Aling Siyan Sabili[1]
M. Adib Nazri[2]
Siti Ayu Surayya[3]
Laila Wati[4]

SMART LEARNING: THE IMPACT OF AI TECHNOLOGIES ON ENGLISH LANGUAGE PROFICIENCY IN THE DIGITAL ERA

Abstrak

Penelitian ini mengkaji dampak alat berbasis AI terhadap kemahiran berbahasa Inggris di kalangan mahasiswa General English di Universitas Hamzanwadi. Pendekatan deskriptif kualitatif digunakan untuk mengeksplorasi bagaimana teknologi AI, termasuk aplikasi pembelajaran bahasa, pengenalan ucapan otomatis, dan gamifikasi, memengaruhi perolehan kosakata, ketepatan pengucapan, dan kelancaran bahasa secara keseluruhan. Data dari 20 mahasiswa dikumpulkan melalui observasi, kuesioner, dan wawancara. Hasil penelitian menunjukkan bahwa alat berbasis AI secara signifikan meningkatkan keterampilan berbahasa Inggris mahasiswa, terutama dalam berbicara, mendengarkan, membaca, dan menulis. Mahasiswa melaporkan peningkatan kepercayaan diri dalam berbicara, antusiasme yang lebih besar dalam membaca, dan kemampuan menulis yang lebih baik. Selain itu, 60% mahasiswa setuju bahwa alat berbasis AI meningkatkan keterampilan mendengarkan mereka. Penelitian ini menyimpulkan bahwa teknologi AI menawarkan pengalaman belajar yang dipersonalisasi dan interaktif yang mengurangi kecemasan, meningkatkan kepercayaan diri, dan meningkatkan motivasi. Disarankan agar para pendidik EFL lebih banyak mengintegrasikan alat berbasis AI dalam strategi pengajaran mereka untuk memaksimalkan manfaat ini, sambil terus menyempurnakan alat tersebut berdasarkan umpan balik mahasiswa guna meningkatkan efektivitas dalam pembelajaran bahasa.

Kata Kunci: Teknologi AI, Kemahiran Bahasa Inggris.

Abstract

This study examined the impact of AI-powered tools on English language proficiency among General English students at Hamzanwadi University. A qualitative descriptive approach was used to explore how AI technologies, including language learning apps, automated speech recognition, and gamification, influence vocabulary acquisition, pronunciation accuracy, and overall fluency. Data from 20 students were collected through observations, questionnaires, and interviews. The results showed that AI tools significantly enhanced students' English skills, particularly in speaking, listening, reading, and writing. Students reported increased confidence in speaking, greater enthusiasm for reading, and improved writing abilities. Additionally, 60% of students agreed that AI tools improved their listening skills. The study concludes that AI technologies offer personalized, interactive learning experiences that reduce anxiety, boost confidence, and enhance motivation. It is recommended that EFL educators integrate AI tools more extensively in their teaching to maximize these benefits, while also refining these tools based on student feedback for greater effectiveness in language learning.

Keywords: AI Technologies, English Language Proficiency

INTRODUCTION

In the rapidly evolving landscape of education, technology has become a pivotal force reshaping traditional learning environments. Among the myriad of technological advancements, Artificial Intelligence (AI) stands out as a transformative tool in the field of language education (Bahroun et al., 2023). The integration of AI technologies into language learning platforms has

---

[1][2][3][4] Study Program of English Language Education, Faculty of Language, Art, and Humanities, Hamzanwadi University

email: 28siyansabili@gmail.com

introduced innovative methods to enhance English language proficiency, enabling personalized and efficient learning experiences that were previously unattainable. As the global demand for English proficiency continues to grow, particularly in non-native English-speaking countries, the role of AI in facilitating language acquisition has garnered significant attention from educators, researchers, and policymakers.

