

IMMERSIVE VIRTUAL REALITY IN ENGLISH LANGUAGE EDUCATION: GLOBAL RESEARCH LANDSCAPE AND EMERGING FRONTIERS

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Abstract

Driven by the growing use of immersive technologies in education, virtual reality (VR) has become an increasingly prominent environment for supporting English language learning. While existing studies have examined VR in relation to language skills, learner affect, interaction, and instructional outcomes, the overall development of this research area remains insufficiently mapped. To fill this gap, this study provides a science-mapping analysis of VR-assisted English language learning from 2021 to 2025. Following a PRISMA-guided screening procedure, a total of 316 English-language journal articles were retrieved from the Web of Science (WoS) Core Collection and analysed using VOSviewer and CiteSpace. The analysis covered publication performance, citation impact, country-level distribution, co-cited references, keyword co-occurrence, and citation bursts. The results show a clear increase in research output and influence, with contributions concentrated mainly in a limited number of countries. Co-citation analysis identifies three knowledge bases: receptive learning and outcomes, oral communication and affective engagement, and immersive experience with cognitive-affective involvement. Keyword analysis further reveals themes related to educational design, immersive experience, affective factors, simulation-based instruction, and learner engagement. Burst detection indicates a recent shift toward instruction, acquisition, teachers, and learner perceptions. Overall, the study contributes to the field by clarifying both the intellectual structure and the changing priorities of research on VR-assisted English language learning. It also advances current understanding by showing that VR-assisted English learning is increasingly framed not simply as a novel technological application, but as a pedagogically mediated and context-dependent learning environment.

Keywords: bibliometric analysis, English language learning, immersive learning, science mapping, virtual reality

Introduction

Over the last five years, immersive technologies have increasingly been used to create interactive and experience-based learning environments. Virtual reality (VR), as a prominent form of immersive technology, has received growing attention in technology-enhanced language education. This development is particularly relevant to English language learning because learners often need opportunities to use English beyond textbooks and conventional classroom interaction. VR can support this need by providing simulated communicative contexts. Previous studies have suggested that VR can enhance language practice, learner engagement, and English skill development (Lin et al., 2023; Ma, 2021).

However, the educational value of VR cannot be assumed from its immersive features alone. Its effectiveness depends substantially on how virtual environments are designed and integrated into language-learning activities. Without clear instructional objectives, meaningful tasks, and appropriate interaction, VR may remain an attractive technological tool rather than an effective means of supporting language development. Previous research has emphasized the importance of learner acceptance, motivational design, teacher readiness, and appropriate technological and instructional conditions (Barrett et al., 2021; Hung et al., 2023; Lee & Hwang, 2022). The educational value of VR therefore depends on how its technological affordances are translated into meaningful language-learning activities.

The development of VR-supported English education has both national and international significance. Differences in technological infrastructure, teacher preparation, curriculum priorities, financial resources, and access to digital resources can influence the adoption of emerging educational technologies across national systems (UNESCO, 2021). Internationally, variation in linguistic, technological, and educational contexts may also influence the learner groups, instructional priorities, VR systems, and language skills examined in research. Recent studies have increasingly emphasized pedagogical design, learner experience, and classroom implementation (Couture-Matte, 2025; Jung, 2025). However, the extent to which this orientation characterizes the wider field remains unclear.

Existing research has examined VR-assisted English learning in relation to speaking performance, anxiety, motivation, learner perceptions, self-regulation, and classroom interaction (Chen & Hwang, 2022; Chien et al., 2020; Zhao et al., 2024). Systematic reviews have also synthesized the pedagogical affordances, technological features, learning outcomes, and implementation challenges associated with VR in language education (Dhimolea et al., 2022; Parmaxi, 2023; Peixoto et al., 2021). However, these studies have mainly focused on empirical findings, instructional applications, and technological characteristics. They have not fully explained the broader organization of the field, the knowledge bases that have shaped it, the relationships among major themes, or the topics that have recently attracted increasing scholarly attention.

A comprehensive bibliometric account focused specifically on VR in English language education appears limited. As a result, understanding of the field's overall development, intellectual structure, thematic evolution, and emerging research fronts is still incomplete. This limited field-level understanding may increase the risk of duplicating established work, overlooking underexplored topics, and interpreting emerging themes without sufficient intellectual and historical context. It may also limit the identification of underrepresented contexts and promising directions for future research.

Bibliometric methods are particularly suitable for addressing this gap because they reveal structural patterns and relationships across a research field rather than focusing only on individual study findings. By examining publications, citations, countries, references, and keywords, bibliometric research can clarify the intellectual foundations, thematic organization, geographical contribution patterns, and temporal development of a knowledge domain (Donthu et al., 2021; Öztürk et al., 2024).

