BILINGUAL PUBLISHING GROUP

Forum for Linguistic Studies

https://journals.bilpubgroup.com/index.php/fls

REVIEW

Responsible and Ethical Use of Artificial Intelligence in Language Education: A Systematic Review

Nurkhamimi Zainuddin [1*], Nur Azlin Suhaimi [1], Mohammad Najib Jaffar [1], Norita Md Norwawi [2], Muhammad Sabri Sahrir [3], Wan Ab Aziz Wan Daud [4], Mohammad Taufiq Abdul Ghani [5]

[1] Faculty of Major Language Studies, Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia

[2] Faculty of Science and Technology, Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia

[3] Kuliyyah of Education, International Islamic University Malaysia, 53100 Gombak, Selangor, Malaysia

[4] Faculty of Language Studies and Human Development, Universiti Malaysia Kelantan, 16300 Bachok, Kelantan, Malaysia

[5] Faculty of Languages and Communication, Universiti Pendidikan Sultan Idris, 35900 Tanjung Malim, Perak, Malaysia

ABSTRACT

A plethora of publications have shed light, particularly on the affordances of artificial intelligence (AI) in language education, garnering significant attention, promising transformative impacts on teaching and learning practices. However, the rapid adoption of AI tools has raised ethical concerns regarding data privacy, bias and academic integrity. in response to these concerns, this systematic review aims to explore the responsible and ethical use of AI in language education (REALE) by examining recent literature from 2020 to 2024. The structure of this research revolves around two key questions: What are the emerging patterns and practices in REALE? and What research methodologies have been utilized in studies examining REALE? The researchers selected 9 studies from 65 publications in the Web of Science (WoS) and Scopus databases, following a rigorous screening process based on predefined inclusion and exclusion criteria. These selected studies were analyzed using thematic codes: the objective of the study, methodologies applied, sample, country and the

*CORRESPONDING AUTHOR:

Nurkhamimi Zainuddin, Faculty of Major Language Studies, Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia; Email: khamimi@usim.edu.my

ARTICLE INFO

Received: 20 August 2024 | Revised: 28 August 2024 | Accepted: 9 September 2024 | Published Online: 8 November 2024
DOI: https://doi.org/10.30564/fls.v6i5.7092

CITATION

Zainuddin, N., Suhaimi, N.A., Jaffar, M.N., et al., 2024. Responsible and Ethical Use of Artificial Intelligence in Language Education: A Systematic Review. Forum for Linguistic Studies. 6(5): 316–325. DOI: https://doi.org/10.30564/fls.v6i5.7092

key outcomes reported. The findings reveal a growing trend towards implementing AI in language education, with an emphasis on ethical training and awareness. The review suggests the necessity for educators and policymakers to develop comprehensive guidelines for the responsible and ethical use of AI in language education. It also recommends further research into inclusive and ethical AI practices across different educational levels to foster a more equitable and responsible use of technology in language education.

Keywords: Artificial Intelligence; Systematic Review; Language Education; Responsible; Ethics

1. Introduction

Prior to the advent of Artificial Intelligence (AI) technology, Information and Communication Technology (ICT) had significantly contributed to enhancing learning settings through various advancements and transformations. According to Papadakis, the integration of IoT, AI and ICT has further amplified these transformations, enabling more accessible and inclusive education[1]. Subsequently, AI has garnered the attention of education experts in several ways, particularly in its influence on the methods and practices of teaching and learning[2–4]. AI technology is becoming more and more interwoven into several elements of life in this era characterised by increased mobility and technology. Aravantinos et al. highlight the growing presence of AI in primary school settings, underscoring the importance of understanding its educational impact through systematic reviews of existing literature[5]. Prior research has observed that AI technology has been extensively incorporated into education through the utilisation of natural language processing in machine learning, data mining and learning analytics[2, 4, 6].

The application of AI in education is growing significantly[7–9]. AI is an educational tool that allows educators to provide content with greater efficiency and significance. AI is not solely a learning tool; rather, it possesses the capability to comprehend and address the unique requirements of students, fostering a more engaging and immersive learning atmosphere. Lavidas et al. further emphasize that AI's role extends beyond the classroom, influencing students' intentions to use AI applications for academic purposes, particularly in the humanities and social sciences[10]. AI has numerous applications that advance education in a more progressive manner. These include the utilisation of an Intelligent Tutoring System, Voice Assistant, Personalised Learning, Virtual Mentor, Smart Content, Automatic Assessment and Educational Games. Education integrates humans with technology through the utilisation of various technologies, resulting in a flexible and participatory learning method[11].

