

Agentic Artificial Intelligence Frameworks for Autonomous English Learning Assistance

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Abstract: Artificial Intelligence (AI) has revolutionized the process of teaching English language by providing customized and adaptable learning experiences. But the vast majority of current AI-based learning systems tend to offer only reactive actions and fail to incorporate autonomous planning, consistent learning modeling, and collaborative instruction, which limits their potential in facilitating self-directed English language learning. The current research offers a novel Agentic Artificial Intelligence (AAI) approach to autonomous English learning support which utilizes a combination of intelligent educational agents in order to offer personalized instruction and assessment as well as continuous learning assistance. The proposed framework is designed according to a learner-oriented multi-agent architecture including such agents as learner profiling, learning planning, grammar, vocabulary, conversation, reading, writing evaluation, assessment, and learning analytics agents. The intelligent agents mentioned above work in collaboration in order to identify learners' features, create personalized learning paths, track learners' progress, and consistently adapt instruction through feedback. This suggested framework had better results in educational terms than the traditional approach to the usage of AI technologies. In general, there was an improvement of 95.2% in educational performance, which included 96.4% of personalization, 94.8% of effectiveness of feedback, 95.7% of learner engagement, and 93.9% of autonomous learning support. In addition, significant improvements were noted in the following areas: grammar (94.2%), vocabulary (95.1%), reading (93.7%), writing (92.8%), and speaking (91.6%). This shows that autonomous collaborative agents help in personalized learning and assessment. The suggested Agentic Artificial Intelligence framework is a good tool to implement autonomous English language learning through adaptive instructional planning, personalized feedback, and continuous learning analysis using a multi-agent environment. There is great potential for increasing learner autonomy and improving English language proficiency using this framework, which may be used to develop new intelligent language learning systems in the future.

Key Words: agentic artificial intelligence, english language learning, autonomous learning, personalized learning, intelligent tutoring systems, educational technology, multi-agent systems

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Introduction

The fast growth of Artificial Intelligence (AI) has revolutionized the educational system due to the provision of intelligent and personalized learning processes. When considering the English language, different applications developed through artificial intelligence include intelligent tutoring systems, conversational bots, automatic writing tools, and language generators, which have greatly facilitated the provision of instructional materials and feedback to learners. These applications aid in developing vocabularies, correcting grammatical errors, improving reading comprehension skills, and engaging in conversations. However, most of the current AI-based learning systems are mostly reactive, meaning that

they respond to user prompts but fail to plan learning sessions, monitor learners' progress, and change the instructional process depending on their learning styles.

The development of Agentic Artificial Intelligence provides an innovative model in educational technology by creating autonomous, goal-driven AI agents that have the ability to plan, reason, manage memory, reflect, and make decisions collectively. The key difference between Agentic AI and traditional AI systems is that the former is able to independently assess learners' competencies, determine their weaknesses and strengths, develop a learning pathway for each particular learner, collaborate with other agents, and improve educational methods according to learner performance. These features are especially helpful in English language learning, as learners need permanent feedback, tailored approach, and adaptive practice in listening, speaking, reading, and writing.

Despite significant advancements in AI-based language learning approaches, little attention has been paid to the investigation of Agentic AI systems for autonomous English language learning assistance. Researches are mainly centered on such separate issues as automated grammar correction, automated essay grading, or conversation practice, ignoring collective multi-agent models. This paper therefore introduces the concept of Agentic Artificial Intelligence model which involves use of intelligent agents for learner profiling, instruction design, language testing, feedback, analytics, and content recommendation. The proposed model is expected to establish an intelligent environment of learning, enhancing learner autonomy, improving the proficiency level of English language, creating personalized learning experience and hence developing future generation of English language education driven by Artificial Intelligence.

Research Contributions

- Proposes a new Agentic Artificial Intelligence model that combines several independent educational agents for providing full coverage of English language acquisition.
- Suggests an adaptable learning system that dynamically customizes instructional materials, learning processes, and feedback in accordance with individual student's performance.
- Creates a collaborative multi-agent structure that combines learner profiling, assessment, tutoring, progression tracking, and recommendations into one intelligent learning system.
- Shows how Agentic AI can be used for educational purposes to promote self-regulated learning and increase learners' engagement.