Accordingly, this study examines the intellectual foundations, thematic organization, and changing research priorities of VR-assisted English language learning as an evolving field. By moving beyond the synthesis of individual instructional applications and learning outcomes, it provides a basis for identifying underexplored issues, interpreting national contribution patterns within the wider international research landscape, and informing more pedagogically meaningful uses of VR in English language education. The study is guided by the following research questions:

RQ1. What are the publication trends, citation impact, and geographical distribution of VR-assisted English language learning research?

RQ2. What intellectual foundations are revealed through co-citation analysis?

RQ3. What major themes are identified through keyword co-occurrence analysis?

RQ4. What emerging topics are revealed through burst-detection analysis?

Research Methodology

General Background

The bibliometric approach, as a science-mapping technique, offers a systematic way to assess research output and impact through quantitative indicators (Bo et al., 2025a; Donthu et al., 2021). Bibliometric analysis combines statistical indicators with network visualization to examine publication trends, citation impact, and leading contributing countries. It also helps identify thematic clusters, citation bursts, and intellectual connections among publications (Morál-Muñoz et al., 2020). Such approaches have been increasingly applied in educational technology research to map emerging knowledge domains and research trends (Zhou et al., 2026a). Unlike scoping reviews, which are designed to map the breadth, characteristics, and evidence gaps of a research field (Bo et al., 2025b), bibliometric analysis provides a quantitative and visual approach to tracing thematic evolution and the structure of scholarly knowledge (Öztürk et al., 2024; Zhou et al., 2026b). It also enables the identification of citation relationships, intellectual foundations, thematic networks, and emerging research fronts that may not be readily visible through conventional qualitative synthesis. In the present study, a bibliometric research design was adopted to provide a quantitative and visual overview of VR research in English language learning. This design was suitable for examining how the field developed, how research topics were connected, and how scholarly attention evolved during the 2021–2025 period. A systematic procedure was followed to support the transparency and reproducibility of the study.

Data Collection

To enhance the transparency and reproducibility of the data collection process, the search strategy is presented in Table 1. All records were retrieved from the Web of Science (WoS) Core Collection. This database was selected because it provides standardized bibliographic metadata and citation information suitable for bibliometric analysis. The Topic field (TS) was used because it searches the titles, abstracts, author keywords, and Keywords Plus of indexed records. The search terms were organized into two concept groups: virtual reality and English language education. The Boolean operator “OR” was used to connect synonymous or related terms within each concept group, whereas “AND” was used to combine the two groups. No additional filters were applied during the initial search. The final search strategy was as follows:

TS = ((“virtual reality” OR “VR”) AND (“English education” OR “English language teaching” OR “English language learning” OR “English as a foreign language” OR “English as a second language” OR “EFL” OR “ESL”)).

All records were downloaded on January 2, 2026, for subsequent bibliometric analysis and visualization.

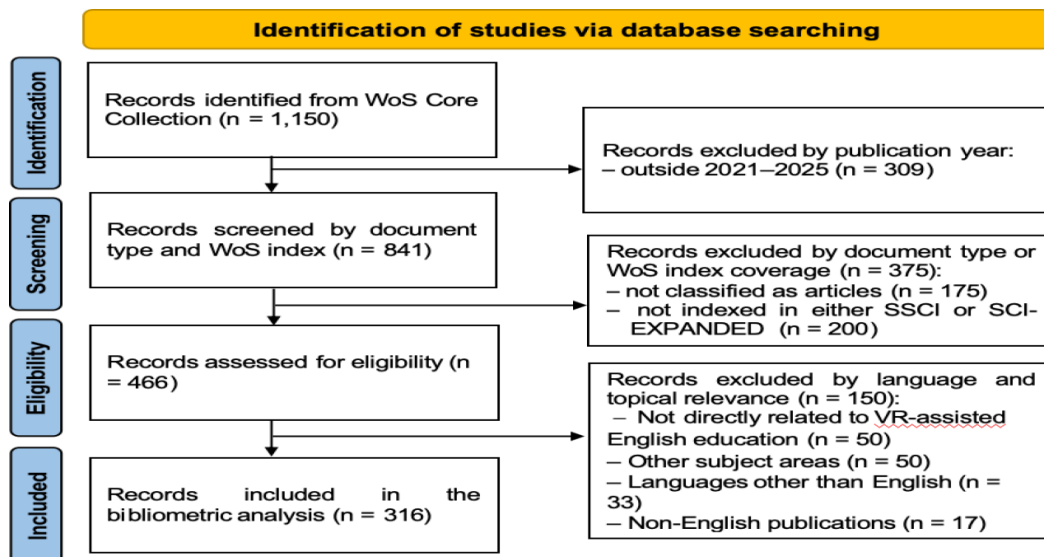
Table 1
Search Strategy for Data Collection