The integration of AI technologies into English language education offers several advantages. AI-powered platforms provide customized learning experiences by adjusting content to match each learner's needs, speed, and skill level. This personalization helps accommodate various learning styles and ensures that instruction is tailored to individual strengths and weaknesses (Srinivasa et al., 2022). Additionally, AI enhances learner engagement and motivation through interactive and gamified elements, making the learning process more enjoyable and effective.

AI tools also offer immediate feedback and assessments, enabling learners to monitor their progress and make timely improvements. This ongoing feedback helps accelerate learning and address specific challenges. Furthermore, AI can provide access to high-quality educational resources and expertise, helping to overcome shortages of qualified instructors. AI's role in language education not only boosts proficiency but also makes quality learning more accessible across diverse contexts (Pokrivcakova, 2019).

According to Wang (2019), AI refers to the simulation of human intelligence in machines that are programmed to perform tasks typically requiring human cognition, such as learning and problem-solving. In educational contexts, AI is applied through various tools that enhance teaching and learning. For instance, speech recognition technology allows for real-time feedback on pronunciation and fluency, helping students practice speaking skills with greater accuracy. English learning apps leverage AI to offer personalized lessons and adapt content based on individual progress, making language acquisition more tailored and effective. Additionally, gamification strategies, powered by AI, integrate game-like elements into the learning process, increasing engagement and motivation by making learning interactive and enjoyable. These AI tools collectively contribute to creating a more dynamic and personalized educational experience, addressing diverse learner needs and improving overall language proficiency.

According to Chen (2011), speech recognition technology significantly enhances language learning by providing immediate and precise feedback on pronunciation and fluency. These tools allow learners to practice speaking skills with real-time corrections, which helps in refining their pronunciation and reducing language errors. The ability to interact with AI-driven speech recognition systems not only aids in developing accurate pronunciation but also increases learners' confidence and comfort in using the language.

In addition, Gilgorea et al. (2023) emphasize that English learning apps using AI provide customized learning experiences by adjusting content to fit individual proficiency levels and learning speeds. These apps employ AI to monitor learner performance and modify instructional materials to meet specific needs. This personalization enhances learning efficiency and language acquisition by delivering lessons tailored to each student's unique progress. Such adaptive systems ensure that learners can advance at their own pace and focus on areas where they need improvement.

Complementing the advantages of speech recognition and personalized learning apps, AI-powered gamification strategies further enrich the language learning experience. According to Tsay et al. (2020), incorporating game-like elements such as points, levels, and interactive challenges into educational tools can markedly enhance student engagement and motivation. These AI-driven gamification techniques transform learning into a more enjoyable and immersive process, encouraging regular practice and reinforcing language skills through interactive activities. This heightened engagement not only fosters better retention of language skills but also leads to more effective learning outcomes overall.

Numerous studies have highlighted the effectiveness of AI-powered tools in English language teaching, particularly through language learning apps, automated speech recognition, and gamification. Pokrivcakova (2019) demonstrated that AI-powered language learning apps significantly enhance student engagement and language acquisition by providing personalized feedback and adaptive learning experiences. In a study by Chen (2011), automated speech

recognition was found to improve pronunciation and listening skills, as students received immediate and accurate feedback on their spoken language, leading to more effective practice. Anis (2023) showed that the integration of gamification strategies in AI-driven language learning platforms boosted motivation and retention rates, as students were more likely to participate actively and consistently in language learning activities.

These studies collectively indicate that AI technologies, through language learning apps, automated speech recognition, and gamification, offer powerful tools for enhancing English language proficiency. Building on this body of research, the current study aims to investigate the specific effects of AI-powered language learning tools on EFL students' overall English language proficiency at the General English program in Hamzanwadi University. The objective of this study is to evaluate how the implementation of AI tools, such as language learning apps, automated speech recognition, and gamification, influences students' language abilities, with a particular focus on improvements in vocabulary acquisition, pronunciation accuracy, and engagement. By examining these outcomes, the study seeks to contribute to a deeper understanding of the effectiveness of AI technologies in language education and provide insights into their practical application in EFL contexts.

