

EXPLORING AI-SECOND LANGUAGE LEARNERS' PERCEPTION ABOUT DIGITAL IDENTITY PERSISTENCE AT UNIVERSITY LEVEL IN PAKISTAN

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ABSTRACT

The aim of paper in hand was to explore AI - second language learners' perception about the digital identity persistence at university level in Pakistan. It was qualitative research based on survey design in nature and it was conducted in Lahore, Punjab Pakistan. Data were collected from 77 randomly selected second language learners of public and private universities who were enrolled in the academic session of 2024 - 2026 via conducting interviews. Structured interview protocol/guide was developed to conduct face to face and online interviews. The collected data were thematically analyzed by reading written answers and listening to the recorded data from the respondents to obtain an overall understanding of its content, patterns, and meanings for developing, to intimate and comprehensive awareness of the dataset. Codes were designated to identify segments of data to meet the research objectives. After analysis it explored that AI - second language learners were using variety of digital AI- powered tools as chatbots, Doulingo, Google Translate, WhatsApp, Quillbot, Memrise, DeepL, and Babbel for language learning. AI recognized users by their digital identity awareness in the form of email ID, saving history, login account detail, backend storing data, and privacy implication on platform. It was concluded that according to most of the respondents digital identity persistence their digital identity by their credential, cookies, data storage, questions in the last session and developing conceptual model linking AI usage. It was also explored that second language users have experience of using multiple AI platforms for learning and they experience that each AI platform has different ability to recognize their identity. Therefore, it is recommended that universities may organize training and workshop to educate AI- assisted second language learners so that they use appropriate language platform and addresses the awareness about digital identity.

KEYWORDS: Identity, Digital identity, AI User, second Language, University level

INTRODUCTION

The field of second language learning and acquisition (L2) has undergone significant transformation in the twenty-first century due to artificial intelligence (AI) (Abdelrady et al., 2025, 2026). The need for multilingualism has increased as cross-cultural communication and globalization have grown, necessitating the creation of novel language learning aids (Brynjolfsson, 2022; Ramzan et al., 2020, 2023, 2025). In order to satisfy language learning demands, AI plays an integral part as it provides learners all over the world with customized, effective, and engaging learning methods (Akram & Li, 2024; Hassani & Silva, 2023). The integration of artificial intelligence technologies into language instruction is revolutionizing how people learn new languages, improving conventional methods, and opening up new avenues for learners of all ages and backgrounds (Ma et al., 2024, 2025). As essential elements of contemporary language learning platforms, AI based applications like speech recognition, natural language processing (NLP), and machine translation have made the process more accessible, interesting, and successful (Baker, 2019; Goh, 2020). The effects of artificial intelligence are changing the way students engage with language learning and simple enhancing language instruction. By identifying the user identity and enabling them to concentrate on particular areas of difficulty (Ramzan et al., 2025), personalized learning programs driven by AI algorithms may respond to individual needs, monitor progress, and provide tailored feedback (Grego & Vesselinov, 2025).

Castells (2021) put forth the notion of "mass self-communication" paradigm, which emerged from the advent of the internet and presented the learners new approaches on how to comprehend and conceptualize the world, as well as on how to develop their sense of digital identity. Digital identity is itself a broader idea of identity which has different meanings in various academic disciplines and discussions (Akram et al., 2021, 2022; Chen &

Ramzan, 2024). Digital identity, for example, has frequently been analyzed in social media research through the lens of online engagement and identity creation in virtual environments (Marwick, 2022; Papacharssi, 2020). From this viewpoint, one may examine the performative aspect of digital identities such as self-presentation and identity expression as well as the ways in which platform designs direct and limit user behavior and interactions (Buss et al., 2023; Kavakci & Kraeplin 2019) (Abidin & Dyer, 2022). Critical studies (Liu, 2023) tend to emphasize the social and ethical ramifications of data gathering, surveillance, and control (Zuboff, 2022), as well as concerns pertaining to power dynamics and exclusionary mechanisms resulting from algorithmic, decision-making and automated systems (Burel & Fourcade, 2021; Nobel, 2019) regarding users. On the other hand, Masiero (2023) argued that the literature on information systems emphasizes aspects such as identity verification, authentication, and authorization, as well as issues pertaining to the trust and privacy of individuals learning AI as a second language (Sullivan, 2024).