Search parameter	Specification
Database	WoS Core Collection
No filters	N/A
Search field	TS
Search query	((“virtual reality” OR “VR”) AND (“English education” OR “English language teaching” OR “English language learning” OR “English as a foreign language” OR “English as a second language” OR “EFL” OR “ESL”))
Boolean operators	AND and OR
Search date	January 2, 2026

Data Screening

The study selection procedure, conducted in line with the PRISMA framework (Page et al., 2021), is shown in Figure 1. The initial search yielded 1,150 records from the WoS Core Collection, without applying language restrictions at the retrieval stage. After applying the publication year criterion from 2021 to 2025, 309 records were excluded, leaving 841 records for further screening. This period was chosen to examine the most recent stage of development in VR-supported English language education, when immersive technologies were receiving growing attention in educational research and classroom-based applications. The subsequent screening by document type and WoS index coverage excluded 375 records, including 175 records not classified as research articles and 200 records not indexed in either SSCI or SCI-EXPANDED. The remaining 466 records proceeded to eligibility assessment. Two reviewers independently screened the titles and abstracts of these records against the predefined eligibility criteria. Inter-coder reliability was evaluated using Cohen’s kappa and indicated almost perfect agreement ($\kappa = 0.84$). Any disagreements were resolved through discussion until consensus was reached. At this stage, 150 records were excluded because they were unrelated to VR-assisted English education ($n = 50$), focused on other subject areas ($n = 50$), addressed languages other than English ($n = 33$), or were published in languages other than English ($n = 17$). Finally, 316 English-language journal articles satisfied all inclusion criteria and were included in the bibliometric analysis. This PRISMA-guided screening procedure ensured that the final dataset consisted of peer-reviewed and thematically relevant journal articles and provided a transparent and reproducible basis for the subsequent bibliometric analyses.

Figure 1
PRISMA Flowchart



Data Analysis

The final dataset was analysed using CiteSpace (version 6.3.R1, 64-bit Advanced) and VOSviewer (version 1.6.20). Performance analysis assessed publication productivity, citation impact, and country-level contributions, while Datawrapper was used only to generate the world map of publication distribution. In VOSviewer, full counting was applied. Co-citation analysis was conducted at the cited-reference level, with a minimum citation threshold of 12; 42 of the 14,701 cited references met this criterion. Keyword co-occurrence analysis used the “All keywords” field, combining Author Keywords and Keywords Plus. A minimum occurrence threshold of 9 was applied, and 48 of the 2,034 keywords met this criterion. The thresholds were determined through preliminary testing: 12 produced a manageable and interpretable co-citation network, whereas 9 reduced low-frequency keyword noise while retaining sufficient terms for thematic interpretation. In CiteSpace, the time span was set from 2021 to 2025, with one year per slice, and Pathfinder pruning was applied. Burst-detection analysis identified emerging topics and shifts in research attention over time. The parameter configuration was set as follows: $\alpha_1/\alpha_0 = 2.0$, $\alpha_i/\alpha_{i-1} = 2.0$, $\gamma = 0.7$, and a minimum duration of 1. By combining these complementary analyses, the study examines research performance, intellectual foundations, thematic structure, and emerging trends within a single analytical framework. This approach allows these dimensions to be interpreted in relation to one another rather than as separate bibliometric results. To support reproducibility, the bibliographic dataset of the 316 included studies has been deposited in Zenodo and is publicly available at <https://doi.org/10.5281/zenodo.21170138>

Research Results

Performance Analysis

Drawing on data from the WoS Core Collection, Table 2 summarizes the overall bibliometric performance of VR-assisted English language learning research between 2021 and

