



ENHANCING B1 ENGLISH COMMUNICATIVE COMPETENCE THROUGH AI AND VR: A METHODOLOGICAL ANALYSIS OF TalkTIME

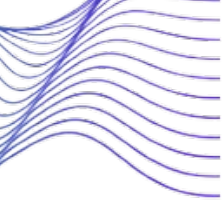
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Abstract. *This thesis investigates the pedagogical potential of integrating artificial intelligence (AI) and virtual reality (VR) technologies to enhance English-language learning among B1-level students, with a particular focus on the TalkTIME project – an AI-driven, VR-supported immersive language-learning platform. Using documentary analysis, comparative content analysis, and a practical descriptive case-study method, the research synthesises theoretical insights from recent AI-ICALL and VR-ELT literature with the functional design of TalkTIME. The findings show that AI contributes to personalisation, adaptive feedback, error diagnosis, and learner autonomy, while VR provides immersive, context-rich environments that foster communicative competence, pragmatic awareness, and emotional engagement. Together, AI and VR create a complementary pedagogical ecosystem in which adaptive intelligence supports experiential, situation-based language practice. The results indicate that such integration significantly improves learners' listening comprehension, spoken fluency, vocabulary retrieval, and confidence by reducing speaking anxiety and enabling safe, authentic communication practice. Despite challenges related to technological cost, teacher preparation, and logistical implementation, the study concludes that AI–VR synergy has substantial potential to transform foreign-language education into a more personalised, interactive, and effective learning experience. Recommendations for further research include developing unified AI–VR instructional models and expanding teacher training to ensure pedagogically sound integration of emerging educational technologies.*

Keywords: *AI in language learning, virtual reality (VR), intelligent tutoring systems, immersive learning, communicative competence, personalised learning, adaptive feedback, ICALL, VR simulations, B1 learners, English language teaching, educational technology, learner autonomy, affective factors, TalkTIME project.*

Introduction. The rapid development of artificial intelligence (AI) and immersive virtual reality (VR) technologies has begun reshaping foreign-language education in profound ways. AI-powered systems provide adaptive and personalised learning paths, instantaneous feedback, and intelligent tutoring support, thereby increasing the efficiency, accuracy, and learner autonomy in English language acquisition. At the same time, VR creates rich linguistic and cultural immersion by placing learners inside authentic, simulated communicative environments that mirror real-world sociocultural contexts, enabling situated learning and experiential interaction. Together, these tools address the limitations of traditional methods by enabling continuous practice, reducing anxiety, enhancing motivation, and supporting the development of communicative competence and intercultural awareness.



A practical illustration of this transformative potential can be seen in the TalkTIME project, which integrates AI-driven virtual agents and immersive VR spaces to improve students' foreign-language proficiency. In TalkTIME, students develop and refine their English-speaking and comprehension skills by entering a virtual world, where AI characters – designed as interactive avatars – guide them through realistic communication scenarios. The system can be accessed through Android, iOS, or Windows devices, and full immersion is achieved through VR headsets that allow learners to feel physically present within the virtual environment.

Upon entering the application, students are presented with several thematic locations (e.g., an airport, a hotel lobby, a café, a tourist information center). In each location, AI characters greet the learners and engage them in dialogue based on pre-designed pedagogical scripts. For example, in the "Airport Check-in" scenario, the AI agent may ask the student to confirm their flight number, explain the purpose of the trip, or respond to unexpected communicative challenges such as delayed flights or missing luggage. In a "Café Ordering" scenario, learners interact with a virtual barista, practicing functional language such as making requests, clarifying ingredients, or handling misunderstandings. These dynamic exchanges replicate spontaneous conversation while maintaining a psychologically safe environment in which learners can experiment with language without fear of embarrassment.

The pedagogical aim of the TalkTIME project is to create controlled yet realistic communicative conditions that help students strengthen key language skills – particularly listening comprehension, spoken fluency, and pragmatic competence. By immersing learners in simulated but authentic interaction, the platform helps them overcome both psychological barriers (e.g., speaking anxiety, fear of making mistakes) and linguistic barriers (e.g., limited vocabulary retrieval, difficulties with spontaneous speech). To achieve this goal, the project must address several pedagogical tasks, including the development of scenario-based dialogues, adaptation of tasks to learners' proficiency levels, integration of real-time AI feedback, and the alignment of VR activities with communicative teaching principles.

