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Entornos virtuales de aprendizaje para la enseñanza del idioma inglés en la educación superior: una revisión sistemática

Virtual learning environments for English language education in higher education: a systematic review

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Palabras claves: Entornos virtuales de aprendizaje, enseñanza del idioma inglés, educación superior, EFL, aprendizaje digital.

Resúmen: Introducción. Los entornos virtuales de aprendizaje (EVA) se convirtieron en una característica sumamente prominente de la enseñanza del idioma inglés en la educación superior. Más allá del sistema tradicional de gestión del aprendizaje, los EVA ofrecen espacios de aprendizaje más inmersivos, con asistencia móvil, gamificados y con soporte de inteligencia artificial. Sin embargo, la evidencia de su contribución pedagógica aún se encuentra dispersa en diferentes tradiciones de investigación y modalidades tecnológicas. **Objetivos.** Revisión sistemática de estudios empíricos sobre la enseñanza del idioma inglés mediada por EVA en la educación superior, con especial énfasis en las tendencias de publicación, el aprendizaje de idiomas, los enfoques metodológicos, los resultados educativos y los desafíos en la implementación. **Metodología.** Se realizó una búsqueda sistemática en Scopus bajo las directrices PRISMA 2020 con la expresión ("entorno virtual de aprendizaje" O EVA) Y inglés en títulos, resúmenes y palabras clave. La búsqueda encontró 43 registros, de los cuales 21 fueron excluidos en la etapa de selección de título y resumen. Se evaluó la elegibilidad de 22 informes en texto completo. **Epílogo.** Siguiendo las directrices PRISMA 2020, se realizó una búsqueda sistemática de títulos, resúmenes y palabras clave en Scopus utilizando la expresión (≪entorno virtual de aprendizaje≫ O VLE) Y ≪inglés≫. La búsqueda identificó 43 registros. Tras la revisión de títulos y resúmenes, se excluyeron 21 registros y se evaluó la elegibilidad de 22 informes para su publicación a texto completo. Se excluyó una publicación no empírica de la síntesis cualitativa, quedando veintiún estudios incluidos. **Resultados.** La evidencia apunta a un cambio gradual de las plataformas tradicionales como Moodle y Blackboard hacia entornos tridimensionales, con asistencia móvil, gamificados, colaborativos y con soporte de IA. En los VLE se abordaron las habilidades lingüísticas integradas, el inglés para fines específicos, la autonomía del estudiante, la participación, la interacción y el desarrollo metacognitivo. **Conclusiones.** Los resultados destacaron la importancia de la alineación pedagógico-tecnológica en la educación superior. **Área de estudio general:** educación. **Área de estudio específica:** educación del idioma inglés. **Tipo de artículo:** revisión bibliográfica sistemática.

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Keywords: Virtual learning environments, English language education, higher education, EFL, digital learning.

Introduction. Virtual learning environments (VLEs) have become a highly prominent feature of English language teaching in higher education. Beyond the traditional learning management system, VLEs offer more immersive, mobile-assisted, gamified, and AI-supported learning spaces. However, evidence of their pedagogical contribution is still scattered across different research traditions and technological modalities. **Objectives.** Systematic review of empirical studies on EVA-mediated English language teaching in higher education, with special emphasis on publication trends, language learning, methodological approaches, educational outcomes, and challenges in implementation. **Methodology.** A systematic search was conducted in Scopus under the PRISMA 2020 guidelines with the expression ("virtual learning environment" or VAS) and English in titles, abstracts, and keywords. The search found 43 records, of which 21 were excluded in the title and abstract selection stage. 22 full-text reports were assessed for eligibility. **Epilogue.** Following the PRISMA 2020 guidelines, a systematic search for titles, abstracts and keywords was conducted in Scopus using the expression ("virtual learning environment" or VLE) and "English". The search identified 43 records. After reviewing titles and abstracts, 21 records were excluded and 22 reports were assessed for eligibility for full-text publication. One non-empirical publication was excluded from qualitative synthesis, with twenty one studies included. **Results.** Evidence points to a gradual shift from traditional platforms such as Moodle and Blackboard to three-dimensional, mobile-assistive, gamified, collaborative, and AI-supported environments. Integrated language skills, English for specific purposes, student autonomy, participation, interaction, and metacognitive development were addressed in the VLEs. **Conclusions.** The results highlighted the importance of pedagogical-technological alignment in higher education. **General area of study:** education. **Specific area of study:** English language education. **Type of article:** systematic bibliographic review.

1. Introduction

Digital technologies have gradually changed the settings in which higher education institutions teach and learn additional languages. In the past, university-level English education was primarily based on face-to-face interaction and print-based materials;

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now, digital spaces are often used to access materials, communicate with peers and instructors, complete language tasks, receive feedback, and regulate aspects of learning. In this changing educational landscape, Virtual Learning Environments (VLEs) have assumed a particularly relevant role because they can bring together instructional content, interaction, assessment, communication, and learner activity within a digitally mediated setting.