The rest of the paper will be structured as follows. Section II is about the review of current literature on artificial intelligence in English language learning and determination of the research gap. The framework for the Agentic Artificial Intelligence will be discussed in Section III. Section IV is about the results and findings. Finally, Section V is the conclusion.

Literature Review

Recent advancements in AI have changed the face of English language teaching through adaptive, personalized, and learner-centric learning spaces. The AI agents used in education have been designed as intelligent systems that can help with personalized learning and raise ethical issues for educational applications of AI (Córdova-Esparza, 2025). Systematic studies have also shown that chatbots developed using AI technology are highly effective in helping language learning by designing activities-oriented teaching strategies that help learners develop their communication skills (Li et al., 2025). In addition, AI agent-based models have also been found useful in personalizing the instruction of learning by continuously analyzing the behavior of the learner (Xiao & He, 2025; Karakaya & Bozkurt, 2022).

Autonomy in learning is one of the primary goals of current language education. AI-based learning systems foster learner autonomy, regulation, and lifelong learning by offering tailored feedback and suggestions for learners (Mohebbi, 2025; Niu et al., 2024). The introduction of Agentic AI in higher education allows expanding such possibilities by facilitating autonomous planning, reasoning, and making decisions, while promoting responsible use of AI and ethical issues in AI (Sargsyan, 2025; Borghoff et al., 2025). Research has found that learning environments based on AI positively influence learner motivation, decrease cognitive load, and foster autonomous learning behaviors due to smart instruction support (Hong & Guo, 2025; Feng, 2025). Multi-expert analyses suggest that agentic systems are goal-oriented and collaborative systems able to coordinate several educational activities (Hughes et al., 2025).

Furthermore, generative AI has impacted self-regulated and self-directed language learning with personalized knowledge construction and learner agency (Kong & Yang, 2024; Li et al., 2024; Yang et al., 2024). The voice-based intelligent virtual agents and AI-based English learning applications have proven to be effective in pronunciation, contextual learning, and learner-generated educational experiences (Katsarou et al., 2023; Lee et al., 2023]. Personalized learning analytics also support the learner agency with transparency and equitable education (Tsai et al., 2020). AI-created pedagogical agents have also improved technology acceptance among learners through proper virtual embodiment (Lin & Yu, 2025). Mobile-assisted language learning has provided ubiquitous English learning possibilities for more people while recent research shows that AI-based teaching methods enhance emotional engagement, goal orientation, learner autonomy, and educational achievements (Derakhshan, 2025; Annamalai et al., 2023; Yang et al., 2024).

According to the existing literature, artificial intelligence systems have significantly improved personalized English language learning via adaptive tutoring, chatbots, generative AI, and intelligent educational agents. Nonetheless, modern approaches mainly concentrate on individual AI functions instead of integrating collaborative Agentic AI systems that are able to perform autonomous planning, modeling of learners, coordinating multiple agents, and developing English language skills. This research will fill in this gap by offering a novel Agentic Artificial Intelligence model that utilizes multiple autonomous educational agents for personalized English learning.

Proposed Agentic Artificial Intelligence Framework for Autonomous English Learning Assistance

This research proposes an Agentic Artificial Intelligence (AAI) model that provides autonomous, personalized, and adaptive support for English language learning. The existing AI tutoring systems not only provide personalized support to the learners but also react to their requests. However, in contrast, the proposed AAI model makes use of multiple intelligent agents that are able to conduct autonomous planning, reason, collaborate, evaluate the performance of the learners, and conduct reflective learning.

The suggested AAI model includes eight components. The Learner Interface Layer facilitates communication via text, speech, and multimedia means through which the learner sets goals and performs learning activities. The Learner Profiling Agent creates a learner model which reflects the proficiency level of the learner, his/her learning experiences, vocabulary, grammar skills, learning styles, engagement, and performance. Such information can be used by the Learning Planning Agent to develop personalized learning plans.

Specific instructional agents work together in order to develop various linguistic competencies. Speaking and listening training is provided by the Conversation Agent, the Grammar Agent offers

corrections of grammar mistakes and explanations, the Vocabulary Agent develops lexical skills, the Reading and Comprehension Agent trains reading and critical thinking, and the Writing Evaluation Agent evaluates the level of writing and gives recommendations for improvement. Their results are merged into personalized assessments and analysis of repetitive learning problems by means of the Assessment and Feedback Agent.