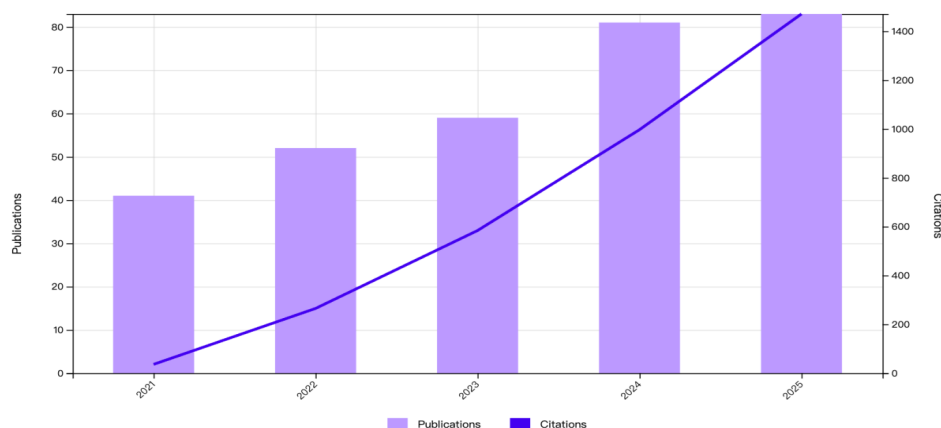
2025. A total of 316 publications were retrieved, producing 2,763 citing articles and 3,360 citations, or 3,088 citations excluding self-citations. On average, each publication received 10.63 citations. The H-index of 29 indicates that at least 29 studies in this field have been cited 29 times or more. These indicators suggest that VR-assisted English language learning has become an increasingly visible research area.

Table 2
Overview of Bibliometric Performance Indicators (2021 to 2025)

Metric	Value (2021 to 2025)
Total Publications	316
Total Citing Articles	2,763 (2,655 excluding self-citations)
Total Citations	3,360 (3,088 excluding self-citations)
Average Citations Per Item	10.63
H-Index	29

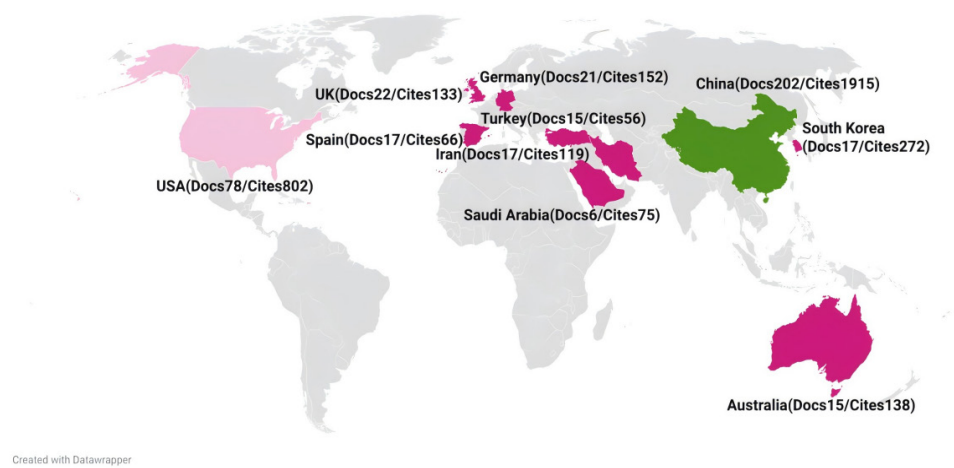
Figure 2 reports the annual distribution of publications and citations related to VR-assisted English language learning from 2021 to 2025. The blue bars refer to publication counts, while the purple line tracks citation counts. Publications increased from about 41 in 2021 to around 83 in 2025, showing a clear upward trend. Citations grew more rapidly over the same period, rising from a low level in 2021 to about 1,450 in 2025, which indicates growing citation impact. On the whole, the simultaneous growth in publications and citations suggests increasing scholarly attention and influence in this field.

Figure 2
Annual Publication and Citation Trends (WoS database)



As displayed in Figure 3, P. R. China ranks first in VR-assisted English language learning research, with 202 documents and 1,915 citations. This indicates a strong concentration of publications and academic influence in this context. The United States ranks second, with 78 documents and 802 citations. Australia, South Korea, the United Kingdom, and Germany are also notable contributors, although their publication and citation outputs are considerably lower than those of P. R. China. Overall, VR-assisted English language learning research is unevenly distributed, with publications and citations concentrated in a few countries.