However, the concept of a VLE has become harder to bound. Previous implementations were tightly coupled with institutionally supported Learning Management Systems (LMSs) such as Moodle and Blackboard. Functions consisted of content distribution, assignment submission, asynchronous communication, assessment, and course administration. The structure has been expanded by subsequent technological developments. Language education today may include mobile-assisted environments, synchronous collaborative spaces, 3D simulations, virtual and augmented reality, gamification, conversational agents, adaptive systems, and Artificial Intelligence (AI). The VLE is therefore no longer simply an online repository or course-management platform, but rather an interactive digital space where learning activities, communication, feedback, and learner participation converge.

Emerging technologies have exploded in growth, and this has led to several specialized strands of evidence. For instance, Virtual Reality (VR) has received increasing attention to support situated and immersive English-language practice. Rahmanu & Molnár (2026) conducted a systematic review of VR-supported English education in higher education and identified applications in EFL, ESL, ESP, EAP, and occupational English contexts. This synthesis reported on benefits across language domains, while also identifying constraints related to cognitive load and the physical demands of immersive technologies. Empirical research has also shown that immersive environments can provide opportunities for practicing contextualized language and developing communicative skills (Zhang, 2020). This body of evidence demonstrates the pedagogical potential of immersive learning, but its technological focus necessarily captures only one facet of the wider VLE landscape.

Broader reviews of emerging technologies also suggest an increasingly heterogeneous field. For example, Liu et al. (2026) synthesized applications of mobile learning, AI, VR/AR, gamification, and related technologies across various levels of EFL education.

Their meta-analytic results revealed a general positive effect of emerging technologies on learning outcomes, but also a large heterogeneity which emphasized the relevance of educational level, type of technology and conditions of implementation.

This technological diversification is also observable in empirical research, with mobile environments being employed to expand language-learning opportunities beyond the traditional classroom setting and to enable flexible participation in learning

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activities (Wiboolyasarin, 2023). Recent developments in artificial intelligence have further expanded the scope of technology-mediated environments for language teaching and learning (Jiang et al., 2025). However, this is a growing scholarship, and the evidence available is in several ways fragmentary. Systematic reviews currently tend to organize literature around a single technology (e.g., VR, AI), a specific language domain (e.g., vocabulary), or a broad umbrella of emerging technologies across multiple educational levels. For example, research into the combination of artificial intelligence and extended reality demonstrates how emerging technologies are increasingly converging in language learning environments and generating new cognitive and pedagogical demands (Chen & Xu, 2026). While these perspectives are valuable, they do not fully address the VLE as the central unit of analysis across English language education in higher education. The difference is conceptually significant. Moodle-based autonomous learning, Blackboard-supported university English instruction, immersive three-dimensional speaking environments, mobile-assisted learning spaces, gamified platforms, and AI-supported virtual systems may be technologically different. But pedagogically, they can perform overlapping functions; they can help organize language-learning activity, facilitate interaction, provide feedback, extend opportunities for practice, support learner regulation, and mediate access to instructional resources. For example, research on language learning supported by Moodle has demonstrated its capacity to foster learner autonomy and to provide opportunities for learning beyond classroom instruction (Jordan & Coyle, 2013), in the same manner as Vaičiūnienė & Gedvilienė (2008), whereas studies on three-dimensional environments have indicated their affordances for socially situated and collaborative learning experiences. Thus, the study of these environments together can reveal continuities and contrasts not apparent when individual technologies are studied in isolation. Research on LMS-supported university language education has revealed that students' experiences are determined not only by the presence of platforms but also by their digital competence, perception, and ability to productively engage with technology-mediated instruction (Robinson et al., 2017). Therefore, the findings of mixed educational populations may have little to say about the role of VLEs in tertiary English language teaching.

A further issue concerns the meaning of effectiveness. The educational contribution of Achievement scores alone cannot adequately characterize VLEs. Virtual language learning might affect not only linguistic performance, but also engagement, interaction, collaboration, learner autonomy, metacognitive regulation, accessibility, and perceptions of the learning experience. For example, research on technology-mediated English learning has demonstrated that virtual environments can improve student interaction and engagement when technological affordances are linked to meaningful learning activities (Viloria et al., 2019). Similarly, with the right pedagogical structures and

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resources to learners (Gulbinskienė et al., 2017), online environments can foster learner autonomy and self-regulated approaches to language learning. VLEs also contribute to specific languages.