Digital recognition helps language learners to save their time and effort through continuity of the previous session to make language learning easier sounds and intonations (Baker, 2023) as the second language learners use different tools of second language learning by logging in. Furthermore, the advent of machine translation technologies, such as Google Translate, has broken down language barriers, offering real-time translations that enhance comprehension and vocabulary acquisition (Bunce, et al., 2021). Furthermore, AI promotes immersive learning experiences by replicating real-world interactions, allowing students to practice in real-world settings without the use of a live human conversation partners (Godwin & Jones, 2024).

Numerous studies have examined the promise of AI and confirmed its contribution to language teaching (Akram & Abdelrady, 2023, 2025) and learning process (Bao & Wang, 2024). The role of AI in language education cannot be overlooked. Most current literature reviews concentrate on the broad applicability of AI or the effects of particular technologies (AI-Adwan et al., 2022), resulting in a scarcity of studies on whether these empirical applications actually facilitate a shift in second language teaching and learning (Dina & Yusop, 2024). There are a few of researches conducted on how AI recognize to the user when they login for browsing or while learning second language via AI tools of different platforms. Very little users knows whether AI recognize them when they login second time for the same topic. This gap was explicitly highlighted by Liang et al. (2023), who urged future research to focus on how AI- recognize the user when they interact with different platform of language learning. Therefore, the primary objective of this study was to explore AI-Second-Language-Learners' perception regarding Digital Identity Persistence at University Level in Pakistan. This investigation sought to delve into how AI recognize its user when login second time, when they get rid of the previous session due to tiredness or not getting the relevant data while browsing for evaluating the technology use in second language learning (Renkema & Zarifhonarvar, 2025).

Statement of the Problem

With the increasing integration of AI-driven platforms in higher education, users frequently interact with systems that appear to recognize, remember, and adapt to their behavior across sessions. However, this "recognition" is often technically driven by mechanisms such as login credentials, cookies, and stored histories rather than true identity awareness. Among second-language users at the university level in Pakistan, little is known about how they perceive this continuity whether they believe AI systems recognize them, resume prior interactions, or construct a persistent digital identity. This gap between system functionality and user perception raises critical questions about digital identity formation, trust, and expectations from AI systems. Therefore, this study seeks to explore how university-level second-language users interpret AI recognition, session continuity, and the persistence of their digital identity across multiple interactions. Keeping above in view

Research Objectives

1. To explore what kinds of digital tools do the AI-Second Language learners use for learning second language at university level.
2. To find persistence of Digital identity of the AI-second language users when they return to an AI platform/login second time.
3. To describe the importance of AI resuming previous activity/session from where the user left
4. To diagnose better platform in form of session continuity in the perspective of AI- second language learning users.

Research Questions

1. What kinds of digital tools do the AI-Second Language learners use for learning second language at university level?
2. What extent Digital identity persistence of the AI-second language users when they return to an AI platform/login second time?
3. Is there any importance of AI resuming previous activity/session from where the user left?
4. Which one is the better platform in form of session continuity in the perspective of AI- second language learning users?

Significance of the Study

The hope was that the current research would aid students learning a second language. Thorough examination of the available literature This study seeks to address the research gap about AI's function in promoting learning transformation during this period, providing educational practitioners and academics with insightful knowledge that may be used to advance future research in this area.

LITERATURE REVIEW

Digital Identity

A digital identity is composed of an entity's distinctive characteristics. These qualities combine to create a record that confirms the entity's identification and sets it apart from other entities. The identity of a human user in a corporate network could include identifying data like their network username, Social Security number, and social media profiles (Ubaid & Waleed, 2025: 31).

Farhan (2022: 237) define digital identity as a set of digital data representing an entity such as an individual, organization, device, or software in digital environment including the Internet and information systems, and is also referred to as "computer representation" (Kamali, 2025).

Types of Digital Identities

The following are the types of digital identities. These are not only for people, but also for devices, services and other digital entities:

Verifiable Digital Identities: The basis of authentication and endorsement, the procedures by which IT systems confirm users and provide them the right access, is verifiable digital identities. Digital identities are necessary for both human and nonhuman users in order for them to engage with online services and with one another (Moorhouse & Zou, 2023).