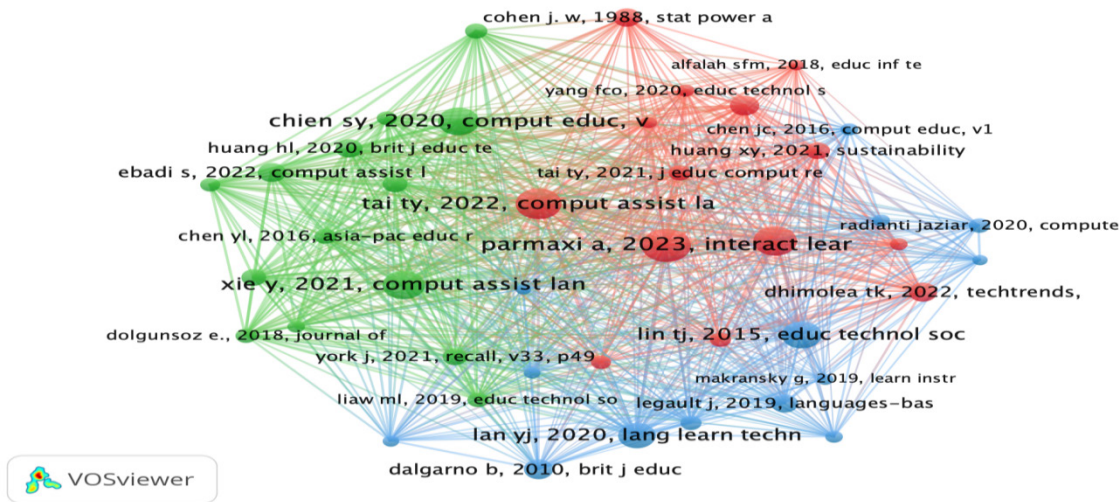
Figure 3
Geographical Distribution of Publications and Citations (Datawrapper)



Co-citation Analysis by Clusters

Co-citation analysis identified three major clusters, revealing the intellectual foundations and key knowledge connections in research on immersive VR in English language learning. As shown in Figure 4, the final co-citation network comprised 42 cited references, 825 links, and a total link strength of 3,060. In the visualization, each colour represents a distinct co-citation cluster, reflecting a particular intellectual orientation in the field. Table 3 summarizes the three clusters together with their representative publications and thematic orientations.

Figure 4
Co-citation Analysis (VOSviewer visualization)



Cluster 1 (Red), comprising 14 articles, is centred on VR-supported receptive learning and educational outcomes in English language learning. These studies position immersive VR as a structured, input-rich environment for receptive English learning. In this environment, vocabulary acquisition and listening comprehension are supported through contextualised

tasks, problem-based activities, and multimodal exposure (Chen et al., 2021; Tai & Chen, 2021; Tai et al., 2022). Its focus lies primarily in how VR environments create supportive conditions for receptive language development. It therefore reflects a receptive-learning-and-outcome-oriented research strand, highlighting the role of VR in supporting vocabulary growth, listening development, and educational outcomes in English learning.

Cluster 2 (Green), consisting of 14 papers, is organised around VR-supported oral communication and affective engagement in English language learning. The cited studies locate this cluster within a knowledge base in which VR is used to create interactive and authentic communicative contexts that support speaking performance, oral proficiency, willingness to communicate, and learners' affective readiness for oral participation (Chen & Hwang, 2022; Chien et al., 2020; Ebadi & Ebadijalal, 2022). Rather than focusing only on linguistic outcomes, this cluster frames VR as an interactive environment that can shape learners' motivation, anxiety, learning perceptions, and communicative participation. Overall, it captures a communication-and-affect-oriented research strand, emphasising the role of VR in supporting oral language practice and learner engagement.

Cluster 3 (Blue), including 14 publications, is grounded in immersive VR learning experience and cognitive-affective engagement. Its intellectual foundation draws on studies that examine how immersive VR creates presence-rich and interaction-based learning environments. In these environments, learners' cognitive processing, emotional engagement, and experiential involvement are shaped through immersive pedagogical design (Hamilton et al., 2021; Lan, 2020; Makransky & Petersen, 2021). This cluster is not tied to a single language skill; instead, it positions immersive VR as an experiential space that shapes how learners experience, interact with, and emotionally engage in language learning activities. These studies form an experience-and-engagement-oriented knowledge base, foregrounding the role of immersive VR in structuring learning experiences and supporting cognitive-affective involvement in English language learning.