learning processes. Technology-mediated feedback has been increasingly integrated into writing instruction, giving learners more opportunities to revise, reflect on, and improve their writing (Alrishan, 2024). Mobile-supported environments have the potential to support flexible and customized educational experiences, enabling students to perform language activities in various contexts and on various devices (Khlaisang & Sukavatee, 2023). The use of immersive technologies can introduce an additional dimension to this as they allow learners to take part in simulated communicative situations that are hard to reproduce in traditional classroom settings (Boda & Tóth, 2024). Nevertheless, technological innovation does not automatically lead to effective education. Learning can create barriers to connectivity, access, social isolation, anxiety, decreased interaction, and the perception of diminished academic performance, especially when learning environments are implemented without sufficient institutional or pedagogical support (Contreras et al., 2021; Wang et al., 2026). These environments require careful instructional design to ensure that the complexity of the technology does not overwhelm students' cognitive or digital capacity. Therefore, a synthesis of both linguistic findings and implementation conditions is required to offer a more balanced view of the field. The review is inclusive of VLEs, including traditional LMSs, as well as collaborative, mobile, immersive, gamified, and intelligent virtual environments, when these are used as structured environments for teaching or learning English. The growing diversity of such environments is evidenced in studies exploring gamified approaches to language learning (Chang, 2023), immersive applications for enhancing language-learning experiences (Chen et al., 2025), and modern virtual environments enabling interaction and engagement in English-language education (Karacan & Bekereci-Şahin, 2025). In so doing, the review seeks to clarify how the field has evolved, what technological environments have been explored, what dimensions of English learning they address, how their educational contribution has been evaluated, and what benefits and constraints recur across different configurations.

The systematic review addresses the following research questions:

RQ1. What are the publication trends and characteristics of research on virtual learning environments for English language education in higher education?

RQ2. What types of virtual learning environments and technological platforms are used for English language education in higher education?

RQ3. What English language skills and competencies are addressed through virtual learning environments?

RQ4. What research methodologies, parti-

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cipants, and data-collection instruments are employed to investigate VLE-mediated English language education in higher education?

RQ5. What learning outcomes, pedagogical benefits, and implementation challenges are reported across the identified studies?

Previous empirical evidence has shown the potential of virtual environments for improving some aspects of language learning, such as feedback and written production (Espinoza, 2026). Other research concentrated on the potential of technology-mediated environments for developing more holistic language competencies (Windsor, 2021). Thus, the contribution of the present review is not to evaluate another individual technology but rather to place the VLE itself as the integrative analytical framework through which both conventional and emerging digital environments can be studied together. This synthesis can inform researchers looking to identify gaps in the evidence base, instructors making pedagogically informed decisions about digital environments, and higher education institutions.

2. Methods

2.1 Review design

The systematic review surveyed the empirical literature on virtual learning environments (VLEs) for English language education in higher education. The review was reported and conducted in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al., 2021). It was conducted as an assertive systematic review, a methodology to identify, screen, assess, and synthesize studies concerning the pedagogical use of virtual environments for English language teaching and learning in tertiary education. Meta-analysis was not considered appropriate due to the significant methodological and technological heterogeneity of the retrieved studies. Rather, a structured narrative synthesis reported on publication patterns, technological contexts, language learning contexts, research methods, and key educational outcomes and challenges reported in the evidence base.

2.2 Information source and search strategy

The bibliographic database chosen was Scopus. Scopus was chosen because the review aimed to find peer-reviewed scholarly literature indexed in a multidisciplinary citation database. Last searched on 15 Aug 2026. A deliberately broad search expression was used to retain sensitivity at the identification stage and to avoid premature exclusion of potentially relevant publications:

*("Virtual learning environment.ºR VLE) AND English**

Search was restricted to the title, abstract and keyword fields. Instead of embedding higher education and narrower ELT-related terminology in the search expression, the educational level and the relevance to ELT were subsequently determined by manual screening. This strategy meant that potentially relevant studies using different descriptors

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(e.g., university students, college English, EFL, ESL, ESP, pre-service teachers) remained eligible for assessment. The search retrieved 43 records, all of which were exported from Scopus with their bibliographic information, abstracts, author keywords, indexing terms, DOI information, and other available metadata.

2.3 Eligibility criteria

Eligibility was decided based on three substantive dimensions: educational context, language-learning focus, and technological environment. Studies were included if they (a) were conducted in a higher education setting, such as universities, colleges, tertiary institutions, postgraduate education, or university-based pre-service teacher education.

(b) focused on teaching or learning English, such as EFL, ESL, ESP, College English, English-language teacher education, or specific English-language competencies; and (c) investigated a digital environment as a learning environment, rather than using an isolated technological tool. The operational definition of a VLE was purposefully broad. Eligible environments included conventional learning management systems such as Moodle and Blackboard, synchronous online spaces, purpose-built language-learning environments, mobile-assisted environments, gamified systems, and immersive or three-dimensional virtual spaces. Primary empirical research using quantitative, qualitative, mixed-methods, experimental, quasi-experimental, descriptive, longitudinal, or design-oriented approaches was eligible for inclusion. We excluded conceptual papers, literature reviews, systematic reviews, and other publications that did not contain original empirical evidence from the final synthesis. Studies that were conducted only in primary or secondary education were also excluded, as well as studies in which English was not the subject of instruction or learning. Studies that used virtual technologies to teach subjects other than English language education were also excluded. No study was excluded on the grounds of irrelevance that could not be determined from the title. If the title or abstract did not provide enough evidence to make a definite decision, the record was retained for further assessment instead of being discarded prematurely.