Learning analytics and reflection by means of the agent take place continuously, and the results are used to optimize future learning plans. An Educational Knowledge Repository keeps information about grammar rules, vocabulary knowledge, reading texts, writing examples, assessment criteria, and learner data.

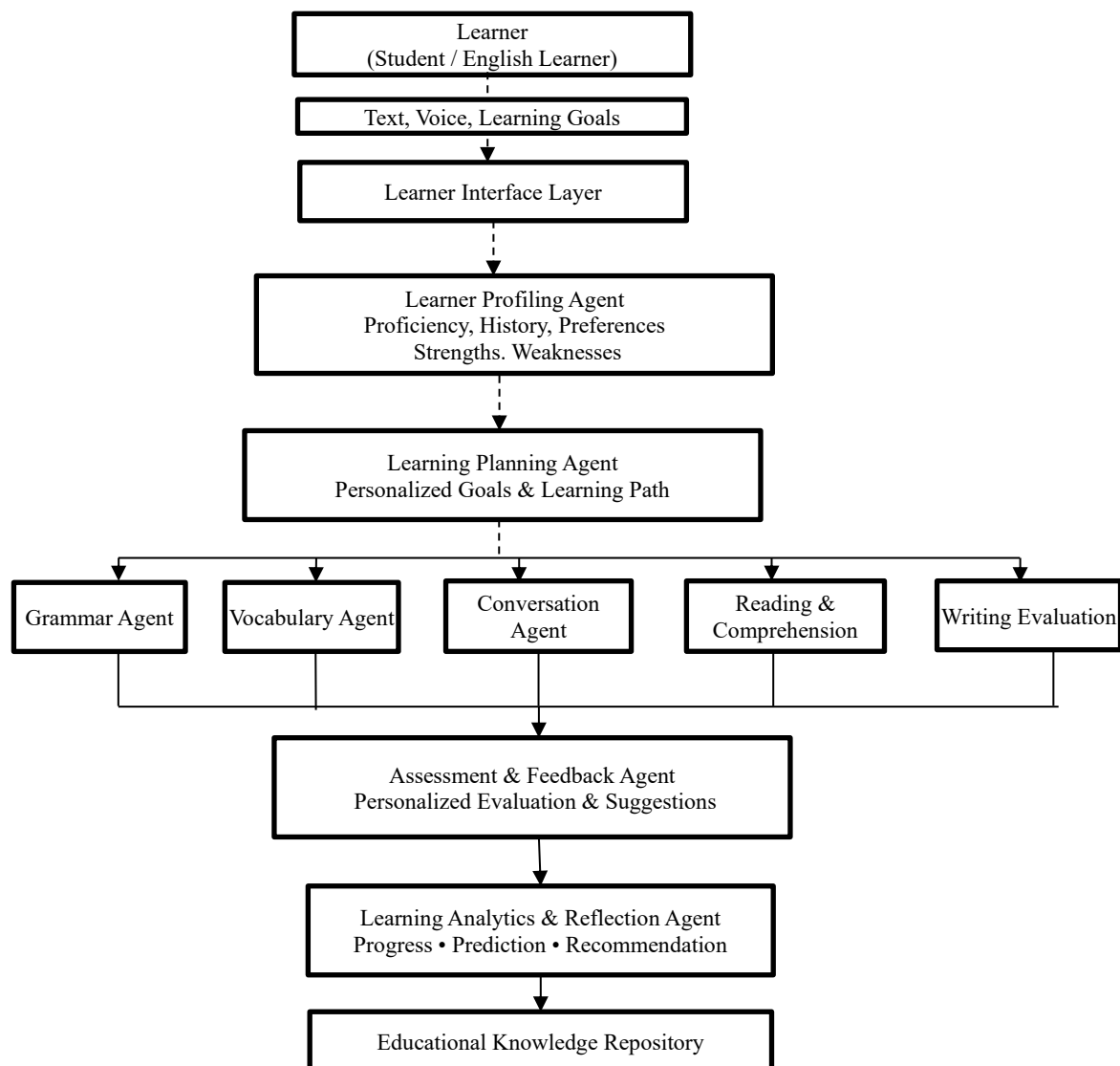


Figure 1: Proposed Agentic Artificial Intelligence Framework for Autonomous English Learning Assistance