METHOD

This study used a qualitative descriptive research approach. Qualitative descriptive research focused on phenomena and circumstances surrounding the object and employed the researcher as the primary instrument in the investigation (Mohajan, 2020). The descriptive qualitative method is a research approach based on post-positivism philosophy that is used to study the state of natural things.

The study focused on General English students at Hamzanwadi University in 2024, who are typically enrolled in courses aimed at improving overall English language skills, including listening, speaking, reading, and writing. These students generally possess foundational or intermediate English proficiency and seek to enhance their language abilities for academic and practical purposes. By examining this group, the study aims to assess how AI tools influence various aspects of English language proficiency in a broad educational setting. This quiet study involved 20 students, carefully selected to participate in the research, which specifically focused on assessing how AI-driven tools, including language learning apps, automated speech recognition, and gamification, influenced various aspects of their English proficiency.

Data were collected through a combination of observation, questionnaire, and iinterview section. The observation was designed to assess changes in students' English language proficiency before and after the implementation of AI-powered tools. The study focused on evaluating improvements in areas such as vocabulary acquisition, pronunciation accuracy, and overall language fluency, as influenced by the use of AI-driven technologies like language learning apps, automated speech recognition, and gamification.

The questionnaire was designed to gather insights into students' perceptions of AI-powered tools and their impact on English language proficiency. It included questions that assessed the effectiveness of AI tools, such as language learning apps and automated speech recognition, in improving vocabulary, pronunciation, and overall language skills. The questionnaire combined Likert scale items to measure students' agreement with various statements and open-ended questions to capture their personal experiences and suggestions. The aim was to understand how these AI tools contributed to their learning and to provide feedback for improving AI-based educational strategies in EFL settings.

The interview section aimed to gather in-depth feedback from students about their use of AI-powered language learning tools. During the interviews, students discussed their experiences with tools like language learning apps, automated speech recognition, and gamification. They were asked how these tools affected their English language skills, including vocabulary, pronunciation, and engagement. Students shared their personal experiences, challenges, and suggestions for improving these AI tools. This helped to provide a clearer understanding of how AI technologies support language learning and how they can be enhanced.

FINDING AND DISCUSSION

The results of the research, conducted between July and August 2024, are presented in this section. The study focused on students at Hamzanwadi University's General English program and looked at how AI-powered tools affected their English skills. We used pre-tests and post-tests to measure changes in vocabulary, pronunciation, and language fluency. Additionally, students completed a questionnaire about their experiences with AI tools like language learning apps, automated speech recognition, and gamification. The results compare pre-test and post-test scores with questionnaire feedback to show how AI tools helped improve English language proficiency.

Observation Result

The learning process began with the teacher leading students to continue their English material, with a special focus on enhancing their speaking and listening skills. To make the learning experience more engaging and effective, the teacher introduced speech recognition apps into the teaching plan. These apps were chosen for their ability to deliver interactive and enjoyable English learning material.

The teacher started by demonstrating how to use the apps, which featured various exercises designed to practice speaking and listening. For instance, the apps included activities where students could practice pronunciation and listening comprehension.

Figure 1 Students' learning process using Duolingo

Figure 1 demonstrated how AI tools significantly contributed to personalized learning experiences in language education. These tools were tailored to accommodate the varied needs of students by incorporating interactive features that promoted active engagement in the learning process. Duolingo, a widely recognized language-learning app, was especially effective in enhancing pronunciation and listening skills. By allowing students to progress at their own pace, Duolingo provided a customized learning experience that adapted to each student's progress. The app offered a broad spectrum of exercises targeting key language skills such as vocabulary, grammar, and pronunciation. These exercises were delivered in an engaging and interactive manner, making the learning experience both enjoyable and motivating.