2.4 Study selection

The study selection was conducted in two consecutive stages. First, titles and abstracts of the 43 records retrieved from Scopus were screened according to the pre-defined eligibility criteria. Each investigation was carefully considered regarding the educational context, target population, English-language focus, technological environment, and empirical nature. In the first screening step, 21 records were excluded because they did not meet one or more of the eligibility criteria. The most common reasons included non-higher education populations, disciplinary contexts other than English language education, studies in which virtual technology was not serving as a language-learning environment, and non-empirical publications. The

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remaining 22 reports were assessed for full-text eligibility. At this stage, a more detailed exploration of the educational setting, participant characteristics, research design, and role of the virtual environment was undertaken. One report was excluded as it was a conceptual discussion rather than a primary empirical investigation. Twenty-one studies met the eligibility criteria and were included in the qualitative synthesis.

2.5 Data extraction

The conduction of the study developed a structured extraction matrix to systematically characterize the evidence included. For each eligible study, data were extracted on author(s), year of publication, country or geographical context, higher-education setting, participant characteristics, sample size, type of VLE or technological platform, English-language skill or instructional focus, research design, data-collection instruments, intervention or implementation duration, and principal findings.

2.6 Data synthesis

The included studies varied in terms of participant groups, technological set-ups, research designs, duration of the intervention, instruments, and outcome measures, so statistical pooling was considered inappropriate. The evidence was thus synthesized descriptively and thematically. The synthesis was developed along five analytical dimensions that correspond to the research questions. First, the years of publication and study characteristics were examined to identify temporal trends in literature. Second, the VLEs and technology platforms were classified according to the main technology configuration. Third, the skills, competencies and learning-related constructs in the corpus that are associated with the English language. Fourth, methodological characteristics, such as research design, participant profile, sample size, and data-collection procedures, were compared across studies. Finally, reported educational outcomes, pedagogical affordances, implementation constraints, and recurring challenges were thematically synthesized.

3. Results

The search in Scopus returned 43 records that could be related to virtual learning environments and English language education. After screening titles and abstracts, 21 records were excluded as they did not meet the pre-specified eligibility criteria. The main reasons for exclusion were an educational setting that was not higher education; the absence of an explicit focus on teaching or learning English; the use of virtual technologies for disciplinary purposes unrelated to language education; and the non-empirical nature of the publication. The remaining 22 reports underwent full-text eligibility assessment. One report was subsequently excluded because it presented a conceptual discussion without original empirical evidence. The final corpus therefore comprised 21 empirical studies addressing the implementation, evaluation, or pedagogical application of VLEs for English language education in higher education. The selection procedure is summarized in the PRISMA 2020 flow diagram

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(**Figure 1**).

3.1 Temporal distribution of evidence

The literature covered spans close to two decades, from 2008 to 2026, with an uneven path in scholarly production. In the past, contributions were sporadic, while in later years more sustained research effort was generated. This trend has been especially true since 2020, when research has focused more on traditional learning management systems, but also on immersive environments, mobile-assisted applications, gamified spaces, and platforms supported by artificial intelligence. The temporal pattern suggests a gradual broadening of the VLE construct in English education. Earlier research focused on institutional platforms and online learning environments, but more recent work has explored more technologically sophisticated settings with simulation, immersion, mobility, adaptive functionality, and greater interaction among learners. The evidence base reveals both the persistence of established LMS-mediated instruction and the rise of increasingly diversified digital learning ecosystems (**Table 1**).

3.2 Types of virtual learning environments and technological platforms

A great deal of technological variation was found in the 21 studies. The identified environments could be categorized into some broad categories of environments such as learning management systems, synchronous and collaborative online environments, immersive or three-dimensional virtual environments, mobile-assisted environments, gamified systems and purpose-built or intelligent learning environments. The most frequently mentioned conventional LMS platforms in the corpus were Moodle and Blackboard. These environments had a range of purposes, from autonomous language learning and teaching of grammar to English for Specific Purposes (ESP) and development of integrated language skills. The studies performed a pedagogical role not only by delivering content but also by managing assignments, interacting with learners, providing self-paced practice, and accessing additional instructional resources.

The second cluster included collaborative and synchronous environments that were designed to encourage interaction between learners and instructors. These spaces supported task-based activities, teacher education, collaborative language practice, and synchronous participation. Rather than simply repositories of instructional materials, they evolved into digitally mediated environments in which communication was itself part of the learning experience (**Table 2**).