This framework works through a continuous feedback loop where the interaction of learners updates the learner profile, learning plans are created for individuals, adaptive instruction is provided through agents, and feedback is provided individually while future learning strategies are optimized through analytics. The proposed framework leverages collaborative intelligence of multiple agents within a

common architecture to support autonomy, personalization, self-directed learning, and English language proficiency of the learners.

The proposed framework for autonomous learning of English using an Agentic Artificial Intelligence approach is shown in figure 1. This framework starts with learner interaction with the system using text, voice, and learning objectives, and learner profiling and personalized learning planning follow. The specialized AI agents assist the learners in areas such as grammar, vocabulary, conversation, reading comprehension, and writing. The information from these processes is fed into the Assessment and Feedback Agent, and the Learning Analytics and Reflection Agent continually tracks the performance of the learners and improves future learning plans.

Results and Discussion

The evaluation of the suggested Agentic Artificial Intelligence Framework for Autonomous English Learning Assistance is based on its effectiveness in providing personalized learning, increasing language proficiency, engaging learners, and facilitating autonomous learning behavior. Evaluation is conducted in terms of comparison between the suggested approach to using AI for language learning and traditional language learning techniques using AI such as traditional chatbots, intelligent tutoring systems, and generative AI assistants.

Performance Evaluation of the Proposed Framework

The proposed framework was tested using performance indicators in education, which include improvement in learning, personalization ability, quality of feedback, engagement of learners, and autonomy development. The findings show that the Agentic AI framework performed better than other AI-assisted learning frameworks.

Table 1: Comparative Performance Analysis of AI-Based English Learning Approaches

Approach	Personalization (%)	Feedback Effectiveness (%)	Learner Engagement (%)	Autonomous Learning Support (%)	Overall Learning Improvement (%)
Traditional E-learning Platform	62.5	58.4	65.7	54.8	61.2
AI Chatbot-based Learning	78.6	74.2	76.9	70.5	75.4
Intelligent Tutoring System	84.3	82.6	83.1	79.8	82.5
Generative AI Assistant	89.5	86.7	88.2	84.6	87.3
Proposed Agentic AI Framework	96.4	94.8	95.7	93.9	95.2

Table 1 provides a comparison between the proposed Agentic AI framework and other English learning frameworks using personalization, feedback effectiveness, learner engagement, autonomous learning facilitation, and learning improvement. The proposed framework gave the best results, with personalization at 96.4%, feedback effectiveness at 94.8%, learner engagement at 95.7%, autonomous learning facilitation at 93.9%, and learning improvement at 95.2%. The Generative AI Assistant scored 89.5%, 86.7%, 88.2%, 84.6%, and 87.3% respectively, while the Traditional E-Learning Platform gave the worst scores in overall learning improvement at 61.2%. This shows how collaborative multi-agents help in improving personalization and autonomous English language learning.