Table 3
Co-citation Analysis by Cluster

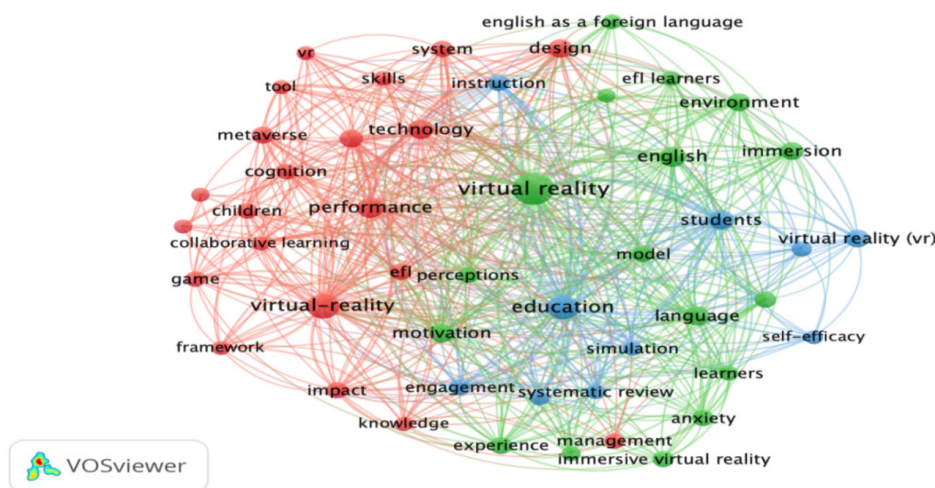
Cluster No. & Colour	Cluster Labels	No. of Articles	Representative Publications
Cluster 1 (Red)	VR-supported receptive learning and educational outcomes	14	Alfadil (2020), Chen et al. (2021), Dhimolea et al. (2022), Lai and Chen (2023), Parmaxi (2023), Tai and Chen (2021), Tai et al. (2022)
Cluster 2 (Green)	VR-supported oral communication and affective engagement	14	Chen and Hwang (2022), Chien et al. (2020), Ebadi and Ebadijalal (2022), Xie et al. (2021), York et al. (2021), Chen et al. (2020), Wang et al. (2020)
Cluster 3 (Blue)	Immersive VR learning experience and cognitive-affective engagement	14	Hamilton et al. (2021), Lan (2020), Legault et al. (2019), Makransky et al. (2019), Makransky and Petersen (2021), Radianti et al. (2020), Yeh et al. (2022).

Keyword Co-Occurrence Analysis by Cluster

Keyword co-occurrence analysis identified three major clusters, capturing the main research themes and keyword associations across the selected literature. As shown in Figure 5, the resulting network comprised 48 items, 562 links, and a total link strength of 1,319.

The colours distinguish the thematic clusters, each corresponding to a major research focus in the field. The network structure indicates that VR-assisted English language learning research is organized around several interconnected thematic areas. Table 4 outlines the three clusters together with their representative keywords and thematic directions.

Figure 5
Co-Occurrence Analysis (VOSviewer visualization)



Cluster 1 (Red), with 21 keywords, focuses on the design of VR-supported learning systems and their use in performance-oriented English language learning. Keywords such as “virtual reality,” “technology,” “system,” “framework,” “design,” and “tool” are associated with the development of VR platforms, instructional frameworks, and digital learning environments. This design-oriented focus is supported by studies that examine VR language learning from the perspectives of pedagogical design, implementation conditions, and immersive learning environment development (Dhimolea et al., 2022; Parmaxi, 2023). The co-occurrence of “EFL,” “collaborative learning,” and “performance” suggests that these systems are commonly examined in classroom-based language learning, where learners interact with peers and complete tasks within VR-supported environments. This cluster reflects a design-oriented strand of VR-assisted English language learning research, in which system development, collaborative learning activities, and measurable learning performance are closely connected.

Cluster 2 (Green), consisting of 17 keywords, highlights the affective and experiential dimensions of immersive VR in language learning. Terms including “immersion,” “experience,” and “language learning” point to a focus on how immersive environments influence learners’ perceptions and participation. This experience-oriented focus is reflected in studies that connect VR-based interaction with foreign language anxiety, learner experience, and intercultural or intracultural learning engagement (Yeh et al., 2022; York et al., 2021). The presence of “motivation,” “perceptions,” and “anxiety” suggests that emotional responses are central to this cluster. These studies commonly examine whether immersive VR can increase motivation, reduce anxiety, and create more supportive conditions for language practice. This cluster therefore represents an experience-oriented strand that connects immersive learning environments with learner affect, engagement, and psychological readiness for communication.

Cluster 3 (Blue), including 10 keywords, centres on simulation-based instruction, learner engagement, and self-efficacy in VR-supported English learning. This set of terms, containing

“simulation,” “instruction,” and “virtual reality”, suggests that this cluster focuses on the use of VR to create structured learning scenarios for English practice. This practice-oriented focus is supported by studies on immersive VR simulation and EFL classroom learning, where presence, engagement, intrinsic motivation, and self-efficacy shape learners’ experiences and perceived capability (Lin & Wang, 2021; Makransky et al., 2019). The appearance of “engagement” and “self-efficacy” is further linked to learners’ participation, confidence, and perceived ability during simulated learning activities. This cluster highlights a practice-oriented strand of research in which VR simulations provide learners with repeated opportunities for task-based language use and confidence development.