3.3 English language skills and educational foci

The pedagogical applications found in the corpus spanned a wide range of English language skills and related learner competences. The evidence was not sufficiently robust in any one linguistic domain to characterize VLE research as limited to one dimension of language learning. Speaking and oral communication became a prominent area of

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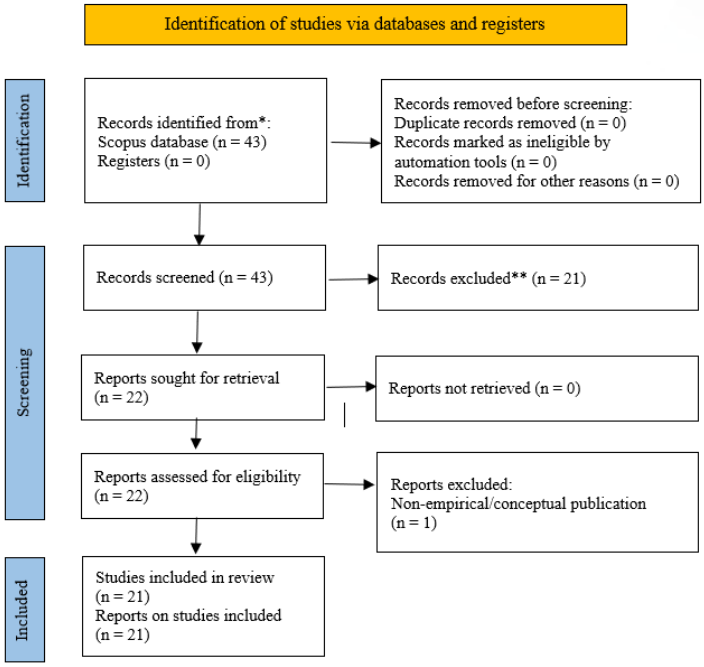


Figura 1: PRISMA 2020 flow diagram of the study selection process

Note. The flow diagram follows the PRISMA 2020 template for new systematic reviews using databases and registers.

investigation, particularly in immersive, simulated, mobile and task-oriented environments. In general, these studies used virtual spaces to increase opportunities for interaction, to contextualize communication, or to provide spoken-language practice away from the constraints of the traditional classroom. Writing was also a frequent instructional focus. Composition, grammatical accuracy, corrective feedback, and academic writing were supported in virtual environments. In these contexts, the digital environment often enabled iterative practice, access to feedback and long-term engagement with written production. Common measures of linguistic performance were also exceeded by the corpus. Some of the investigations have addressed learner autonomy, metacognitive awareness, engagement, motivation, interaction, collaboration, and digital competence. This work recommends that VLE research in higher education conceptualizes successful language learning not only as achievement scores, but also as the capacity of the learners to self-regulate, participate in, and maintain their own learning.

3.4 Methodological characteristics

Included studies showed considerable methodological heterogeneity. It included quantitative, qualitative, mixed-methods, experimental, quasi-experimental, descriptive, longitudinal, and design-based approaches. This diversity demonstrates the multidimensional nature of VLE research, with researchers examining both quantifiable lan-

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Tabla 1: Characteristics of the Included Studies

Study / Year	Country	Higher-education context	Sample	Research design
Espinoza (2026)	Chile	Undergraduate EFL students	60	Mixed-methods quasi-experimental
Kan (2025)	China	Vocational college science / engineering students	NR	Experimental / comparative
Chen et al. (2025)	NR	College EFL students	240	Randomized controlled trial
Robinson et al. (2017)	South Korea	University students enrolled in English classes	686	Quantitative survey
Wiboolyasarin (2023)	Thailand	Pre-service teachers' / university student teachers	523 surveys, 88 trials	Mixed methods
Alrishan (2024)	Jordan	Undergraduate English language and literature students	90 surveys, 20 interviews	Mixed methods
Jordan & Coyle (2013)	China	First-year students at an English-medium university	NR	Usage analytics + survey
Karacan & Bekereci-Şahin (2025)	Turkey	Pre-service English language teachers	63	Qualitative
Viloria et al. (2019)	India	Mumbai University students in a Virtual English Course	NR	Data-mining study
Jiang et al. (2025)	NR	University-linked English-language learners aged 18-30	NR	Between-group experiment
Chang (2023)	China	College English learners in higher education	NR	Model development + empirical evaluation
Herrera (2017)	Colombia	Public-university EFL students and teachers	210 students; 5 teachers	Descriptive qualitative
Sarré (2013)	France	First-year Master's biology students	NR	Design / implementation + learner-perception study
Khlaisang & Sukavatee (2023)	Thailand	Higher-education learners	546	Mixed-method development / evaluation
Contreras et al. (2021)	Mexico	Bachelor in English Language students and professors	152 students, 26 professors	Quantitative descriptive survey
Zhang (2020)	China	Higher-education learners in spoken-English instruction	100	Pre/post intervention study
Boda & Tóth (2023/2024)	Hungary	University computer-science students	NR	Classroom experience / evaluation
Snytnikova (2016)	Russia	Master's students in Chemistry/Biology	NR	Course implementation / evaluation
Vaičiūnienė & Gedviliene (2008)	Lithuania	University ESP students	NR	Experimental course / case evaluation
Windsor (2021)	China	First-year university undergraduates	1,000 across	Longitudinal cohort / intervention evaluation
Gulbinskienė et al. (2017)	Lithuania	University students	NR	Survey / evaluative study

