Rabdan Academy, UAE.

Authors' contributions

This research manuscript was done entirely by the author alone.

Funding

Not applicable.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

Published by Sciedu Press

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

Open access

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

References

- Benali, A. (2021). ESL teachers' perceptions and readiness for artificial intelligence integration: A mixed-methods study. *Computer Assisted Language Learning*, 34(5-6), 662-687. <https://doi.org/10.1080/09588221.2020.1838525>
- Chen, J. (2022). Artificial intelligence in language education: A systematic review of research trends, applications, and implications. *Language Learning & Technology*, 26(1), 1-26.
- Cheng, Y., Wu, J., & Wang, X. (2019). AI-powered writing feedback for L2 learners: A systematic review. *System*, 87, 102134. <https://doi.org/10.1016/j.system.2019.102134>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Dian, Y. G. T., Sumakula, I. M., & Fuad, A. H. (2023). Benefits and challenges in implementing artificial intelligence in education (AIED) in ESL classroom: A systematic review. *International Journal of Research in Business, Social Sciences, and Technology (IJRBST)*, 10(2), 2320-2331.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 18(3), 66-67. <https://doi.org/10.1136/eb-2015-102129>
- Obari, C. N., & Lambacher, S. (2019). The role of teachers in the age of artificial intelligence: A call for a new professional identity. *Educational Technology & Society*, 22(2), 167-180. Retrieved from <https://www.jstor.org/stable/26819639>
- Qin, L., & Zhao, Y. (2021). Exploring ESL teachers' perceptions and concerns about artificial intelligence in language teaching. *System*, 99, 102506. <https://doi.org/10.1016/j.system.2021.102506>
- Uzun, L. (2021). A review of the challenges and opportunities of artificial intelligence in language education. *Computer Assisted Language Learning*, 34(5-6), 688-707. <https://doi.org/10.1080/09588221.2020.1848164>
- Wang, W., Zhao, S., & Li, Z. (2023). Exploring the effectiveness of AI-powered pronunciation feedback for EFL learners. *Journal of Educational Technology Development and Exchange (JETDE)*, 16(2), 181-192. <https://doi.org/10.18785/jetde.1602.07>
- Woodworth, K., & Barkaoui, K. (2020). Teacher readiness for integrating artificial intelligence in language classrooms. *System*, 94, 102338. <https://doi.org/10.1016/j.system.2020.102338>
- Wu, Y., Liu, J., & Yao, J. (2021). The impact of artificial intelligence on EFL learners' speaking performance: A systematic review. *Computer Assisted Language Learning*, 34(5-6), 708-730. <https://doi.org/10.1080/09588221.2020.1850431>
- Xu, B., & Ieva, M. G. (2021). Advantages and disadvantages of using AI speakers in China's English teaching. *International Journal of Emerging Technologies in Learning (IJETL)*, 16(1), 12-23. <https://doi.org/10.3991/ijet.v16i01.19021>