Table 4
Co-Occurrence Analysis by Cluster

Cluster No. & Colour	Cluster Label	Number of Keywords	Representative Keywords
1 (Red)	VR Learning Systems and Instructional Design	21	“virtual-reality”, “technology”, “efl”, “environments”, “system”, “framework”, “design”, “tool”, “collaborative learning”, “performance”
2 (Green)	Immersive VR Experiences and Affective Factors	17	“efl learners”, “immersive virtual reality”, “immersion”, “experience”, “language learning”, “motivation”, “perceptions”, “anxiety”
3 (Blue)	VR Simulation Instruction and Learner Engagement	10	“virtual reality (VR)”, “simulation”, “instruction”, “engagement”, “self-efficacy”

Burst Detection Analysis by Keywords

Burst-detection analysis detected 12 burst keywords between 2021 and 2025, reflecting shifts in research attention and the development of emerging topics over time. These burst keywords mark periods during which particular themes attracted intensified scholarly interest. The timing of these bursts provides further evidence of how research priorities changed across the five-year period. Table 5 presents the burst keywords together with their burst strength, onset year, and duration.

Table 5
Top 12 Keywords with Strongest Citation Bursts (CiteSpace)

Keywords	Year	Strength	Begin	End	2021 - 2025
Performance	2021	2.61	2021	2021	
Collaborative learning	2021	1.52	2021	2022	
Simulation training	2021	1.23	2021	2021	
Language learners	2021	1.23	2021	2021	
EFL learners	2022	1.79	2022	2022	
Virtual reality	2022	1.72	2022	2023	
Challenges	2022	1.19	2022	2022	
Immersion	2022	1.18	2023	2023	
Instruction	2021	1.42	2024	2025	
Acquisition	2023	1.18	2024	2025	
Teachers	2024	1.13	2024	2025	
Perceptions	2024	1.13	2024	2025	

The burst-detection results indicate a gradual shift in research attention in VR-assisted English language learning from 2021 to 2025. In 2021, burst keywords such as “performance,” “collaborative learning,” and “simulation training” were prominent. These terms suggest that early research attention was mainly directed toward the measurable effects of VR-supported learning, collaborative classroom activities, and simulation-based practice. During 2022–2023, terms such as “EFL learners,” “virtual reality,” “immersion,” and “challenges” became more visible. This suggests that researchers began to pay closer attention to learner groups, immersive learning conditions, and the difficulties associated with VR implementation. From 2024 to 2025, the emergence of “instruction,” “acquisition,” “teachers,” and “perceptions” points to a more pedagogically grounded research orientation. This shift indicates a stronger pedagogical orientation in recent VR-assisted English language learning research.

Discussion

The bibliometric findings indicate that VR-assisted English language learning has developed into a more pedagogically grounded area of inquiry within technology-enhanced language education. The field has shifted from outcome-oriented and system-focused studies toward a more integrated focus on communication, immersive experience, affective engagement, and classroom-based language practice (Chen et al., 2020; Wang et al., 2020). This shift suggests that VR functions as a pedagogically mediated learning environment rather than a technology-centered tool, and that its effectiveness depends on educational design that supports meaningful language learning processes (Yang et al., 2021). However, the performance and country-level findings should be interpreted cautiously. The relatively short time span and uneven geographical distribution of the data may limit the generalisability of the observed trends across different educational contexts. The geographical concentration of publications may partly reflect differences in research funding, technological infrastructure, institutional capacity, and national priorities for digital education. Countries with stronger investment in educational technology and greater access to VR facilities may be better positioned to conduct and publish research in this area, whereas resource-constrained contexts may remain underrepresented.

This broader shift is also reflected in the relationship between the three co-citation knowledge bases and the three thematic clusters. Receptive language learning and educational outcomes relate to VR learning systems and instructional design, while oral communication and affective engagement correspond to immersive experiences and affective factors. Similarly, immersive learning experience and cognitive-affective engagement are linked to simulation-based instruction, engagement, and self-efficacy. These connections show how the field’s intellectual foundations are reflected in its main research themes.

Theoretical Implications

Theoretically, this study contributes to the literature on VR-assisted English language learning by offering an integrated field-level understanding of how this research area has developed. Previous literature has mainly examined VR in relation to specific tools, learning tasks, language skills, or learner outcomes (Alfadil, 2020; Bacca-Acosta et al., 2022; Xie et al., 2021). While these studies have provided valuable evidence on the use of VR in English learning, they offer less insight into how the field is conceptually organised as a whole.