A standout feature of Duolingo was its speech recognition technology, which was instrumental in helping students improve their speaking abilities. The app encouraged students to practice speaking by repeating words and sentences, offering immediate feedback on their pronunciation. This real-time correction was particularly valuable, as it enabled students to quickly correct errors, leading to gradual improvements in their pronunciation. Regular practice, combined with instant feedback, helped students gain confidence in speaking English, a skill that often poses challenges.

Moreover, Duolingo's interactive design empowered students to take control of their learning journey (Kessler et al., 2023). The app's adaptive system automatically adjusted the difficulty of exercises based on individual performance, ensuring that learners were consistently challenged at the right level. This personalized approach not only improved the effectiveness of language acquisition but also made the learning process more rewarding. Consequently, Duolingo supported not just language learning but also encouraged self-directed learning, a critical skill for both academic success and real-world application.

Figure 2 Students' learning process by Playing English Puzzle game

Figure 2 highlighted how AI-enhanced tools promoted collaborative learning in a team environment. The integration of AI in group activities allowed students to engage more effectively with one another, fostering a deeper understanding of the language through shared experiences. Collaborative learning, especially in a team setting, not only enhanced communication skills but also encouraged the exchange of ideas, problem-solving, and critical thinking. These group activities, supported by AI technology, provided students with opportunities to practice language skills in a dynamic and interactive context, making the learning experience more engaging and productive.

One prominent example of this was the use of cooperative language learning games like Microsoft Wordament. This game utilized AI to create an interactive platform where students could work together in real-time to solve word puzzles. The competitive yet collaborative nature of Wordament motivated students to think quickly and accurately, all while working as part of a team (Kemme et al., 2013). Such games proved to be popular among students due to their fun and engaging format, which transformed learning from a solitary activity into a shared experience. The collaborative aspect of these games also helped in reinforcing vocabulary, spelling, and word recognition, as students had to rely on both individual and group efforts to succeed.

The effectiveness of using AI-powered games like Microsoft Wordament in a collaborative setting lay in their ability to combine learning with play. These games not only made language learning enjoyable but also created a sense of camaraderie and teamwork among students. By participating in these activities, students were able to build their language skills in a supportive environment where peer interaction played a crucial role. Moreover, the immediate feedback provided by the game helped students quickly identify and correct mistakes, leading to continuous improvement in their language proficiency. This blend of AI technology with collaborative learning strategies demonstrated the potential for AI to enhance not just individual learning but also collective educational experiences.

Figure 3 Students' learning process by using ChatGPT Mobile

Figure 3 illustrates how students engaged in personal role-playing scenarios through interactive speaking activities utilizing AI-powered tools. It has been demonstrated that participating in role-playing conversations with virtual assistants, such as ChatGPT Mobile. The role-playing practice required students to adapt quickly to different situations and articulate their thoughts clearly, promoting fluency and boosting their confidence in spoken English.

In this activity, students individually took on various roles and initiated conversations with ChatGPT by speaking directly into their devices, where the virtual assistant responded in real time with contextually appropriate dialogue suited to the scenario. This practice provided an engaging and interactive way for students to enhance their speaking and listening skills in a simulated real-world environment. Additionally, when student closed the conversation, ChatGPT mobile was automatically recorded the conversation in the form of readable note. As students interacted with these scenarios, they encountered new vocabulary and sentence structures in conversation context, which helped them to understand and use new expression.

In summary, ChatGPT Mobile was used for conversation practice, allowing students to engage in role-playing scenarios. By conversing with the virtual assistant, students improved their speaking abilities, adapted to various conversational contexts, and articulated their thoughts more clearly. The real-time feedback from the assistant made the interactions feel authentic. After each session, ChatGPT automatically saved the conversations, enabling students to review and learn new vocabulary and sentence structures, making the learning experience both engaging and productive.

Questionnaire Result

To clarify the results of the questionnaire, the researcher has made a calculation result table of 20 students' perception on how AI impact their learning process. The questionnaire consisted of 7 aspects to be asked. The result of questionnaire is presented in the following table.