2. Literature Review

2.1. Artificial Intelligence in Language Education

The use of AI in language education has many benefits, including the ability to tailor lessons to the needs of different students, giving students immediate, personalized feedback on their work, creating effective tests and forecasting student performance in the classroom[12–15]. AI in language education guarantees optimal support for students throughout their studies[16, 17]. Students may progress through their coursework at their own pace, receive immediate feedback on their development and be guided without the necessity for direct teacher intervention[18]. It can provide students with learning experiences tailored to their individual needs, provide revision suggestions and measure their progress[19, 20]. AI provides a new foundation for educators to construct an adaptive and individualized language classroom[21]. AI-based solutions can ease educators' burdens in several ways, including the use of facial recognition for attendance, automatic evaluation of students, correction of pronunciation, monitoring and recording of student emotions and behaviors, collecting resources, marking homework and answering student questions[22–25].

Regarding language teaching, a few studies have highlighted the efficacy of AI in assisting students with vocabulary acquisition, pronunciation and the development of all four language abilities. Attention was focused on many learner-related matters, including their level of attentiveness, level of engagement, level of interest and attitude, as well as the assessment of their competency and level of achievement. The results encompassed enhanced writing proficiency, pre-

cision, constructive discourse, diminished speech-related worries and a heightened level of involvement [26–29].

Recent studies have also highlighted how AI-driven chatbots significantly enhance academic engagement among EFL students by fostering deeper learning interactions and promoting more active participation [30]. Wu et al. have explored the determinants influencing EFL learners' intentions to use AI in distributed learning environments, emphasizing the importance of understanding learners' perceptions and the contextual factors that drive AI adoption [31]. Moreover, the engagement of Chinese EFL learners with large language models has been investigated, revealing the critical role of autonomy, competence and relatedness in fostering effective learning outcomes [32]. Research into vocabulary learning using large language models shows that AI tools offer unique advantages in enhancing vocabulary acquisition and retention, beyond traditional learning methods [33].

Most studies utilizing artificial intelligence in language education predominantly focus on outlining the AI tools employed for language teaching, yet they often overlook the exploration of ethical and responsible utilization methods of these AI tools. To get insight into how to effectively tackle these concerns and establish a framework that is both responsible and sustainable, we may explore the use of AI as an independent entity for language instruction and evaluate the possible ethical hazards it may entail.

Considering the widespread use of AI in language education, including its various applications and benefits, it becomes crucial to emphasize the responsible and ethical use of AI in this field. The researchers continuously investigate the literature to identify the types and tendencies of recent studies, ensuring the responsible and ethical use of AI in language education. This will aid in comprehending current practices and guiding future research in the field, focusing on two key research questions:

1. What are the emerging patterns and practices in REALE?
2. What research methodologies have been utilized in studies examining REALE?

Therefore, this study comprehensively examines REALE from various perspectives, including the distribution of research themes and the methodological features of the REALE investigations. It also provides comprehensive summaries and annotated references on the subject. By meticulously examining the range of study subjects, the objective and the methodological features, it provides a more comprehensive understanding of REALE.

3. Methodology

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework was used to guide this study. It has four main steps: identification, screening, eligibility and inclusion (see **Figure 1**). The extensive scope and adaptability of PRISMA have rendered it a preferred instrument among researchers. This research aims to determine the purpose of this study and outline the methodology for conducting a systematic review.

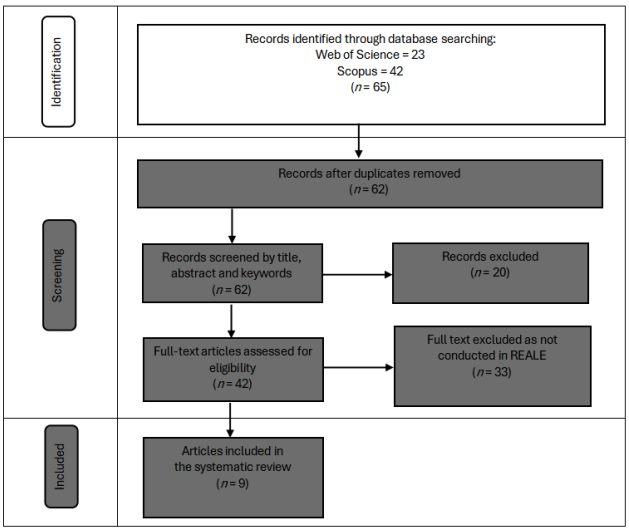

Figure 1. The PRISMA systematic review [34].

3.1. Identification

The PRISMA guidelines offer a structured approach for the initial identification phase of any systematic review. The researchers selected the databases Web of Science and Scopus as the primary sources of data for this study. The key search phrases were meticulously crafted to ensure they accurately reflected the concepts under investigation, incorporating a range of terms relevant to REALE. The specific search queries used in this study are detailed in **Table 1**.

Table 1. Search string used in this study.