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Tabla 2: Virtual learning environments and English-language foci

Study	VLE / Platform	English-language focus	Duration
Espinoza (2026)	VLE (platform not specified)	Writing; grammatical accuracy	Academic semester
Kan (2025)	VR/AR scenario-based VLE	Vocational English, collaborative problem solving	NR
Chen et al. (2025)	Gather Town	Reading speed; IELTS performance	10 weeks
Robinson et al. (2017)	Blackboard	Integrated language skills, perceptions	NR
Wiboolyasarin (2023)	Talent LMS-based VTLLE	English communication,	12 weeks
Alrishan (2024)	Virtual instructional environment / online composition course	Academic writing / essay writing	NR
Jordan & Coyle (2013)	Moodle	Autonomous English self-study	One semester
Karacan & Bekereci-Şahin (2025)	Collaborative synchronous online VLE	Teacher education, technology integration, self-learning	14 weeks
Viloria et al. (2019)	Virtual English Course / distance-education environment	English-course engagement, interaction and	2015–2018 dataset
Jiang et al. (2025)	AI-driven gamified VLE	English learning, Engagement, motivation	NR
Chang (2023)	Intelligent demand-driven College English environment	College English, personalized learning	NR
Herrera (2017)	Institutional VLE	EFL learning, attitudes, motivation	NR
Sarré (2013)	Online ESP module / VLE	English for Biologists (ESP)	NR
Khlaisang & Sukavatee (2023)	MALLIE chatbot-based mobile-assisted VLE	English communication, four skills	NR
Contreras et al. (2021)	Emergency virtual education / online classes	English-language degree education, virtual teaching experience	Spring 2020
Zhang (2020)	3D VR / computer-simulation VLE	Speaking / spoken English	12 weeks
Boda & Tóth (2024)	MaxWhere 3D virtual space / virtual library	ESL, linguistic knowledge	2020–2021 academic years
Snytnikova (2016)	Moodle LMS	English for Chemists and Biologists (ESP)	NR
Vaičiūnienė & Gedvilienė (2008)	VLE integrated with traditional learning	ESP; information literacy; foreign language competencies	NR
Windsor (2021)	Independent Grammar Study Scheme (IGSS) VLE	Grammar	14 weeks per cohort
Gulbinskienė et al. (2017)	Moodle	English-language skills, Metacognition, learner autonomy	NR

guage outcomes and the experiences of learners and instructors in digitally mediated education. Changes in linguistic performance or associated educational outcomes were investigated using pre- and post-intervention measures in experiments and quasi-experiments. Some had comparison groups, delayed assessments, or longer interventions, increasing the confidence that changes were related to specific instructional settings. Survey-based research was another major methodological approach.

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Questionnaires were employed to explore perceptions, attitudes, autonomy, engagement, usability, satisfaction, and experiences associated with online instruction.

Qualitative investigations offered a more contextualized understanding of participants' experiences, especially in relation to interaction, professional development, online collaboration, and perceived constraints. Mixed-methods designs aimed to combine performance-based evidence with the perspectives of learners, so that the effectiveness of virtual environments could be considered alongside the experiences through which those outcomes were achieved. Sample characteristics were also heterogeneous. Participants were undergraduate students, postgraduate learners, university students taking general English or ESP courses, preservice English teachers, and students from non-language disciplines receiving English-language instruction (**Table 3**).

3.5 Reported learning outcomes and pedagogical benefits

The results presented across the body of evidence were positive, but the type and strength of the evidence varied by research design. Experimental and intervention studies demonstrated improvements in grammatical accuracy, reading performance, spoken English, communicative competence, and other language-related outcomes. The results suggest that virtual environments can be designed to provide conditions for linguistic development. Some studies also linked VLE participation with higher levels of engagement, motivation, interaction, collaboration and learner autonomy, besides measurable performance. Digital environments seemed especially useful when they provided additional practice opportunities, access to learning materials beyond scheduled classroom periods, or interaction that otherwise would have been limited by time or physical location. Evidence also suggests that the educational value of technology is mediated through pedagogical design.