Tabel 1 Percentage of Students' Response on the impact of AI tools in Learning English

NO	Aspect	Response Options	Number of Students	Percentage
1	Impact on Listening Skills	Greatly Improved	12	60%
		Improved	5	25%
		Neutral	2	10%
		Decreased	1	5%
		Greatly Decreased	0	0%
2	Impact on Speaking Skills	Greatly Improved	10	50%
		Improved	7	35%
		Neutral	2	10%
		Decreased	1	5%
		Greatly Decreased	0	0%
3	Impact on Reading Skills	Greatly Improved	9	45%
		Improved	8	40%
		Neutral	2	10%
		Decreased	1	5%
		Greatly Decreased	0	0%

4	Impact on Writing Skills	Greatly Improved	8	40%
		Improved	9	45%
		Neutral	2	10%
		Decreased	1	5%
		Greatly Decreased	0	0%
5	Overall Satisfaction with AI Tools	Very Satisfied	14	70%
		Satisfied	4	20%
		Neutral	1	5%
		Dissatisfied	1	5%
		Very Dissatisfied	0	0%
6	Enjoyment of AI Tools	Strongly Agree	13	65%
		Agree	5	25%
		Neutral	2	10%
		Disagree	0	0%
		Very Disagree	0	0%
7	Willingness to Recommend AI Tools	Yes	20	100%
		No	0	0%
		Maybe	0	0%

The assessment of AI tools' impact on English language skills has produced significant insights. For listening skills, 60% of students reported a "Greatly Improved" ability, 25% saw "Improvement," 10% had a "Neutral" impact, and 5% noticed a "Decreased" effect, with no one experiencing a "Greatly Decreased" impact. This indicates that AI tools are largely effective in enhancing listening comprehension.

In terms of speaking skills, 50% of students felt their abilities had "Greatly Improved," 35% saw improvement, 10% remained neutral, and 5% experienced a decrease, with no reports of a "Greatly Decreased" impact. These results suggest that AI tools positively influence speaking proficiency.

Regarding reading skills, 45% of students reported a "Greatly Improved" outcome, 40% saw improvement, 10% had a neutral response, and 5% experienced a decrease, with no "Greatly Decreased" impact. This shows that AI tools significantly contribute to better reading comprehension and engagement.

For writing skills, 40% of students observed a "Greatly Improved" effect, 45% saw improvement, 10% were neutral, and 5% noticed a decrease, with no reports of a "Greatly Decreased" impact. These findings indicate that while AI tools are generally beneficial for writing skills, individual responses vary.

Overall, 70% of students expressed being "Very Satisfied" with AI tools, 20% were "Satisfied," 5% were neutral, and 5% were "Dissatisfied," with no students being "Very Dissatisfied." This highlights a generally positive reception of AI tools among students.

In terms of enjoyment, 65% of students "Strongly Agree" that they enjoy using AI tools, 25% "Agree," and 10% were neutral, with no one disagreeing. This suggests that AI tools enhance student motivation and engagement. Finally, all 20 students (100%) indicated they would recommend AI tools to others, demonstrating a strong endorsement of their effectiveness and value in English language learning.

Interview Result

The interviews revealed key insights into how AI tools influence the development of English language skills. One participant, familiar with Duolingo and ChatGPT Mobile, noted, "Duolingo has been extremely useful for daily practice with its gamified lessons. ChatGPT Mobile excels in helping with conversation practice and offers immediate feedback." They found these tools made learning more engaging and accessible, significantly improving vocabulary and conversational skills.

Another respondent, who frequently uses Duolingo and occasionally ChatGPT Mobile, described their experience: "Duolingo is quite user-friendly and effective. ChatGPT Mobile is helpful for grammar questions and explanations." They reported increased confidence in using English but pointed out limitations, such as the AI's occasional difficulty in understanding context, which can be frustrating.