Database	Search String
Web of Science (WoS)	TS = ((“artificial intelligence” OR “AI”) AND (“responsible” OR “ethical” OR “ethics”) AND (“adoption” OR “implementation” OR “use”) AND (“language education” OR “language learning” OR “language teaching” OR “language pedagogy” OR “language instruction”))
Scopus	TITLE-ABS-KEY ((“artificial intelligence” OR “AI”) AND (“responsible” OR “ethical” OR “ethics”) AND (“adoption” OR “implementation” OR “use”) AND (“language education” OR “language learning” OR “language teaching” OR “language pedagogy” OR “language instruction”))

3.2. Screening

Once 65 articles are identified, they undergo screening, starting with the removal of duplicates that appear in more than one database. The preliminary evaluation eliminated 3 redundant articles, leaving a total of 62 articles. The researchers examined the titles, abstracts and keywords of these 62 articles in order to ascertain their pertinence to the topic of “Responsible and Ethical Artificial Intelligence in Language Education”. Through the screening process, 20 publications were excluded as they were considered irrelevant to the study’s objectives. **Table 2** presents the outcomes of the inclusion/exclusion screening process that was carried out on the remaining 42 articles.

Table 2. Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
Studies conducted between 2020 and 2024	Studies conducted before 2020
Articles from open access journals	Articles that are not published in open access journals
Articles from journals	Conference proceedings, review articles and books
The text was written in English	Text not written in English
Related to REALE	Not related to REALE

The inclusion of publications in this systematic review was based on the assessment of 9 articles. These articles were first examined to determine if they met specific criteria for inclusion or exclusion. The researchers conducted a review, excluding book chapters and conference proceedings due to their relative lack of comprehensiveness [35].

3.3. Included

This literature study focused on REALE and were chosen from Scopus and WoS, as shown in **Table 3**. The databases were chosen based on the exceptional calibre of the instructional content they contain. This study dedicated each investigation to examining a specific facet of the REALE, with the majority occurring in higher education environments.

3.4. Data Analysis Procedure

The selected publications were imported into Mendeley, a citation management tool and subsequently arranged, annotated and categorised according to their relevance to the research enquiries. This study employed thematic analyses to address the subsequent research problems.

Table 3. Summary of the selected studies.

Study	Database
Yang et al. (2024) [36]	Scopus, WoS
Ružić & Balaban (2024) [37]	Scopus, WoS
Ross & Baines (2024) [38]	Scopus, WoS
Cong-Lem et al. (2024) [39]	Scopus
Hieu & Thao (2024) [40]	Scopus
Ivanytska, et al. (2024) [41]	WoS
Avsheniuk et al. (2024) [42]	WoS
Noroozi et al. (2024) [43]	WoS
Joseph (2023) [44]	WoS

4. Findings and Discussion

4.1. The Emerging Patterns and Practices in REALE

The escalating quantity of publications published between 2020–2024 provides evidence of the rising interest in REALE over the past 5 years, particularly in the aftermath of the COVID-19 pandemic. These selected studies were analyzed using thematic codes: the objective of the study, methodologies applied, sample, country and the key outcomes as shown in **Table 4**.

Table 4. Patterns and Practices of REALE.

Study	Objective	Methodology	Sample	Country	Outcome
Yang et al. (2024)[36]	To examine the ethical considerations and emotional reactions linked to the utilisation of AI chatbots in educational environments	Mixed Method	Articles from Web of Science and SpringerLink	China	The transformative potential of ChatGPT in education and the need for careful consideration of ethical implications and the emotional impact on students
Ružić & Balaban (2024)[37]	To examine the utilisation of AI in primary and secondary education, focussing on the theoretical underpinnings, areas of application and ethical concerns	Qualitative	Articles from Web of Science and Scopus	Croatia	A need for extensive studies to integrate AI into education and establish clear guidelines to harness the ethical considerations and data privacy concerns
Ross & Baines (2024)[38]	To discuss the benefits, drawbacks and ethical considerations of generative AI	Mixed method	Staff and students from the Department of Classics, University of Reading	United Kingdom	By imparting the ethical issues of generative AI to staff and students, they can make well-informed assessments regarding the utilisation of AI in their work, devoid of unwarranted trust or undue apprehension
Cong-Lem et al. (2024)[39]	To explore EFL teachers' views on what they consider academic dishonesty involving AI and examines the strategies they use or plan to use in response	Mixed Method	31 EFL teachers from various institutions	Vietnam	The teachers predominantly viewed plagiarism, absence of innovative concepts and use of AI-generated content without appropriate acknowledgement as manifestations of academic dishonesty
Hieu & Thao (2024)[40]	To examine the difficulties and potential advantages of incorporating ChatGPT into language instruction methods	Qualitative	9 EFL teachers from 2 educational institutions	Vietnam	The study identified the challenges and opportunities in integrating ChatGPT into language teaching including cultural and contextual misalignments, language accuracy issues and ethical considerations
Ivanytska, et al. (2024)[41]	To emphasize the significance of teachers' proficiency in negotiating the ethical ramifications of integrating AI into education	Quantitative	86 EFL students from various Ukrainian universities	Ukraine	A need for a method of integrating AI into foreign language instruction that effectively combines the advantages of teaching with the necessary precautions to maintain the standard and authenticity of the educational experience
Avsheniuk et al. (2024)[42]	To examine the impact of ChatGPT on critical thinking skills and proficiency in the English language	Mixed Method	31 students and 3 language instructors from English departments	Ukraine	Various perspectives on the effectiveness of ChatGPT, its influence on critical thinking, the enhancement of English language abilities and ethical concerns
Noroozi et al. (2024)[43]	To address ethical concerns associated with the utilisation of Generative AI in the field of education	Qualitative	17 articles from SSCI-indexed journals	Netherlands	A need for an ethical guideline, to ensure responsible integration in diverse educational contexts
Joseph (2023)[44]	To develop a framework for integrating LLM-based tools like ChatGPT into language teaching	Qualitative	17 articles from Google Scholar and ScienceDirect	India	To address ethical considerations related to the use of Large Language Model-based tools in education