Methods. This thesis is based on a documentary and analytical research method, grounded in the systematic examination of two uploaded academic sources and additional project-specific materials. Lotze offers a theoretical and technological framework for AI-powered intelligent computer-assisted language learning (ICALL), including adaptive learning systems, natural language processing tools, chatbot interaction, AI-driven writing assistants, and intelligent tutoring mechanisms. The scholar provides an extensive literature review on the use of virtual reality in English-language teaching, discussing immersive environments, skill-focused simulations, pedagogical benefits, and technological limitations.

The comparison focused particularly on the intersection of AI and immersion-based learning, identifying shared pedagogical principles and complementary technological functions. Special attention was given to elements that address communicative competence, learner motivation, affective variables, and real-time language support. In addition to the documentary analysis, the study employed a content-based comparative method. This included categorising the technological tools described in both sources into



unified analytical themes such as personalisation, immersion, interaction, feedback mechanisms, and affective support. These categories were then used to evaluate the pedagogical potential of combining AI and VR within a single integrated system. A practical-descriptive method was also applied to incorporate the TalkTIME project as an applied case study. The project documentation – describing virtual locations, AI-generated conversational scripts, platform accessibility (Android/iOS/Windows), and VR interaction procedures – was analysed in relation to the theoretical frameworks outlined in the two academic sources. Through this process, the TalkTIME system was examined as a real-world implementation of AI–VR synergy in language learning. The analysis included an evaluation of how TalkTIME aligns with ICALL principles (adaptivity, feedback, scenario-based learning) and with VR pedagogical features (situated immersion, embodied interaction, reduction of speaking anxiety). A synthesis method was used to integrate the findings from all sources into a unified methodological foundation. This synthesis allowed the identification of pedagogically significant patterns, such as the mutual reinforcement of AI adaptivity and VR immersion, and provided the basis for constructing the study's argument regarding their combined value in developing students' communicative skills.

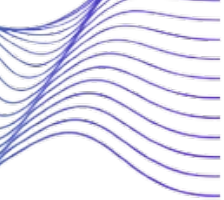
Results

1. The Role of AI in English Language Learning

Analysis of the reviewed literature demonstrates that artificial intelligence plays a transformative role in foreign-language education, particularly in supporting personalisation, learner autonomy, and interactive instruction. AI systems enable a highly individualised learning process by using adaptive algorithms that model learners' knowledge, performance patterns, and cognitive needs. These systems dynamically adjust the level of difficulty, pace, and type of tasks presented to the learner, ensuring continuous alignment with their evolving proficiency. Such adaptivity reduces the mismatch between instructional content and learner readiness, ultimately increasing engagement and retention. A key finding is the impact of instantaneous feedback, which AI systems deliver automatically and continuously. Research shows that immediate corrective feedback decreases learner frustration, prevents fossilisation of errors, and supports more accurate language production. This is particularly evident in AI-based pronunciation analysers, grammar checkers, and automated writing evaluation tools, which allow learners to identify and address weaknesses in real time.

AI also provides a range of multifunctional language support tools, including writing assistants, intelligent dictionaries, semantic suggestion systems, machine translation tools, and conversational chatbots capable of natural language processing. These tools not only enhance accuracy but also promote metalinguistic awareness and self-correction strategies.

A further advantage is seen in intelligent tutoring systems (ITS), which simulate aspects of personalised one-to-one instruction by diagnosing errors, recommending tasks, predicting progress trajectories, and structuring learning pathways. Through predictive analytics, ITS technologies anticipate learners' difficulties and offer targeted interventions, creating conditions for self-regulated and autonomous learning. Overall, the integration of AI substantially reduces teacher workload by automating assessment, feedback, and monitoring functions, allowing teachers to focus on higher-order



pedagogical tasks such as communicative practice, strategy instruction, and learner support.

2. The Role of Virtual Reality in English Language Learning

The reviewed literature confirms that virtual reality significantly enhances English language learning by offering immersive, interactive, and emotionally safe communicative environments. VR systems simulate authentic real-life contexts – such as airports, cafés, classrooms, or cultural sites – where learners can practise communicative tasks without the social pressure typically associated with real-world interaction. This safe environment promotes risk-taking, experimentation, and confidence-building, all of which are essential for developing oral fluency. One key finding is VR's ability to generate linguistic immersion, exposing learners to real-world speech patterns, accents, social cues, and multimodal input (Ordóñez-Procel et al., 2023). Immersion facilitates naturalistic acquisition processes similar to studying abroad or engaging in real-life English-speaking environments, but without geographical or financial constraints.