3.6 Challenges and constraints

Differences in digital competence may also influence learners' ability to engage effectively in technologically demanding environments. Another complex dimension was interaction. While virtual environments offered new opportunities for communication, some participants reported a decreased sense of immediacy, limited social presence, or difficulties sustaining meaningful interaction compared to face-to-face instruction. Learner engagement was also context specific. Digital environments could promote motivation through interactivity, gamification, immersion, or flexible access, but participation was not necessarily sustained over time. Research on autonomous and self-directed environments suggests that without instructional scaffolding, feedback, or learner regulation, initial engagement may decrease.

3.7 Synthesis of findings across research questions

Analyzing the 21 studies reveals an increasing heterogeneity in English language education mediated by VLEs. Regarding

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Tabla 3: Methodological characteristics and main findings

Study	Main finding / contribution
Espinoza (2026)	Greater grammatical accuracy and sustained gains with metalinguistic corrective feedback.
Kan (2025)	Improved collaboration efficiency and application of English in interdisciplinary problem solving.
Chen et al. (2025)	Higher reading speed and IELTS performance than traditional instruction.
Robinson et al. (2017)	Students reported benefits for language learning alongside limitations and areas for improvement.

RQ1, the results reveal a longitudinal evolution from rather isolated early studies toward more focused and technologically diverse research The corpus for RQ2 shows a shift from traditional LMS platforms to an ecosystem that includes synchronous collaboration, immersive three-dimensional spaces, mobile applications, gamification, and AI-supported environments. T RQ3 – The VLEs were used in relation to speak, writing, reading, grammar, ESP, integrated language skills, and wider constructs related to learner development. Hence, their pedagogic scope embraces linguistic performance and dimensions such as autonomy, engagement, interaction, and metacognitive development. In relation to RQ4, the methodological framework was marked by high heterogeneity. Surveys, qualitative inquiries, mixed-methods investigations, learning analytics and technology-development studies were alongside experimental and quasi-experimental designs. Finally, concerning RQ5, the synthesis shows positive educational outcomes, but also a lot of contextual variation. Language performance, participation, motivation, interaction, and autonomous learning improvements were recurrently documented.

4. Discussion

This systematic review synthesizes empirical research on virtual learning environments for English language education in higher education, integrating evidence that has been scattered across conventional learning management systems, immersive technologies, mobile applications, gamified environments, and more recent AI-supported platforms. Three general observations emerge from the synthesis. First, the conceptual boundaries of the VLE have widened over time. Second, positive language learning outcomes are less related to the technological environment per se than to the pedagogical practices embedded within it. Third, despite the growing sophistication of such environments, the educational value of virtual environments lies in learner autonomy, interaction, feedback, and instructional design.

4.1 From learning management systems to diversified virtual learning ecosystems

One of the most obvious trends in the corpus is the increasing diversification of the technologies used to deliver virtual English language education. Previous studies tended to conceptualize the VLE through institutio-

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nally established learning management systems, especially Moodle and Blackboard. In these kinds of environments, the technology was used to organize courses, distribute resources, practice in free time, communicate, and learn outside the classroom during scheduled hours. More recent research, however, takes a broader view of virtual learning. Conventional LMS architecture is increasingly co-existing with immersive three-dimensional environments, mobile-assisted systems, virtual collaborative spaces, gamified platforms, chatbots, and AI-supported applications.

4.2 Pedagogical design as a mediator of language-learning outcomes

Caution is needed in interpreting the positive findings reported in most included studies. Improvements were observed in several linguistic areas, including speaking, writing, grammatical accuracy, reading, communicative competence and ESP-related learning. But the variety of technologies and instructional arrangements makes it hard to attribute these outcomes to virtuality alone. More plausibly, VLEs can establish conditions in which effective language learning practices are more accessible, more frequent, more flexible, or more engaging.

4.3 Linguistic development beyond isolated language skills

Another important finding relates to the range of learning outcomes that are investigated across the evidence base. Traditional language domains such as speaking, writing, reading and grammar remain prominent, but the included studies frame these skills increasingly in broader constructs including communication, collaboration, learner autonomy, metacognitive awareness, engagement, and digital competence. This wider orientation is consistent with the affordances of virtual learning. A VLE can bring together resources, communication, assessment, feedback, collaboration, and independent learning in a common environment, unlike instructional technologies that are designed for practice of a discrete linguistic feature. Therefore, language development can happen in tandem with competencies around self-regulation, interaction, information management, and digital participation.

4.4 Learner autonomy, engagement, and interaction

Learner autonomy emerged as an important cross-cutting dimension of education mediated by VLEs. Virtual environments can allow students to have more control over when, in what order, at what speed, and how often they engage in learning activities. This flexibility is particularly relevant in higher education, where learners are increasingly expected to take responsibility for managing large parts of their academic work.