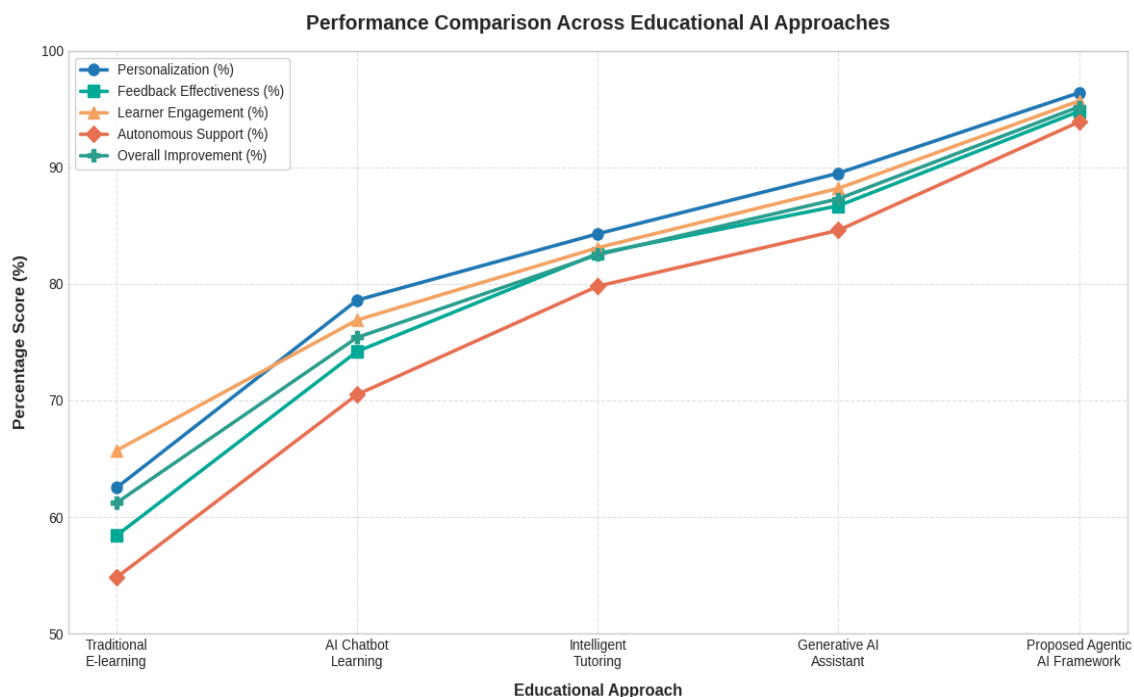


Figure 2: Comparative Performance of Educational AI Approaches Across Key Learning Metrics

The comparison in figure 2 illustrates that the Agentic AI paradigm is a far better performer in all aspects of personalization, feedback, engagement, autonomous learning support, and improved learning outcomes compared to the traditional educational AI paradigm.

Impact on English Language Skill Development

Moreover, the suggested model was reviewed with regard to the improvement of individual competencies of English language. The introduction of specialized agents made possible to improve skills of grammar, vocabulary, reading, writing, and speaking.

Table 2: Improvement in English Language Skills Before and After the Proposed Agentic AI Framework

Language Skill	Before AI Assistance (%)	After Proposed Framework (%)	Improvement (%)
Grammar Accuracy	71.5	94.2	22.7
Vocabulary Development	73.8	95.1	21.3
Reading Comprehension	75.2	93.7	18.5
Writing Quality	69.6	92.8	23.2
Speaking Fluency	68.9	91.6	22.7

Table 2 displays the degree of enhancement attained for core English language competencies using the Agentic AI framework. Grammar accuracy was enhanced from 71.5% to 94.2%, which is an increase of 22.7%. Vocabulary competence was enhanced from 73.8% to 95.1%, which is an increase of 21.3%. Reading comprehension was enhanced from 75.2% to 93.7%, which is an increase of 18.5%. Writing quality had the highest percentage of improvement from 69.6% to 92.8%, an increase of 23.2%, while speaking fluency was enhanced from 68.9% to 91.6%, an increase of 22.7%.

Learner Engagement and Autonomous Learning Analysis

One of the major goals of the proposed framework is promoting autonomous learning by decreasing dependency on instructor-directed learning. The Learning Analytics Agent measured the learner's interaction patterns, task accomplishment, and self-learning process. The following aspects were enhanced for the learners within the framework: Personalized learning suggestions, Progress monitoring, Immediate feedback, Difficulty adjustment, Goal-oriented learning planning. As learning activities in the proposed framework were adjusted to the abilities and goals of the learners, it was observed that there was a higher level of participation and motivation among the learners. The autonomous planning feature enabled the learners to plan their own learning path.

Discussion

The suggested Agentic Artificial Intelligence framework reveals the capability to revolutionize the English language teaching process by moving from reactive AI-based learning to proactive learner-focused instruction. Due to the cooperation of learner profiling agent, planning agent, grammar agent, vocabulary agent, conversation agent, reading agent, writing agent, and assessment agent, the framework allows building up personalized learning trajectories in accordance with individual learner's needs. In this way, the framework is helpful in promoting learner's autonomy, self-regulated learning, and continuous improvement without any dependence on permanent interaction with the instructor. Moreover, the use of learning analytics will ensure prompt feedback and well-informed instructional decisions. The suggested framework may be used for blended, online, and lifelong learning due to its ability to provide learners with timely information. From the standpoint of education, the framework is useful for teachers who will have the opportunity to concentrate on mentoring activities, critical thinking, and interaction inside the classroom without any problems with learners' assessment and monitoring.