Trusted Digital Identities: Digital identities that are trusted enable individuals, devices, apps, and service providers to verify that the entities with whom they engage are who they claim to be. Digital identities also enable systems to track behavior and identify the actors responsible for certain actions (Nguyen, 2024).

Human digital identities: Digital identities are the digital representations of human operators in a system. A person's digital identity might include details like their age, driver's permit, societal safety number, or biometric information such as finger expression and face recognition scans. Digital IDs allow people to access digital resources like banking online or getting crucial data from a business network (Rohail, 2024).

Machine digital identities: Non-human things like robots, applications, Internet of Things (IoT) nodes, and other devices are represented by machine identities. To establish and differentiate themselves, they frequently use exceptional identifiers like indications or certificates (Dwivedi, et al., 2022).

A machine's digital identity, much like a human operator's, gives it access to particular digital means, such as a commercial application that retrieves sensitive information from a cloud record (Alian & Mohamed, 2024).

Federated identities: Nonhuman things like robots, applications, Internet of Things (IoT) nodes, and other devices are represented by machine identities. To establish and differentiate themselves, they frequently use unique identifiers like tokens or certificates.

A machine's digital identity, much like a human user's, gives it access to particular digital resources, such as a business application that retrieves sensitive data from a cloud database (Khodadadi & Muhammad, 2025).

The Role of digital IDs in IAM

The identity and access management (IAM) systems that businesses employ to implement cyber security measures and regulate user access to digital resources rely heavily on digital identities (Meyer et al., 2023). New users must create a unique digital identity when they need system access, such as when a new worker joins a business linkage or a new server joins a data center. The system then registers that identity. The IAM system then uses these distinct digital IDs to monitor user activity and apply tailored permissions. When a user requests access to a digital asset, they must authenticate themselves with the IAM system. Authentication entails submitting some credentials such as a username and password, date of birth or digital certificate to prove the user is who they claim to be (Tursunbayeva & Renkema, 2025).

Some IAM systems may use multifactor authentication (MFA) for increased security, which mandates users to submit many authentication factors in order to verify their identities. The IAM system verifies the permissions linked to the user's unique digital identity upon authentication and only provides those that are authorized (Fatemeh & Safian, 2023). In this manner, IAM systems prevent hackers from gaining access while simultaneously ensuring that each user has the precise rights necessary to carry out their duties (Nadia & Satvati, 2024).

A user of a single sign-on (SSO) system may use one digital identity to access several applications and online services. The SSO portal verifies the user's identity and creates a token or certificate that serves as a security key for a number of connected resources (Leiping & Zhang, 2025).

Importance of using Digital Identities

1. **Enhanced cyber security:** Computer systems are shielded from hackers, deception, identity robbery, and other illegal behavior by digital identities. The X-Force Threats Intelligence Index indicates that the theft

of legitimate accounts is one of the utmost frequent methods used by cybercriminals to gain access to victim environments, accounting for 30% of all cases (Tursunbayeva & Renkema, 2022). Digital individualities can assistance closes susceptibilities in the identity coating and reinforce information defenses against identity-based attacks in a number of ways. Organizations may track user behavior more easily thanks to digital identities (Xiong, Shi, 2024). In addition to being able to differentiate between legitimate and illegitimate users, they can also identify dubious actions linked to the digital identities of authorized users, which may indicate an ongoing account takeover. Additional steps, like MFA and time-based credentials, can also help protect digital identities from theft or misuse (Ali & Hazaea, 2023). These additional layers of security can help boost income instead of deplete the budget. According to Ruan (2025), IBM Institute for Business Value, 66% of operations managers see cyber security as a facilitator of income (Bao & Wenting, 2025).

2. **Promoting trust:** Trust is essential for fostering cooperative workflows between clients, service providers, external partners, and internal workers. Users may have more confidence that the individuals, devices, and services they interact with are real and trustworthy thanks to a robust digital identity management system (Maravilla, 2022). By analyzing massive datasets of digital identifiers, such as fingerprints, retinal scans, or facial characteristics, artificial intelligence (AI) may accelerate the verification of digital identities. This feature enhances and simplifies identity verification, which in turn fosters greater trust in computer systems (Morales, 2025).