Studies from **Table 4** reveal a growing trend towards the ethical and responsible use of AI in education, with a particular focus on addressing the challenges and ethical considerations associated with AI tools such as chatbots and large language models. The COVID-19 pandemic has accelerated interest in these technologies, as educators seek innovative ways to engage students in remote and distributed learning environments. Methodologically, there has been a noticeable prevalence of mixed methods and qualitative studies, with only one quantitative study present, allowing researchers to explore both the quantitative outcomes and the qualitative experiences of students and educators with AI tools. This trend reflects a broader recognition of the need to balance technological innovation with ethical responsibility in education.

The practices identified in the literature highlight the diverse applications of AI in educational settings. These include using AI-driven chatbots to enhance student engagement, applying large language models for personalized learning experiences and addressing academic dishonesty through AI monitoring tools. These studies highlight the significance of formulating unambiguous guidelines and frameworks to ensure the ethical integration of AI into education while protecting student data privacy. The field is increasingly emphasizing not only the technological capabilities of AI, but also its ethical implications and the need for educators to receive adequate training to effectively navigate these challenges.

4.2. The Research Methodologies Utilized in Studies Examining the REALE

The systematic review included 9 studies, all of which employed three distinct study methodologies: mixed methods, qualitative, and quantitative. Overall, most studies on REALE patterns and practices favoured a qualitative and mixed-methods approaches, which is reflected in the equal proportion of qualitative and mixed-methods studies in the reviewed literature. Quantitative methods were the least common, with only one study employing this approach.

Qualitative and mixed-methods approaches were the most frequently employed in the reviewed studies. These approaches focused on gathering rich, in-depth insights into the experiences and perspectives of educators and students using AI in language education. Four studies used qualitative methods, such as case studies, to explore the nuances of ethical AI implementation in classrooms, while four studies utilized mixed methods to gain a comprehensive understanding by integrating both quantitative and qualitative data. These studies highlighted the challenges and ethical concerns associated with AI use, as well as the perceived impacts on teaching and learning. Despite the potential for in-depth understanding, qualitative research in REALE has faced criticism due to issues like small sample sizes and challenges in establishing reliability and validity [45–47]. However, these studies provided essential contextual information that quantitative methods might overlook. Examining qualitative data can be challenging, iterative, intricate, perplexing, and time-intensive, despite its ability to offer substantiated, elaborate, and extensive accounts of individuals' experiences and reasoning regarding the relevant issues [48–50].

Only one study employed a quantitative approach, which focused on statistical analysis to assess the impact and effectiveness of AI tools in language education. This study utilized experimental designs, coupled with surveys and questionnaires to collect data. The use of these methodologies allowed the researcher to generate reliable, objective, and statistically significant results, which are crucial for evaluating the ethical and responsible use of AI in educational contexts. Agarwal et al. and Allen et al. have highlighted the preference for quantitative methods due to their reliability and objectivity [51, 52]. These methods offered clear metrics and quantifiable data for evaluating the outcomes of AI implementation in educational settings. The findings of this review corroborate the claims put out by other previous researches that quantitative methods are less common among educational scholars [53–55].

Mixed-methods studies integrated questionnaires with open-ended inquiries or semi-structured interviews to offer a comprehensive perspective on the use and perception of AI tools in language education. There are researchers argue that mixed-method designs are particularly effective in education research because they allow for triangulation of data, which enhances the validity and reliability of the findings [56–59]. The use of mixed methods in REALE studies, while equally prevalent as qualitative methods, is commendable for its ability to address complex research questions from various perspectives. Researchers praise the mixed-method approach for its ability to obtain triangulated data, thereby enhancing

the validity and comprehensiveness of evidence supporting the application of REALE approaches in language teaching and learning[60, 61].

5. Conclusions

The present study conducted a systematic literature analysis, examining 9 publications released from 2020 to 2024 to address the research issue regarding the current state of research patterns and practices in REALE. The conclusions of this review have consolidated the current knowledge in REALE research, covering key aspects such as the objectives, methodologies, samples, countries of study and outcomes. The investigation revealed that while REALE research is still in its nascent stages, there is significant growth and potential in this field. The findings highlight the importance of continued exploration and development to effectively implement REALE at all educational levels.