VR environments also provide cultural immersion, enabling learners to experience gestures, etiquette, environmental cues, and other sociocultural elements that are essential for intercultural communicative competence. This supports learners in understanding pragmatic norms and cultural variation in language use. Another result is the effectiveness of VR for contextualised skill practice. Empirical studies show that VR simulations allow learners to develop listening comprehension through authentic auditory input, enhance speaking abilities through scenario-based dialogues, and strengthen reading and writing skills through task-embedded textual interactions.¹² VR thereby creates an integrated skills environment aligned with communicative language teaching principles.

Finally, the literature consistently highlights the motivational value of VR. Interactive 3D environments, gamified elements, and embodied experiences generate heightened learner engagement, increased persistence, and positive emotional involvement. Collectively, these findings position VR as an effective bridge between traditional classroom instruction and real-life communicative demands.

3. Synergy of AI and VR in English Language Learning

The combined analysis of the two academic sources reveals that AI and VR create a powerful pedagogical synergy when implemented together. AI enhances VR environments by enabling adaptive personalisation: learner data generated during VR activities (e.g., speech accuracy, task completion time, error patterns) can be analysed by AI systems, which then adjust subsequent VR scenarios to match learners' needs. This creates a continuous cycle of data-driven improvement. AI-powered speech recognition also strengthens spoken interaction within VR settings. By analysing pronunciation, fluency, lexical choices, and syntactic structures, AI provides real-time corrective feedback during VR-based communication tasks. This transforms VR from a passive environment into a responsive and intelligent communicative partner. Meanwhile, VR enhances the effectiveness of AI-driven instruction by offering immersive contexts for practising the content chosen or recommended by AI tutors. When AI identifies a learner's weakness

¹² Bahari, A. (2021). Affordances and challenges of teaching language skills by virtual reality: A systematic review (2010–2020). *E-Learning and Digital Media*, 19(2). <https://doi.org/https://doi.org/10.1177/20427530211036583>



(e.g., difficulties with functions such as requesting information or expressing opinions), VR can generate a scenario specifically designed to target that skill. Thus, AI provides the diagnostic foundation, while VR provides the experiential environment. Together, AI and VR create a pedagogical ecosystem characterised by adaptivity, immersion, emotional safety, and experiential learning. This synergy not only improves linguistic performance but also contributes to psychological readiness, motivation, and communicative confidence – all of which are essential for successful language acquisition.

Discussion

Pedagogical Implications

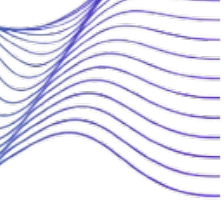
The findings of this study indicate that AI and VR technologies carry significant pedagogical value for foreign-language education, particularly in developing communicative competence and enhancing learner motivation. The integration of AI-powered conversational agents and VR-based simulations creates conditions for spontaneous interaction, allowing learners to practise real-time communication in safe and controlled environments. These interactions mirror natural conversation patterns and support the development of fluency, pragmatic awareness, turn-taking skills, and confidence in speaking English. A major implication concerns the promotion of learner autonomy. AI systems provide instantaneous feedback and personalised learning pathways that adapt to individual learners' needs, pacing, and progress. This fosters self-regulated learning behaviours, enabling students to take responsibility for their own improvement through ongoing monitoring and reflection. Autonomy is further strengthened by AI-powered tools such as pronunciation analysers, grammar checkers, and chatbots, which serve as supplementary language support outside the classroom.

Another pedagogical benefit relates to motivation and emotional engagement. VR-based tasks offer immersive, interactive settings that simulate real-life communicative challenges. Such environments engage multiple sensory channels, making learning more dynamic and enjoyable. The gamified nature of VR scenarios often leads to increased attention, persistence, and emotional involvement, which are crucial factors for sustained language acquisition. AI and VR also support differentiated instruction, as both technologies adjust content difficulty, task complexity, and interaction style according to the learner's proficiency level. This adaptability ensures that learners of different abilities receive individually appropriate input, aligning with the principles of zone of proximal development and inclusive pedagogy.¹³

Importantly, these technological innovations align closely with contemporary language-teaching paradigms. Communicative Language Teaching (CLT) emphasises authentic interaction and meaningful communication – objectives that VR environments naturally fulfil through scenario-based simulations. Similarly, task-based learning benefits from the dynamic problem-solving tasks available in VR contexts. Multimodal instruction, which stresses the integration of visual, auditory, and kinaesthetic modes, is inherently supported by immersive VR technologies. Thus, AI and VR are not only compatible with modern pedagogies but actively extend their potential.