3. **Regulatory compliance:** Data privacy laws like the General Data Protection Regulation (GDPR) or the Payment Card Industry Data Security Standard (PCIDSS) are frequently required of both public and commercial enterprises. Organizations can use IAM systems based on reliable digital identities to make sure that only approved users have access to confidential data. Additionally, IAM systems may keep audit trails to aid businesses in demonstrating compliance or identifying infractions as necessary (Brauer & Mazarakis, 2024).

4. **Flexibility of location:** One of the benefits of cloud services is that they are available from practically any location. However, robust identity verification methods are necessary to safeguard against illegal and fraudulent access. As cloud computing and remote employment become more prevalent, users and the resources they need to utilize are becoming more dispersed. On-site, swiping a broken ID card or presenting a passport or driver's license can be replaced by a verified digital identity that provides the same level of security (Salvatore, 2026).

5. **Control the identities of Users:** Users of some decentralized digital identity systems may build and keep their own portable digital identities in digital wallets (Sohail & Akram, 2025). The individual has control over their identity in these systems, and service providers are no longer responsible for managing it. Companies can compare users' credentials against a common trust directory to confirm their online identities (Nizzolino, 2023).

METHODOLOGY

It was exploratory qualitative research based on survey design in nature. Theoretically, the researcher followed digital identity and human computer interaction theory. Philosophically, the researcher followed phenomenological school of thought. Population for present research comprised all second language learners who were using AI tools for second language learning in public and private universities in Lahore of the academic session of 2024 – 2026. Data were collected from 77 randomly selected second language learners via conducting interviews. Semi-structured interview protocol/guide was developed to conduct face to face and online interview to meet the research objectives and answering the research questions. All participants voluntarily participated in this research. The collected data were thematically analyzed by reading and listening to recording the data multiple times to gain an overall understanding of its content, patterns, and meanings to develop an intimate and comprehensive awareness of the dataset. Codes were assigned to identify segments of data that were meeting the research questions. Themes were generated for reporting in persuasive and clear manner.

RESULTS AND FINDINGS

After analysis it was found that among the second language learners, 50% of the respondents were English language learners, 23% were Chinese, 12% were German, 8% were Arabic, 6% were Spanish, 3% were French, and 1% were others second language learners. It was explored that the learners of second language were using variety of digital AI – powered tools as chatbots, Doulingo, Google Translate, WhatsApp. AI- powered tools, majority of the AI- German and English as second language learners were using chatbots tool for correction and practices of language learning. Moreover, they said that most of them were using chatGPT for vocabulary building, conversation practices and grammar correction and quillbot to simplify sentences and rewriting. Among Spanish language learners, most of them were using Doulingo, Memrise, and Babbel as language learning Apps to gamified learning and daily language practices. Majority of the Chinese language learners were using Youtube, Netflix as video-based learning tools. Moreover, most of them were using edX and Coursera for structured and formal language learning. Most of the German and Spanish learners were using DeepL and Google Translate as dictionary and translation tool. It was explored that most of the second language learners were using Duolingo, ChatGPT, and Google Translate for sentence practice and vocabulary acquisition. It revealed that most of the English learners were using daily AI for their academic routine work and Arabic learners were using sometimes AI- second language learning platform.

Q: When you return to an AI tool/platform, does that AI recognize you as the same user? If ‘Yes’ than how AI recognize the same user when he/she login second time

Most of the respondents replied that “Yes” AI recognized them by their previous questions and recognizing their chat history. Moreover, they said that AI recognized them through stored data that they retrieved in previous session and login credential and or cookies saved in previous session. More of them said AI recognized them by their account and login ID because AI storing their detail of account. Few of them said that “Yes” AI tool recognized them as the same user but they did not know how exactly did AI recognized them. According to them either AI recognized them via internet system or IP address through device memories. Few of them replied as AI recognized them by remembering their personality/personally like them as human the way they behaved with AI automatically. Moreover, they replied that “Yes” AI recognized them through Algorithmic data storage.

Q: When you leave a session and login again, does the AI recognize you and continue from your previous session, or does it start a new one?”

The respondents replied that “Yes” AI recognize them when they login second time and start from the previous session from where they left because AI recognize their digital identity by saving their chat with AI memory. Moreover, they said that no doubt AI recognized them when they login in second time but it start from the new chat rather than from the previous one although their AI saved their old chats yet it start from the new session by default. Few of them replied as when they login second time AI sometime start from the previous session if second time stated from the same device/devices by depending on browser/internet. Moreover, they said that most of the time there is no session continuity although like a human AI identified automatically everything yet it forgets everything the user left the session. In short, most of the respondents believed that AI kept their digital identity (identity persistence) because it recognize them via login/account but AI does not continue the same session in the next time automatically.