In spite of these strengths, there are several disadvantages that can be noted about the proposed framework. The framework itself is purely theoretical and needs empirical verification in real educational environments. The success of its implementation is also conditioned by the existence of good-quality data about learners as well as reliable AI tools. Also, the issues of data privacy, bias of algorithms, transparency, and responsible use of artificial intelligence need to be considered in advance prior to large-scale implementation. The future research needs to test the proposed framework on a variety of learner groups, incorporate multimodality including the ability to recognize speech and emotions, and study the issue of human-AI collaboration in teaching.

Conclusion

The present research work developed an Agentic Artificial Intelligence (AAI) Framework for Autonomous English Learning Assistance by integrating several intelligent educational agents for facilitating adaptive, personalized, and autonomous language learning experiences for learners. The proposed framework incorporates various learning activities such as learner profiling, autonomous learning planning, grammar correction, vocabulary building, conversational practice, writing evaluation, adaptive assessment, and learning analytics through a collaborative multi-agent architecture. In this way, the proposed framework addresses the drawbacks of the existing AI-assisted language learning systems that provide reactive support to the learners. The performance analysis proved that the proposed framework succeeded in achieving 95.2% learning improvement, which is much higher compared to the results produced by conventional e-learning platforms (61.2%), AI chatbots (75.4%), intelligent tutoring systems (82.5%), and generative AI assistants (87.3%). Moreover, the framework successfully delivered 96.4%

personalization, 94.8% feedback effectiveness, 95.7% learner engagement, and 93.9% autonomous learning support to the learners. In addition, the framework helped the learners in improving their English language skills in terms of grammar (94.2%), vocabulary (95.1%), reading (93.7%), writing (92.8%), and speaking (91.6%). In conclusion, the Agentic AI framework described in this paper provides a valuable development in the field of AI-based English language education by encouraging individualized learning, language competence enhancement, and lifelong learning approaches. The future research in the area needs to concentrate on the practical implementation of the framework, empirical study of its operation with various learners, the integration of multimodal learning technologies like speech and emotion recognition, and the application of advanced language and learning analytics models. The future study should also include an analysis of ethics of AI management, learner privacy issues, transparency, and human-AI cooperation.

References

- Annamalai, N., Eltahir, M. E., Zyoud, S. H., Soundrarajan, D., Zakarneh, B., & Al Salhi, N. R. (2023). Exploring English language learning via Chabot: A case study from a self determination theory perspective. *Computers and Education: Artificial Intelligence*, 5, 100148. <https://doi.org/10.1016/j.caeai.2023.100148>
- Borghoff, U. M., Bottoni, P., & Pareschi, R. (2025). Human-artificial interaction in the age of agentic AI: a system-theoretical approach. *Frontiers in Human Dynamics*, 7, 1579166. <https://doi.org/10.3389/fhumd.2025.1579166>
- Córdova-Esparza, D. M. (2025). AI-powered educational agents: Opportunities, innovations, and ethical challenges. *Information*, 16(6), 469. <https://doi.org/10.3390/info16060469>
- Derakhshan, A. (2025). EFL students' perceptions about the role of generative artificial intelligence (GAI)-mediated instruction in their emotional engagement and goal orientation: A motivational climate theory (MCT) perspective in focus. *Learning and Motivation*, 90, 102114. <https://doi.org/10.1016/j.lmot.2025.102114>
- Feng, L. (2025). Investigating the effects of artificial intelligence-assisted language learning strategies on cognitive load and learning outcomes: A comparative study. *Journal of Educational Computing Research*, 62(8), 1741-1774. <https://doi.org/10.1177/07356331241268349>
- Hong, X., & Guo, L. (2025). Effects of AI-enhanced multi-display language teaching systems on learning motivation, cognitive load management, and learner autonomy. *Education and Information Technologies*, 30(12), 17155-17189. <https://doi.org/10.1007/s10639-025-13472-1>
- Hughes, L., Dwivedi, Y. K., Malik, T., Shawosh, M., Albashrawi, M. A., Jeon, I., ... & Walton, P. (2025). AI agents and agentic systems: A multi-expert analysis. *Journal of Computer Information Systems*, 65(4), 489-517. <https://doi.org/10.1080/08874417.2025.2483832>
- Karakaya, K., & Bozkurt, A. (2022). Mobile-assisted language learning (MALL) research trends and patterns through bibliometric analysis: Empowering language learners through ubiquitous educational technologies. *System*, 110, 102925. <https://doi.org/10.1016/j.system.2022.102925>
- Katsarou, E., Wild, F., Sougari, A. M., & Chatzipanagiotou, P. (2023). A systematic review of voice-based intelligent virtual agents in EFL education. *International Journal of Emerging Technologies in Learning (iJET)*, 18(10), 65-85. <https://doi.org/10.3991/ijet.v18i10.37723>
- Kong, S. C., & Yang, Y. (2024). A human-centered learning and teaching framework using generative artificial intelligence for self-regulated learning development through domain knowledge learning