This study, like several others, has inherent limitations that present opportunities for further investigation. The scope of this review was limited to the journals included in the analysis, primarily those listed in WoS and Scopus. The increasing volume of articles in REALE made it challenging to conduct a comprehensive and exhaustive search. The criteria formulated for selecting publications, though rigorous, may have excluded relevant studies published in other reputable sources. Additionally, the review focused predominantly on studies related to English as a foreign Language (EFL), which may not fully represent the diversity of REALE research across different languages and educational contexts.

Given the limitations identified, future research should broaden the scope of REALE studies to include additional sources such as conference proceedings, project reports and academic dissertations that involve languages other than English, such as Arabic, Mandarin, French, Korean or Japanese. Expanding the timeframe and including a wider range of research emphases could reveal more extensive patterns and shifts in the evolution of REALE over time. Future studies should investigate whether people utilize REALE as an independent modality or as part of established courses or programs with robust pedagogical frameworks. These investigations would provide valuable insights into the most effective ways to integrate REALE into diverse educational settings.

Author Contributions

Conceptualization, N.Z. and N.A.S.; methodology, N.Z.; software, M.S.S.; validation, N.M.N.; formal analysis, N.A.S.; investigation, M.N.J.; resources, W.A.A.W.D. and M.T.A.G.; data curation, N.A.S.; writing—original draft preparation, M.N.J.; writing—review and editing, N.M.N.; visualization, W.A.A.W.D.; supervision, N.Z.; project administration, M.T.A.G.; funding acquisition, N.Z. All authors have read and agreed to the published version of the manuscript. Authorship must be limited to those who have contributed substantially to the work reported.

Funding

This research was funded by the Ministry of Higher Education (MoHE) of Malaysia under the Fundamental Research Grant Scheme with reference number (FRGS/1/2024/SSI09/USIM/02/5).

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The data that support the findings of this study are openly available in the references section of this article and can be accessed through the links in this section. All relevant data and materials used in this study are included in these sources and are accessible through the provided links. There are no restrictions on access to these data.

Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Papadakis, S., 2024. IoT, AI, and ICT for Educational Applications: Technologies to Enable Education for All. Springer Nature: Cham, Switzerland. DOI: https:

//doi.org/10.1007/978-3-031-50139-5

[2] Al-Khassawneh, Y.A., 2023. A Review of Artificial Intelligence in Security and Privacy: Research Advances, Applications, Opportunities, and Challenges. Indonesian Journal of Science and Technology. 8(1), 79–96. DOI: https://doi.org/10.17509/ijost.v8i1.52709

[3] Agarry, R.O., Omolafe, E.V., Animashaun, V.O., et al., 2022. Primary Education Undergraduates' Competency in The Use of Artificial Intelligence for Learning in Kwara State. ASEAN Journal of Educational Research and Technology. 1(2), 111–118.

[4] Alimi, A.E., Buraimoh, O.F., Aladesusi, G.A., et al., 2021. University Students' Awareness of, Access to, and Use of Artificial Intelligence for Learning in Kwara State. Indonesian Journal of Teaching in Science. 1(2), 91–104. DOI: https://doi.org/10.17509/ijotis.v1i2.38014

[5] Aravantinos, S., Lavidas, K., Voulgari, I., et al., 2024. Educational Approaches with AI in Primary School Settings: A Systematic Review of the Literature Available in Scopus. Education Sciences. 14(7), 744. DOI: https://doi.org/10.3390/educsci14070744

[6] Widodo, S., Yulianti, Y., 2022. Developing Civics Education Textbook Based on ICT-Integrated Anti-Corruption Education. Jurnal Pendidikan Ilmu Sosial. 31(2), 227–238. DOI: https://doi.org/10.17509/jpis.v31i2.42957

[7] Boubker, O., 2024. From Chatting to Self-Educating: Can AI Tools Boost Student Learning Outcomes? Expert Systems with Applications. 238(Part A), 121820. DOI: https://doi.org/10.1016/j.eswa.2023.121820

[8] Park, W., Kwon, H., 2024. Implementing Artificial Intelligence Education for Middle School Technology Education in Republic of Korea. International Journal of Technology and Design Education. 34(1), 109–135. DOI: https://doi.org/10.1007/s10798-023-09812-2

[9] Williamson, B., 2024. The Social Life of AI in Education. International Journal of Artificial Intelligence in Education. 34(1), 97–104. DOI: https://doi.org/10.1007/s40593-023-00342-5

[10] Lavidas, K., Voulgari, I., Papadakis, S., et al., 2024. Determinants of Humanities and Social Sciences Students' Intentions to Use Artificial Intelligence Applications for Academic Purposes. Information. 15(6), 314. DOI: https://doi.org/10.3390/info15060314