Q: How important is it for you that AI resumes your previous activity/session from where you left?”

After analysis it was found that according to most of the respondents it is very important if the AI resumes their previous activity/session from where they left in the last session because it saved their effort and time for continuing their language learning and practices without any pause. More of them replied as although it is important yet not necessarily start from the previous one when they engage in long session. On the other hand according to them there is no session continuity in AI but some extent it depend on the nature of task. Few of them replied as it is not important for them if AI resumes their previous activity/session from where you left because they always take start from their new tasks/session for clarity.

Q: When you return later and log in again, does the AI recognize your previous frustration or behavior?”

After analysis it was found that most of them said that “Yes” AI recognized their previous frustration and behavior when they second time login as context continuity for same task/chat as adaptive to prior interaction style. More of them said that AI has no ability to recognized their previous frustration and behavior when they second time login. So, according to them AI has no long term behavioral recognition ability and every time it treats them as new user. Only few respond as they were not sure whether AI recognizes their behavior/emotion or not because according to them AI neither recognizes content nor frustration or feeling of the users.

Q: Do you think AI/system ‘learns’ about the user? If yes, in what way?”

After analysis it was found that most of the respondents replied as “Yes”, AI learnt from the users their interaction and the ways they behave with it while learning. Moreover, they said that it depend on the frequency of interaction, the more they used the better AI respond by recognizing their users. They also said that AI learn from the user by storing users’ history, previous chat, cookies, preference and style, proficiency tracking of the second language learners. It read the user’ behavior as human teachers. More of them replied as “Yes” AI learns from the user only of the same and/or one session.

Q: Have you used multiple AI platforms? Do you believe each platform differs in how it recognizes you?

After analysis it was found that according to most of them, they used different AI platforms for second language learning and each platform recognized them through their chat history, cookies, login id, when they used/login second time for learning. According to them each platform are interconnected and share their data. More of them said that “Yes”, they use multiple AI platform for second language learning but according to them some platform are more advanced and recognized them whenever they login second time and some AI platform’s tools are basic and could not recognize them.

Q: Which AI platform do you feel is better at recognition and continuity, and why?

After analysis it was found that according to most of it depend on how frequent the users use it. Moreover, they said that ‘Chat-Based AI Tools’ are better because such type of tool save the Identity of the users through chat and may continue from the last chat when the user login second time. According to most of the respondents, ‘Search – Based AI Tools’ is good for rapid answering yet is weak continuity because these tools do not save history of the users. More of them replayed as all platforms are the same and had the same recognition feature.

Q: What improvements would you suggest for better recognition and continuity in AI platforms?

After analysis it was found that most of the respondents suggested that there should be the AI platform which automatically start from the stage of conversation from where the user left by highlighting the last activity. In the other hands they suggested cross platform and cross-device (mobile, laptop, personal computer etc.) session continuity. Moreover, they suggested that there should be the AI platform that automatically recognizes their preference and learning level tracking their progress in second language learning. On the other hands they suggested personalized and intelligent AI- platform for session continuity to save time and effort. More of them

suggested that there may such AI-platform that understand the users' frustration and confusion and respond according to the mood of the users (Emotion aware - AI). They also suggested that there should be clear user' recognition policy so that users may know how their data is being used. Few of them answered as 'there should be user's autonomous and privacy control AI – platform.