4.5 Methodological diversity and the strength of evidence

The evidence base is methodologically heterogeneous across the 21 studies, which is strength and limitation. Experimental and quasi-experimental studies show changes in observable language outcomes, while qualitative and survey research provide insights

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into learner perceptions, implementation issues, and contextual factors that cannot be captured by performance measures alone. Mixed-methods inquiries are particularly valuable when they combine evidence of learning outcomes with descriptions of participants' experiences of the instructional environment. Nevertheless, methodological diversity makes direct comparison difficult. Sample sizes were vastly different. Interventions were of different lengths of time and outcome measures were not consistent. The technologies studied ranged from traditional LMS platforms to specially designed immersive systems.

4.6 Challenges to sustainable VLE implementation

The barriers identified across the corpus show that successful VLE integration cannot be understood as simply an instructional-design problem. The conditions of virtual language education are determined by technological infrastructure, institutional support, digital competence, accessibility, and teacher training. Another important consideration is teacher competence. As virtual environments become more technologically advanced, instructors need to know more than how to use digital resources. They should be able to select technologies based on pedagogical purpose, design online interactions, provide feedback using appropriate modalities, interpret evidence of digital learning, and decide when technological mediation adds educational value.

4.7 Implications for English language education in higher education

The findings have several implications for university-level English language education; institutions should not choose VLEs just because they are technologically new. The choice of platform should be informed by an analysis of the instructional objectives, the characteristics of the learner, the language competencies, the accessibility requirements, and the types of interaction that the course requires.

4.8 Limitations and future research

There are several limitations that should be considered when interpreting the findings of this systematic review. Firstly, the literature search was only conducted on Scopus. The database provides extensive multidisciplinary coverage and indexes a large body of peer-reviewed research. However, relevant studies that are available only through other bibliographic sources may not be included. Secondly, the search strategy was intentionally wide. This approach reduced the risk of missing potentially relevant studies whose abstracts did not explicitly contain the term higher education. The terminology around digitally mediated learning, however, is very heterogeneous. Research in related constructs such as computer-assisted language learning, technology-enhanced language learning, online language learning, blended learning, mobile-assisted language learning. Third, there was substantial heterogeneity among the 21 included studies. Technolo-

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gical platforms, participant characteristics, sample size, duration of intervention, instructional objectives, language skills, study designs, and outcome measures were heterogeneous. The variability precluded meaningful statistical aggregation and required a narrative and thematic synthesis. The findings should therefore be interpreted as patterns across a diverse evidence base, rather than as a pooled estimate of the effectiveness of VLEs.

5. Conclusions

- The objective of this systematic review was to investigate empirical evidence on the use of virtual learning environments for teaching English language in higher education. Following a systematic identification and screening process, 21 empirical studies were retained for synthesis. Taken together, the evidence paints a picture of a field that has moved from conventional learning management systems to a heterogeneous technological landscape including collaborative online spaces, immersive three-dimensional environments, mobile-assisted applications, gamified systems and increasingly intelligent or AI-supported learning environments.
- The synthesis indicates that VLEs have been used in a variety of English language domains, such as speaking, writing, reading, grammar, integrated language skills, communicative competence, and English for Specific Purposes. Their educational scope goes beyond linguistic performance to include learner autonomy, engagement, interaction, collaboration, metacognitive awareness, and digitally mediated participation. The evidence was favorable but not consistent. Positive perceptions of flexibility, engagement, interaction, and autonomous learning were accompanied by improvements in specific language outcomes. The methodological heterogeneity of the corpus, however, does not allow a generalized claim that VLEs are more effective than conventional instruction per se. The findings suggest instead that educational outcomes are determined by the interaction between the technological affordances, instructional design, learner characteristics, teacher mediation, and institutional conditions. Higher education institutions need more than just access to digital platforms for effective implementation. Investment in infrastructure needs to be matched with professional development that allows instructors to make pedagogically informed decisions about virtual interaction, assessment, feedback, accessibility, learner analytics, and emergent AI-supported functionality. Institutional strategies should also consider inequalities in connectivity. As virtual learning environments are increasingly likely to incorporate immersive technologies, mobile interaction, learning analytics, gamification and artificial intelligence, research should not conflate innovation with effectiveness. The next phase of research requires more com-

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pelling evidence regarding the conditions in which these environments yield enduring linguistic and educational benefits. An evidence-based approach such as this can help to ensure that technological development is subservient to and informed by the pedagogical purposes of English language education.

6. Conflict of interest

The authors declare that there is no conflict of interest in relation to the article presented.

7. Copyright)

The authors are the owners of the copyright (patrimonial and/or exploitation) of the contents of the journal (copyright).

8. Authors' contribution statement

The authors declare that they have participated equally and substantially in the conduct of this research, under the responsibilities under the CRediT Taxonomy to describe the individual contributions of each author to the work. José Luis Andrade Mendoza: research, methodology, data curation, writing - original draft, discussion of results, review, and approval of the final document. Adriana Carolina Lara Velarde: methodology, data curation, writing – original draft, discussion of results, review, and approval of the final document.

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