A third participant, who uses Duolingo daily and has explored ChatGPT Mobile, explained, "Duolingo provides structured learning, ChatGPT Mobile aids in practice and explanations, and Wordament is enjoyable for expanding vocabulary." They observed improvements in vocabulary and grammar but noted that AI tools sometimes lack the detailed explanations and nuanced feedback that human teachers provide.

Overall, the feedback indicated that AI tools positively impact English skills, especially in vocabulary and conversational practice. The tools' convenience and adaptability were appreciated, but they were not seen as a complete replacement for traditional methods. Traditional methods offer structured learning and personal interaction, which are crucial for thorough language education.

The participants suggested using AI tools in conjunction with traditional methods for optimal results. They also recommended integrating more interactive and real-life scenarios into AI tools to enhance their effectiveness.

In summary, while AI tools like Duolingo and ChatGPT Mobile significantly enhance English learning by making it more engaging and accessible, they do not entirely replace the depth and personal engagement provided by traditional teaching methods. Combining AI tools with conventional methods and improving their interactive features could further enhance language learning outcomes.

Overall, the findings showed that AI technologies such like Duolingo, Wordament puzzle game, and ChatGPT mobile had several effects on students' involvement and growth in their command of the English language, especially when it came to speaking, listening, reading, and writing skills. An environment for language learning that is more dynamic and productive is a result of the enhanced involvement, motivation, confidence, and tailored learning experiences offered by AI tools.

The result of this research was supported by Ahmadi (2018), the role of technology in providing diverse linguistic inputs in language learning was essential. In terms of speaking skills, AI-powered applications that offered real-time feedback on pronunciation and fluency notably increased students' confidence. This finding aligned with Guo and Barrot's (2019) study, which demonstrated the effectiveness of immediate corrective feedback from AI in enhancing language production. The instant feedback provided by AI tools allowed learners to promptly address errors, fostering greater fluency and accuracy.

AI tools have also made significant contributions to improving reading skills. Features such as instant translation and contextual definitions have facilitated better comprehension and engagement with English texts, while interactive reading exercises have made the reading process more accessible and engaging. Haymon and Wilson (2020) emphasized the benefits of technology-driven interventions in reading. Regarding writing skills, students have benefited from AI tools that offer grammar and style suggestions, helping them identify and correct mistakes, thus improving their writing proficiency. Wilson (2020) demonstrated the effectiveness of AI in refining written language skills through immediate feedback.

However, there are notable drawbacks to relying solely on AI tools for teaching English beginners. One major concern is that AI may lack the nuanced understanding and empathetic interaction that human instructors provide. Beginners often benefit from the contextual and emotional support that a teacher offers, which AI tools may not fully replicate. Furthermore, an overreliance on AI might detract from essential language skills that are best taught through

direct human interaction (Abbass, 2019). Technological limitations or issues with AI algorithms could also hinder learning progress and potentially frustrate beginners.

CONCLUSION

Based on the finding of the analysis, the researcher demonstrated that using AI tools substantially influenced the students' ability in English language learning, especially for general English students at Hamzanwadi University. This was evidence from the observation, questionnaire, and interview result from study.

In the observation result, AI technologies positively impacted students' English skills, particularly in speaking, listening, reading, and writing. Meanwhile, the interview section showcased that students' confidence in speaking was increased, enthusiasm in reading was boosted, and capability in writing was improved. This finding is also supported from 60% of students agree with AI tools in amplifying their listening skills.

Finally, the use of AI tools technology in English language learning effectively enhanced students' language skills by providing personalized, interactive experiences. Tools like language learning apps and AI-powered platforms make learning more engaging and enjoyable, reducing anxiety and boosting confidence. Immediate feedback and gamified elements increase students' motivation and enthusiasm, leading to more effective and enjoyable practice.

In conclusion, while AI tools have made significant strides in supporting English language learning, they should complement rather than replace human instruction. Future research should focus on exploring the balance between AI and human teaching methods to optimize language acquisition. Investigating how AI can be effectively integrated into traditional teaching frameworks, while addressing the identified limitations, will be crucial for maximizing the benefits of AI in language education. Such research will help in developing more effective and balanced approaches to teaching English that leverage the strengths of both AI and human educators.