[11] Anwar, M.R., Ahyarudin, H.A., 2023. AI-Powered Arabic Language Education in the Era of Society 5.0. IAIC Transactions on Sustainable Digital Innovation (ITSDI). 5(1), 50–57. DOI: https://doi.org/10.34306/itsdi.v5i1.607

[12] Hartono, W.J., Nurfitri, N., Ridwan, R., et al., 2023. Artificial Intelligence (AI) Solutions in English Language Teaching: Teachers-Students Perceptions and Experiences. Journal on Education. 6(1), 1452–1461. DOI: https://doi.org/10.31004/joe.v6i1.3101

[13] Dever, D.A., Azevedo, R., Cloude, E.B., et al., 2020. The Impact of Autonomy and Types of Informational Text Presentations in Game-Based Environments on Learning: Converging Multi-Channel Processes Data and Learning Outcomes. International Journal of Artificial Intelligence in Education. 30, 581–615. DOI: https://doi.org/10.1007/s40593-020-00215-1

[14] Rusmiyanto, R., Huriati, N., Fitriani, N., et al., 2023. The Role of Artificial Intelligence (AI) in Developing English Language Learner's Communication Skills. Journal on Education. 6(1), 750–757. DOI: https://doi.org/10.31004/joe.v6i1.2990

[15] Çağataylı, M., Çelebi, E., 2022. Estimating Academic Success in Higher Education Using Big Five Personality Traits, A Machine Learning Approach. Arabian Journal for Science and Engineering. 47(2), 1289–1298. DOI: https://doi.org/10.1007/s13369-021-05873-4

[16] Liang, J.C., Hwang, G.J., Chen, M.R.A., et al., 2021. Roles and Research Foci of Artificial Intelligence in Language Education: An Integrated Bibliographic Analysis and Systematic Review Approach. Interactive Learning Environments. 31(7), 4270–4296. DOI: https://doi.org/10.1080/10494820.2021.1958348

[17] Darvishi, A., Khosravi, H., Sadiq, S., et al., 2024. Impact of AI Assistance on Student Agency. Computers & Education. 210, 104967. DOI: https://doi.org/10.1016/j.compedu.2023.104967

[18] Bilad, M.R., 2023. Enhancing Engineering Electromagnetics Education: A Comparative Analysis of Synchronous and Asynchronous Learning Environments. International Journal of Essential Competencies in Education. 2(1), 66–74. DOI: https://doi.org/10.36312/ijece.v2i1.1369

[19] Binhammad, M.H.Y., Othman, A., Abuljadayel, L., et al., 2024. Investigating How Generative AI Can Create Personalized Learning Materials Tailored to Individual Student Needs. Creative Education. 15(7), 1499–1523. DOI: https://doi.org/10.4236/ce.2024.157091

[20] Huang, X., Zou, D., Cheng, G., et al., 2023. Trends, Research Issues and Applications of Artificial Intelligence in Language Education. Educational Technology & Society. 26(1), 112–131. Avalable from: https://www.jstor.org/stable/48707971 (cited 4 May 2024).

[21] Adair, A., 2023. Teaching and Learning With AI: How Artificial Intelligence Is Transforming The Future of Education. XRDS: Crossroads, The ACM Magazine for Students. 29(3), 7–9. DOI: http://dx.doi.org/10.1145/3589252

[22] Altinay, Z., Altinay, F., Sharma, R.C., et al., 2024. Capacity Building for Student Teachers in Learning, Teaching Artificial Intelligence for Quality of Education. Societies. 14(8), 148. DOI: https://doi.org/10.3390/soc14080148

[23] Moxon, S., 2021. Exploring the Effects of Automated Pronunciation Evaluation on L2 Students in Thailand.

IAFOR Journal of Education. 9(3), 41–56. DOI: https://doi.org/10.22492/ije.9.3.03

[24] Vistorte, A.O.R., Deroncele-Acosta, A., Ayala, J.L.M., et al., 2024. Integrating Artificial Intelligence to Assess Emotions in Learning Environments: A Systematic Literature Review. Frontiers in Psychology. 15, 1387089. DOI: https://doi.org/10.3389/fpsyg.2024.1387089

[25] Parker, L., Carter, C., Karakas, A., et al., 2024. Graduate Instructors Navigating The AI Frontier: The Role of ChatGPT in Higher Education. Computers and Education Open, 6, 100166. DOI: https://doi.org/10.1016/j.caeo.2024.100166

[26] Pan, C., Zhang, X., 2023. A Longitudinal Study of Foreign Language Anxiety and Enjoyment. Language Teaching Research. 27(6), 1552–1575. DOI: https://doi.org/10.1177/1362168821993341

[27] Uzun, K., 2020. Future Prediction of L2 Writing Performance: A Machine Learning Approach. Journal of Educational Technology. 17(2). DOI: https://doi.org/10.26634/JET.17.2.16840