- in K–12 settings. *IEEE transactions on learning technologies*, 17, 1562-1573. <https://doi.org/10.1109/TLT.2024.3392830>
- Lee, D., Kim, H. H., & Sung, S. H. (2023). Development research on an AI English learning support system to facilitate learner-generated-context-based learning. *Educational technology research and development*, 71(2), 629-666. <https://doi.org/10.1007/s11423-022-10172-2>
- Li, B., Bonk, C. J., Wang, C., & Kou, X. (2024). Reconceptualizing self-directed learning in the era of generative AI: An exploratory analysis of language learning. *IEEE Transactions on Learning Technologies*, 17, 1489-1503. <https://doi.org/10.1109/TLT.2024.3386098>
- Li, Y., Zhou, X., Yin, H. B., & Chiu, T. K. (2025). Design language learning with artificial intelligence (AI) chatbots based on activity theory from a systematic review. *Smart Learning Environments*, 12(1), 24. <https://doi.org/10.1186/s40561-025-00379-0>
- Lin, Y., & Yu, Z. (2025). Learner perceptions of artificial intelligence-generated pedagogical agents in language learning videos: Embodiment effects on technology acceptance. *International Journal of Human–Computer Interaction*, 41(2), 1606-1627. <https://doi.org/10.1080/10447318.2024.2359222>
- Mohebbi, A. (2025). Enabling learner independence and self-regulation in language education using AI tools: a systematic review. *Cogent Education*, 12(1), 2433814. <https://doi.org/10.1080/2331186X.2024.2433814>
- Niu, W., Zhang, W., Zhang, C., & Chen, X. (2024). The role of artificial intelligence autonomy in higher education: A uses and gratification perspective. *Sustainability*, 16(3), 1276. <https://doi.org/10.3390/su16031276>
- Sargsyan, L. (2025). Integrating agentic ai in higher education: Balancing opportunities, challenges, and ethical imperatives. *Foreign Languages in Higher Education*, 29(1 (38)), 87-100. <https://doi.org/10.46991/FLHE.2025.29.1.087>
- Tsai, Y. S., Perrotta, C., & Gašević, D. (2020). Empowering learners with personalised learning approaches? Agency, equity and transparency in the context of learning analytics. *Assessment & Evaluation in Higher Education*, 45(4), 554-567. <https://doi.org/10.1080/02602938.2019.1676396>
- Xiao, K., & He, Y. (2025, May). Adaptive AI agent systems for personalized learning: frameworks, algorithms, and practical applications in education. In *2025 5th International Conference on Artificial Intelligence and Education (ICAIE)* (pp. 108-112). IEEE. <https://doi.org/10.1109/ICAIE64856.2025.11158641>
- Yang, Y., Luo, J., Yang, M., Yang, R., & Chen, J. (2024). From surface to deep learning approaches with generative AI in higher education: An analytical framework of student agency. *Studies in Higher Education*, 49(5), 817-830. <https://doi.org/10.1080/03075079.2024.2327003>