REFERENCES

Abbass, H. A. (2019). Social integration of artificial intelligence: functions, automation allocation logic and human-autonomy trust. Cognitive Computation, 11(2), 159-171. https://doi.org/10.1007/s12559-018-9619-0

Ahmadi, D. M. R. (2018). The use of technology in English language learning: A literature review. International journal of research in English education, 3(2), 115-125. http://dx.doi.org/10.29252/ijree.3.2.115

Anis, M. (2023). Leveraging artificial intelligence for inclusive English language teaching: Strategies and implications for learner diversity. Journal of Multidisciplinary Educational Research, 12(6), 54-70. http://ijmer.in.doi./2023/12.06.89

Bahroun, Z., Anane, C., Ahmed, V., & Zacca, A. (2023). Transforming education: A comprehensive review of generative artificial intelligence in educational settings through bibliometric and content analysis. Sustainability, 15(17), 12983. https://doi.org/10.3390/su151712983

Chen, H. H. J. (2011). Developing and evaluating an oral skills training website supported by automatic speech recognition technology. ReCALL, 23(1), 59-78. https://doi.org/10.1017/S0958344010000285

Chiu, T. K., & Chai, C. S. (2020). Sustainable curriculum planning for artificial intelligence education: A self-determination theory perspective. Sustainability, 12(14), 5568. https://doi.org/10.3390/su12145568

Gligorea, I., Cioca, M., Oancea, R., Gorski, A. T., Gorski, H., & Tudorache, P. (2023). Adaptive learning using artificial intelligence in e-learning: a literature review. Education Sciences, 13(12), 1216. https://doi.org/10.3390/educsci13121216

Guo, Q., & Barrot, J. S. (2019). Effects of metalinguistic explanation and direct correction on EFL learners' linguistic accuracy. Reading & Writing Quarterly, 35(3), 261-276. https://doi.org/10.1080/10573569.2018.1540320

Haymon, C., & Wilson, A. (2020). Differentiated reading instruction with technology for advanced middle school students' reading achievement. Journal of Educational Research and https://doi.org/10.5590/JERAP.2020.10.1.05

Kemme, B., Ramalingam, G., Schiper, A., Shapiro, M., & Vaswani, K. (2013). Consistency in distributed systems. Dagstuhl Reports, 3(2), 92-126. https://inria.hal.science/hal-00932737/

Kessler, M., Loewen, S., & Gönülal, T. (2023). Mobile-assisted language learning with Babbel and Duolingo: comparing L2 learning gains and user experience. Computer Assisted Language Learning, 1-25. https://doi.org/10.1080/09588221.2023.2215294

Mohajan, H. K. (2020). Quantitative research: A successful investigation in natural and social sciences. Journal of Economic Development, Environment and People, 9(4), 50-79. https://www.ceeol.com/search/article-detail?id=939590

Pokrivcakova, S. (2019). Preparing teachers for the application of AI-powered technologies in foreign language education. Journal of Language and Cultural Education, 7(3), 135-153. https://doi.org/10.2478/jolace-2019-0025

Srinivasa, K. G., Kurni, M., & Saritha, K. (2022). Harnessing the Power of AI to Education. In Learning, teaching, and assessment methods for contemporary learners: pedagogy for the digital generation (pp. 311-342). Singapore: Springer Nature Singapore.

Tsay, C. H. H., Kofinas, A. K., Trivedi, S. K., & Yang, Y. (2020). Overcoming the novelty effect in online gamified learning systems: An empirical evaluation of student engagement and performance. Journal of Computer Assisted Learning, 36(2), 128-146. https://doi.org/10.1111/jcal.12385

Wang, P. (2019). On defining artificial intelligence. Journal of Artificial General Intelligence, 10(2), 1-37. https://intapi.sciendo.com/pdf/10.2478/jagi-2019-0002