[28] Yeşilçınar, S., Erdemir, N., 2023. Are Enjoyment and Anxiety Specific to Culture? An Investigation Into The Sources of Turkish EFL Learners' Foreign Language Enjoyment and Anxiety. Innovation in Language Learning and Teaching. 17(2), 453–468. DOI: https://doi.org/10.1080/17501229.2022.2063295

[29] Zhou, L., Xi, Y., Lochtman, K., 2023. The Relationship Between Second Language Competence and Willingness to Communicate: The Moderating Effect of Foreign Language Anxiety. Journal of Multilingual and Multicultural Development. 44(2), 129–143. DOI: https://doi.org/10.1080/01434632.2020.1801697

[30] Wang, Y., Xue, L., 2024. Using AI-driven Chatbots to Foster Chinese EFL Students' Academic Engagement: An Intervention Study. Computers in Human Behavior. 159, 108353. DOI: https://doi.org/10.1016/j.chb.2024.108353

[31] Wu, H., Wang, Y., Wang, Y.L., 2024. "To Use Or Not to Use?": A Mixed-Methods Study on The Determinants of EFL College Learners' Behavioral Intention to Use AI in The Distributed Learning Context. The International Review of Research in Open and Distributed Learning. 25(3), 158–178. DOI: https://doi.org/10.19173/irrodl.v25i3.7708

[32] Wang, X., Wang, S., 2024. Exploring Chinese EFL Learners' Engagement With Large Language Models: A Self-Determination Theory Perspective. Learning and Motivation. 87, 102014. DOI: https://doi.org/10.1016/j.lmot.2024.102014

[33] Wang, X., Reynolds, B.L., 2024. Beyond the Books: Exploring Factors Shaping Chinese English Learners' Engagement with Large Language Models for Vocabulary Learning. Education Sciences. 14(5), 496. DOI: https://doi.org/10.3390/educsci14050496

[34] Page, M.J., McKenzie, J.E., Bossuyt, P.M., et al., 2021. The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. Systematic Reviews. 10(1), 1–11. DOI: https://doi.org/10.1186/s13643-021-01626-4

[35] Klarin, A., 2024. How to Conduct A Bibliometric Content Analysis: Guidelines and Contributions of Content Co-Occurrence Or Co-Word Literature Reviews. International Journal of Consumer Studies. 48(2), e13031. DOI: https://doi.org/10.1111/ijcs.13031

[36] Yang, S., Dong, Y., Yu, Z.G., 2024. ChatGPT in Education: Ethical Considerations and Sentiment Analysis. International Journal of Information and Communication Technology Education (IJICTE), 20(1), 1–19. DOI: https://doi.org/10.4018/IJICTE.346826

[37] Ružić, I., Balaban, I., 2024. The Use of Social Robots as Teaching Assistants in Schools: Implications for Research and Practice. Revista de Educación a Distancia (RED), 24(78). DOI: https://doi.org/10.6018/red.600771

[38] Ross, E.A., Baines, J., 2024. Treading Water: New Data on The Impact of AI Ethics Information Sessions in Classics and Ancient Language Pedagogy. The Journal of Classics Teaching. 1–10. DOI: https://doi.org/10.1017/S2058631024000412

[39] Cong-Lem, N., Tran, T.N., Nguyen, T.T., 2024. Academic Integrity in The Age of Generative AI: Perceptions and Responses of Vietnamese EFL Teachers. Teaching English with Technology. 24(1), 28–47. DOI: https://doi.org/10.56297/FSYB3031/MXNB7567

[40] Hieu, H.H., Thao, L.T., 2024. Exploring the Impact of AI in Language Education: Vietnamese EFL Teachers' Views on Using ChatGPT for Fairy Tale Retelling Tasks. International Journal of Learning, Teaching and Educational Research. 23(3), 486–503. DOI: https://doi.org/10.26803/ijlter.23.3.24

[41] Ivanytska, N., Koliasa, O., Kovalevska, T., et al., 2024. Analyzing the Possibilities of Implementation of AI and Social Networks in Teaching Foreign Language Students: Ukrainian Universities Case Study. Arab World English Journal (AWEJ) Special Issue on ChatGPT, 306–318. DOI: https://dx.doi.org/10.24093/awej/ChatGPT.21

[42] Avsheniuk, N., Lutsenko, O., Svyrydiuk, T., et al., 2024. Empowering Language Learners' Critical Thinking: Evaluating ChatGPT's Role in English Course Implementation. Arab World English Journal (AWEJ) Special Issue on ChatGPT, 210–224. DOI: https://dx.doi.org/10.24093/awej/ChatGPT.14

[43] Noroozi, O., Soleimani, S., Farrokhnia, M., et al., 2024. Generative AI in Education: Pedagogical, Theoretical, and Methodological Perspectives. International Journal of Technology in Education. 7(3), 373–385. DOI: https://doi.org/10.46328/ijte.845