Challenges

¹³ Gardner, R. (2020). The Socio-educational Model of Second Language Acquisition. https://link.springer.com/chapter/10.1007/978-3-030-28380-3_2



Despite the clear pedagogical benefits, one major obstacle concerns technical barriers, including the cost of high-quality VR headsets, hardware-software compatibility issues, and limited access to well-designed educational content. In many institutions, especially in developing regions, infrastructure and budget constraints remain significant barriers to implementation.¹⁴ Another challenge involves teacher preparedness. As noted by Hubbard and confirmed in more recent research, many educators lack training in the pedagogical and technical aspects of AI-based and VR-based tools. Without appropriate professional development, teachers may underutilise advanced features, misapply the technology, or avoid it entirely. Successful integration therefore requires systematic training programs that focus on both technological fluency and pedagogical integration.¹⁵ The findings also reveal logistical constraints, including classroom space limitations, device setup time, maintenance requirements, and safety considerations within VR environments. These practical issues can reduce instructional time, complicate lesson planning, or cause discomfort for learners unfamiliar with immersive technologies.

Nonetheless, academic sources agree that these challenges are not insurmountable. With appropriate investment in digital infrastructure, comprehensive teacher preparation, and careful curriculum design, AI and VR can become powerful components of English-language education. Their combined ability to provide personalised, immersive, and motivating learning experiences positions them as valuable tools for transforming traditional language classrooms and supporting learners in achieving higher levels of communicative competence.

Conclusion. The research work demonstrates that artificial intelligence and virtual reality offer mutually reinforcing benefits for English language teaching, each contributing distinct yet complementary pedagogical functions. AI introduces a high level of adaptivity, enabling personalised learning pathways, immediate corrective feedback, and intelligent monitoring of learner progress. These features support accuracy, self-regulation, and continuous improvement. Virtual reality, in contrast, provides an immersive and context-rich environment where learners can engage in authentic communication, experience cultural nuances, and practise language skills in a psychologically safe space that mimics real-world communicative demands.

When combined, AI and VR have the potential to transform foreign-language education from a traditional, textbook-oriented process into an interactive, learner-centred, and technologically mediated experience. Their integration supports communicative competence development, increases learner autonomy, and enhances motivation through meaningful engagement and multimodal interaction. This synergy aligns closely with modern methodological approaches such as communicative language teaching, task-based instruction, and experiential learning. Despite these promising advantages, the study also highlights several challenges that impede large-scale implementation. Technical barriers – including cost, device access, and content quality – continue to limit adoption. Pedagogical constraints, particularly insufficient teacher training and lack of methodological preparedness, further hinder effective application.

¹⁴ Cai, Y. (2022). A Review of Virtual Reality Technology in EFL Teaching. *Journal of Education, Humanities and Social Sciences*, 4, 260–263.

¹⁵ Hubbard, P. (2008). CALL and the future of language teacher education. *CALICO Journal*, 25(2), 175–188.



Organisational factors such as classroom logistics, equipment maintenance, and time constraints also pose practical difficulties. Nevertheless, both academic sources indicate that with proper planning, institutional support, and professional development, these challenges can be overcome. The findings suggest that AI and VR are not merely supplementary tools but have the potential to become central components of future language-education ecosystems. To fully realise their potential, future research should focus on designing integrated AI-VR platforms that combine adaptive intelligence with immersive environments in a single unified system. Additionally, there is an urgent need to develop comprehensive teacher-training models that address technological literacy, pedagogical integration strategies, and ethical considerations associated with emerging educational technologies.

In conclusion, the evidence indicates that AI and VR, when thoughtfully implemented, can significantly enhance English language teaching by creating more personalised, engaging, and effective learning experiences. Their integration marks an important step toward the digital evolution of language education and opens new avenues for innovation in both pedagogy and practice.

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