CONCLUSION & DISCUSSION

Exploring AI-second language learners' perception about the digital identity persistence at university level in Pakistan was the aim of the in hand research. In this regards interviews were conducted from the respondents and analyzed to draw the conclusion. So, conclusion was drawn from the findings which arose from the analysis. It was concluded that AI-Second Language learners were using AI – powered tools as chatbots, Doulingo, Google Translate, Chatbots AI- powered tools for learning second language at university level. Boldaji and Kamali (2024) found that second language learning users were using ChatGPT, Microsoft Bard, and other Google tools for second language learning. Patton (2023); Ceawell and Huberman, (2021) stated that AI do not persist the digital identity of the users but in hand research found that AI persist the digital identity of the users when they return to an AI platform again because according to most of the respondents that AI recognized them by their digital identity awareness in the form of email ID, saving history, login account detail, backend storing data, privacy implication on platform. It is concluded that according to most of the respondents digital identity persistence of the user by their credential, cookies, data storage, question s in the last session and developing conceptual model linking AI usage & identity persistence. AI resumes the previous activity of the user from where they left in previous session because there is session continuity by recognizing users' digital identity via login credential and recognizing the emotion and frustration of user across sessions but could not recognize when the user login second time or when the new session is initiated. Subhani, (2026) found that AI could not retained digital identity of the users through recognition of users' emotion, frustration and/or behavior. .Present found that there is importance of resuming same session because the present research highlighted that continuity of session is most important because it save time and effort of the users while doing assignment, learning language and writing tasks. The same was illustrated by Elaho & Farhat (2025) that resuming session by AI through users' digital identity is very important because it increased the motivation of users by saving their time and effort. The present study found that AI system learnt about the second language learners by recognizing their personalized responses, interaction, browsing history, stored data, and users; preferences but recent research conducted by Ghafouri (2024) explored that AI seldom recognized the identity of the second language users because each AI platform has different ability to recognize user identity. So, concluding that AI recognized the identity of the second language users. Second language users experience of use multiple AI platforms for learning and they experience that each AI platform has different ability to recognize user identity but 'Chat-Based AI Tools' are better because such type of tool save the Identity of the users through chat and may continue from the last chat when the user login second time. This type of tool e.g., 'Chat-Based AI Tools' are better because such type of tool save the Identity of the users through chat and may continue from the last chat when the user login second time. On the bases of research finding it is recommended that there is need of cross-platform and cross-device (mobile, laptop, personal computer etc.), personalized and intelligent AI-platform for session continuity. There should be also emotion aware – AI, user's autonomous and privacy control AI – platform. Moreover, universities also provide and organize training for teachers and graduates for using AI platform for so that these tools recognized the user digital identity to save their time and effort for better learning.

REFERENCES

1. Abdelrady, A. H., Akram, H., Mohamed, A. T. A., Abaalkhail, G. F., Osman, E. H. E., Mohamed, G. T. A. H., & Suliman, W. M. M. (2026). World Journal of English Language, 16(4), 311-321.
2. Abdelrady, A. H., Ibrahim, D. O. O., & Akram, H. (2025). Unveiling the Role of Copilot in Enhancing EFL Learners' Writing Skills: A Content Analysis. World Journal of English Language, 15(8), 174-185.
3. Abidin, M., & Dyer, F. (2022). Why not robot teachers: Artificial intelligence for addressing teacher shortage. Applied Artificial Intelligence, 32(4), 345–360 <https://doi.org/10.1080/08839514>
4. Akram, H., & Abdelrady, A. H. (2023). Application of ClassPoint tool in reducing EFL learners' test anxiety: an empirical evidence from Saudi Arabia. Journal of Computers in Education, 1-19.
5. Akram, H., & Abdelrady, A. H. (2025). Examining the role of ClassPoint tool in shaping EFL students' perceived E-learning experiences: A social cognitive theory perspective. Acta Psychologica, 254,104775.
6. Akram, H., & Li, S. (2024). Understanding the Role of Teacher-Student Relationships in Students' Online learning Engagement: Mediating Role of Academic Motivation. Perceptual and Motor Skills, 00315125241248709.
7. Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. Frontiers in psychology, 13, 920317.
8. Akram, H., Yingxiu, Y., Aslam, S., & Umar, M. (2021, June). Analysis of synchronous and asynchronous approaches in students' online learning satisfaction during Covid-19 pandemic. In 2021 IEEE International Conference on Educational Technology (ICET) (pp. 203-207). IEEE.