[44] Joseph, S., 2023. Large Language Model-Based Tools in Language Teaching to Develop Critical Thinking

and Sustainable Cognitive Structures. Rupkatha Journal on Interdisciplinary Studies in Humanities. 15(4). DOI: https://doi.org/10.21659/rupkatha.v15n4.13

[45] Dunwoodie, K., Macaulay, L., Newman, A., 2023. Qualitative Interviewing in The Field of Work and Organisational Psychology: Benefits, Challenges and Guidelines for Researchers and Reviewers. Applied Psychology. 72(2), 863–889. DOI: https://doi.org/10.1111/apps.12414

[46] Hammersley, M., 2023. Are There Assessment Criteria for Qualitative Findings? A Challenge Facing Mixed Methods Research. Forum: Qualitative Social Research. 24(1). DOI: https://doi.org/10.17169/fqs-24.1.3935

[47] Willis, M.E., 2023. Critical Realism and Qualitative Research in Psychology. Qualitative Research in Psychology. 20(2), 265–288. DOI: https://doi.org/10.1080/14780887.2022.2157782

[48] Kogen, L., 2024. Qualitative Thematic Analysis of Transcripts in Social Change Research: Reflections on Common Misconceptions and Recommendations for Reporting Results. International Journal of Qualitative Methods. 23, 1–11. DOI: https://doi.org/10.1177/16094069231225919

[49] Oliveira, G., 2023. Developing a Codebook for Qualitative Data Analysis: Insights From A Study on Learning Transfer Between University and The Workplace. International Journal of Research & Method in Education. 46(3), 300–312. DOI: https://doi.org/10.1080/1743727X.2022.2128745

[50] Riazi, M., Ghanbar, H., Rezvani, R., 2023. Qualitative Data Coding and Analysis: A Systematic Review of The Papers Published in the Journal of Second Language Writing. Iranian Journal of Language Teaching Research. 11(1), 25–47. DOI: https://doi.org/10.30466/IJLTR.2023.121271

[51] Agarwal, S.A., Gupta, M., Chauhan, N.K.S., et al., 2024. Basic Concepts of Research Methodology & Statistics. Academic Guru Publishing House: Madhya Pradesh, India.

[52] Allen, G.I., Gan, L., Zheng, L., 2023. Interpretable Machine Learning for Discovery: Statistical Challenges and Opportunities. Annual Review of Statistics and Its Application. 11, 97–121. DOI: https://doi.org/10.1146/annurev-statistics-040120-030919

[53] Åkerlind, G.S., 2024. Common Misunderstandings of Phenomenographic Research in Higher Education. Higher Education Research & Development. 43(1), 1–16. DOI: https://doi.org/10.1080/07294360.2023.2218804

[54] Fischer, H.E., Boone, W.J., Neumann, K., 2023. Quantitative Research Designs and Approaches. In: Lederman, N.G., Zeidler, D.L., Lederman, J.S. (Eds.). Handbook of Research on Science Education. Routledge: London, UK. pp. 28–59.

[55] Kaeedi, A., Esfahani, A.R.N., Sharifian, F., et al., 2023. The Quantitative and Qualitative Study of The Effectiveness of The Problem-Based Learning Approach in Teaching Research Methods. Journal of University Teaching and Learning Practice. 20(5). DOI: https://doi.org/10.53761/1.20.5.07

[56] Humphreys, M., Jacobs, A.M., 2023. Integrated Inferences: Causal Models for Qualitative and Mixed-Method Research. Cambridge University Press: Cambridge, UK. DOI: https://doi.org/10.1017/9781316718636

[57] Knappertsbusch, F., 2023. From Paradigm Wars to Peaceful Coexistence? A Sociological Perspective on the Qualitative-Quantitative-Divide and Future Directions for Mixed Methods Methodology. Forum Qualitative Social Research. 24(1). DOI: https://doi.org/10.17169/fqs-24.1.3966

[58] Hirose, M., Creswell, J.W., 2023. Applying Core Quality Criteria of Mixed Methods Research to An Empirical Study. Journal of Mixed Methods Research. 17(1), 12–28. DOI: https://doi.org/10.1177/15586898221086346

[59] Mertens, D.M., 2023. Research and Evaluation in Education and Psychology: Integrating Diversity with Quantitative, Qualitative, and Mixed Methods. Sage Publications: London, UK.

[60] Creswell, J.W., Plano Clark, V.L., 2023. Revisiting Mixed Methods Research Designs Twenty Years Later. In: Poth, C.N. (Ed.). The Sage Handbook of Mixed Methods Research Design. Sage Publications: London, UK. pp. 21–36. DOI: https://doi.org/10.4135/9781529682663.n6

[61] Wallwey, C., Kajfez, R.L., 2023. Quantitative Research Artifacts As Qualitative Data Collection Techniques in A Mixed Methods Research Study. Methods in Psychology. 8, 100115. DOI: https://doi.org/10.1016/j.metip.2023.100115