9. Al-Adwan, A. S., Nofal, M., Akram, H., Albelbisi, N. A., & Al-Okaily, M. (2022). Towards a sustainable adoption of e-learning systems: The role of self-directed learning. *Journal of Information Technology Education: Re-search*, 21, 245-267.
10. Alian, F., & Mohamed, U. (2024). Evaluating ChatGPT's reliability in second language acquisition (SLA): Insights on language skills and technology's role. *Electronic Journal of e Learning*, 21(8), 78 – 86 <https://academic-publishing.org/index.php/ejel/article/view/3762>
11. Baker, A. K. (2023). Language teachers' identity tensions and professional practice in intercultural teaching; *Journal of Language Teaching Research*, 28(4), 1-22 <https://doi.org/10.1177/13621688241241125>
12. Bao, B. S., & Wang, A. F. (2024). A systematic review of conversational AI in language education: Focusing on the collaboration with human teachers. *Journal of Research on Technology in Education*, 55(1), 48 - 63. <https://doi.org/10.1080/1539152.2142873>
13. Bao, K., & Wenting, I. (2025). The challenges of teaching English as a second language in Australian universities. *Journal of Academic Language and Learning*, 3(1), 1 - 17.
14. Brauer, S., & Mazarakis, P. (2024). English language proficiency and international students' academic success. *Journal of International Education*, 12(1), 32-45.
15. Brynjolfsson, W. T. (2022). How to design Audio-Gamification for Language learning with Amazon Alexa? -A Long-Term field experiment; *International Journal of Human Computer Interact.* 1(10); 22- 39 . <https://doi.org/10.1080/10447318.2022.2160228>
16. Bunce, A., Guest, G., & Johnson, L. (2021). How many interviews are enough? An experiment with data saturation and variability; *Journal of Education and Information Technologies*, 18(1), 59 - 82. <https://doi.org/10.1177/1525822X05279903>
17. Chen, Z., & Ramzan, M. (2024). Analyzing the role of Facebook-based e-portfolio on motivation and performance in English as a second language learning. *International Journal of English Language and Literature Studies*, 13(2), 123-138.
18. Dina, Q., & Yusop, A. F. (2024). Transnational language teachers' emotional vulnerability and professional identity construction: an ecological perspective. *Journal of Multilingual and Multicultural Development*, 44(1), 1 - 15. <https://doi.org/10.1080>
19. Dwivedi, S., Hughes, L., Kshetri, N., Slade, E. L., & Tlili, Y. K. (2022). Opinion paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 2(3); 201 – 217
20. Fatemeh, W., & Safian, C. Z. (2023). AI-driven tools in language education: Opportunities and challenges. *Journal of Applied Linguistics*, 19(4), 211-230. <https://www.journals.sagepub.com/jal>
21. Godwin, J. R., & Jones, E. O. (2024). Co-designing a real-time classroom orchestration tool to support teacher-AI complementarity; *Journal of Learning Analytics*, 6(2), 27 – 42 <https://doi.org/10.18608/jla>
22. Grego, L., & Vesselinov, Q. I. (2025). Correction to: The construction of language teacher identity among graduates from non-English language teaching majors in Vietnam. *Journal of English Teaching & Learning*, 4(8), 485 – 502. <https://doi.org/10.1007/s42321-023-00144-x>
23. Hassani, H. S., & Silva, S. (2023). AI Integration into language education and teacher identity: An ecological perspective. *Journal Language Teaching Research Quarterly*, 4(7), 1-19 <https://doi.org/47.01>
24. Kamali, J. (2025). Teachers' Beliefs about Teacher Metamorphosis; *MEXTESOL Journal*, 45(1), 1-7. <https://doi.org/10.61871/mj.v45n1-7>
25. Khodadadi, L. A., & Muhammad, P. (2025). Emerging technologies: AI in language learning. *International Journal of Language Learning & Technology*, 23(3), 1-17
26. Leiping, M., & Zhang, Z. U (2025). The effects of frequency, duration, and intensity on L2 learning through Duolingo. *Journal of Second Language Studies*, 7(1), 1-43. <https://www.jbe-platform.com/content/journals/10.1075/jsls.00021>
27. Ma, D., Akram, H., & Chen, I. H. (2024). Artificial Intelligence in Higher Education: A Cross-Cultural Examination of Students' Behavioral Intentions and Attitudes. *The International Review of Research in Open and Distributed Learning*, 25(3), 134-157.
28. Ma, D., Akram, H., & Li, S. (2025). Assessing the role of physical activity in shaping students' academic motivation: the mediating role of mental health. *BMC Public Health*.
29. Maravilla, D., (2022). An AI-powered language learning system using virtual reality. *Journal of Educational Computing Research*, 58(4), 439 - 454.
30. Masiero, L. K. (2023). Conceptualizing language teacher education centered on language teacher identity development: A competencies-based approach and practical applications. *TESOL Quarterly*, 5(4), 1037 - 1051. <https://doi.org/10.1002/tesq.568>
31. Moorhouse, L., & Zou, D. (2023). Metamorphosis of a teacher educator: A journey towards a more critical self. *Journal of Applied Learning & Teaching*, 6(2), 252 – 265. <https://doi.org/10.37074/jalt.2023.6.2.8>
32. Morales, S. K. (2025). A media literacy perspective on video-mediated L2 learning. *Journal of Language and Linguistics*, 5(2), 257- 268.
33. Nadia, F. & Satvati, Q. (2024). When gamification spoils your learning: A qualitative case study of gamification misuse in a language-learning app (Duolingo). *International Journal of Language Learning & Technolog*, 7(2); 657 - 663 <https://arxiv.org/abs/.16175>

34. Nguyen, B. J. (2024). An ecological inquiry into the identity formation of a novice TESOL research mentor: Critical Autoethnographic narratives in focus. *Journal of Language Teaching Research*, 28(2), 113 -128. <https://doi.org/10.1177/13621688241251953>
35. Nizzolino, T. A. (2023). Research on the evaluation of deeply intelligent classroom teaching and learning in colleges and universities based on data analysis. *International Journal of Applied Mathematics and Nonlinear Sciences*, 9(1), 231 - 249 <https://doi.org/10.2478/amns-2024-0255>
36. Ramzan, M., Akram, H., & kynat Javaid, Z. (2025). Challenges and Psychological Influences in Teaching English as a Medium of Instruction in Pakistani Institutions. *Social Science Review Archives*, 3(1), 370-379.
37. Ramzan, M., Awan, H. J., Ramzan, M., & Maharvi, H. (2020). Comparative Pragmatic Study of Print media discourse in Baluchistan newspapers headlines. *Al-Burz*, 12(1), 30-44.
38. Ramzan, M., Azmat, Z., Khan, M. A., & un Nisa, Z. (2023). Subject-Verb Agreement Errors in ESL Students' Academic Writing: A Surface Taxonomy Approach. In *Linguistic Forum-A Journal of Linguistics*, 5(2), 16-21.
39. Ramzan, M., Javaid, Z. K., Fatima, N., & Kamran, M. (2025). Apprehension And Challenges In Lab-Based Language Education Using Online Applications. *Educational Research And Innovation*, 5(4), 106-120.
40. Renkema, L. Y., & Zarifhonarvar, E. (2025). Post method survival. *Procedia-Social and Behavioral Sciences, Journal of Language Teaching Research*, 9(8), 824 – 829
41. Rohail, G. R. (2024). Forbidden and necessary: making sense of smartphones in vocational teaching. *Journal of Workplace Learning*, 2(10), 432 – 451 <https://doi.org/10.1108/>
42. Salvatore, T. H. (2026). AI-Mediated Communication in EFL Classrooms: The Role of Technical and Pedagogical Stimuli and the Mediating Effects of AI Literacy and Enjoyment. *Europe Journal of Education*, 12(8), 113 – 132
43. Sohail, A., & Akram, H. (2025). The role of self-awareness and reflection in academic achievement: A psychological and Bayesian analysis. *Pedagogical Research*, 10(1).
44. Sullivan, S. D. (2024). Exploring the impact of AI on teacher leadership: regressing or expanding? *Journal of Education and Information Technologies*, 29(7), 8415 – 8430 <https://doi.org/10.1007/s10639-023-12174-w>
45. Tursunbayeva, G. I., & Renkema, O. A. (2022). Gamification, anxiety, & motivation in second language learners: A qualitative systematic review. *Journal of Language Education and Technology*, 2(2), 98 -117.
46. Tursunbayeva, O. P., & Renkema, I. H. (2025) . ChatGPT and SLA: A new era for CALL? *CALICO Journal*, 40(2), 101-125. <https://www.calico.org>
47. Xiong, X., & Shi, Z. (2024). A feasibility study for the application of AI-generated conversations in pragmatic analysis. *Journal of Pragmatics*, 2(23), 14 - 30. <https://doi.org/10.1016/j.pragma.2024.01.003>
48. Zuboff, W. (2022). Language teacher-researcher identity negotiation: An ecological perspective. *TESOL Quarterly*, 50(3), 735–745. <https://doi.org/10.1002/tesq.313>