By mapping the bibliometric structure of the field, this study adds a broader conceptual understanding of VR-assisted English language learning as a pedagogically situated learning environment rather than a set of separate technology-based applications. This perspective clarifies the relationship among technology, pedagogy, learner experience, and context. Technological affordances provide possibilities for immersion, interaction, and contextual

simulation in English learning, but these possibilities do not automatically lead to effective learning. They become educationally meaningful only when the technical features of VR are aligned with clear instructional goals and task design (Radianti et al., 2020).

In this sense, educational design plays a transforming role. It turns VR's immersive and interactive features into concrete opportunities for language input, communicative practice, learner participation, and reflection. Learner experience is then formed through these tasks, including how learners understand the simulated context, use language, engage in interaction, and regulate their emotional responses. At the same time, classroom conditions determine whether these designed opportunities can be realised in practice. Teacher guidance, task arrangement, learner readiness, device availability, and institutional support all influence the extent to which VR-supported learning can be effectively implemented (Lee & Hwang, 2022). This study therefore presents VR-assisted English language learning as an instructional system shaped by technological affordances, learner experience, and classroom conditions.

Practical Implications

From a practical perspective, the bibliometric findings suggest that the role of VR in English language learning should be understood beyond its technological functions. As the field has developed, scholarly attention has gradually expanded from technological applications and learning outcomes to broader concerns related to learner experience, interaction, and instructional practice (Peixoto et al., 2021; Radianti et al., 2020). This development indicates that the educational value of VR does not reside solely in its immersive features. Rather, its significance lies in its capacity to support meaningful language-learning processes and enrich learning experiences. Consequently, teachers, curriculum designers, and educational institutions should evaluate VR in terms of its pedagogical contribution to English learning rather than its technological novelty. In practice, teachers should select VR activities according to specific language objectives. Vocabulary and listening tasks may use contextualised input and feedback, while speaking activities may involve role-play, simulated interaction, or avatar-based practice. Curriculum designers and institutions should also align VR use with course outcomes, learner levels, teacher training, technical support, and available resources.

These findings further inform educational planning and decision-making in relation to VR integration in language education. By mapping the major research themes, influential knowledge bases, and emerging directions in the field, this study provides a structured overview of how VR has evolved within English language education over time. Such evidence enables educators and institutional stakeholders to better understand the opportunities and priorities associated with VR-supported language learning. In addition, the study underscores the importance of aligning future VR adoption with educational objectives, learner needs, and local instructional contexts. Such alignment reflects a broader shift from technology adoption toward socio-technical transformation (Zhou et al., 2026c). Empirical research further supports these implications, showing that VR-supported learning environments can enhance vocabulary acquisition, motivation, and learner engagement when appropriately designed and integrated into instruction (Lai & Chen, 2023; Legault et al., 2019). Overall, these findings may inform more pedagogically grounded and sustainable approaches to integrating VR into English language education.

Limitations and Future Research Directions

Although this study offers an evidence-based overview of research on VR-assisted English language learning, several limitations need to be acknowledged. First and foremost, the dataset was retrieved exclusively from the WoS Core Collection and was limited to

journal articles. Although WoS was selected for its standardized indexing and citation data, restricting the dataset to SSCI- and SCI-EXPANDED-indexed records may have excluded relevant studies indexed in ESCI, AHCI, Scopus, ERIC, or other education-focused databases. Additionally, the final sample included only English-language journal articles, which may underrepresent relevant research published in other languages. Finally, bibliometric analysis is useful for examining research performance, keyword co-occurrence, citation bursts, and co-citation structures. However, it cannot fully capture the pedagogical quality, classroom effectiveness, or contextual complexity of individual VR-assisted English learning studies. Future research may address these limitations by using multiple databases, including non-English publications, and combining bibliometric analysis with systematic review, meta-analysis, or qualitative synthesis. Such approaches could provide a more comprehensive understanding of VR-assisted English language learning.

Conclusion and Implications

This study offers a field-level synthesis of VR-assisted English language learning research from 2021 to 2025. The overall development of the field indicates a shift from technology-centred experimentation toward greater attention to instructional design, learner experience, and classroom implementation. Across the co-citation, keyword co-occurrence, and burst-detection analyses, the field is increasingly organised around learner experience, communicative practice, affective engagement, educational design, and classroom implementation. This study contributes to the literature by clarifying how VR-assisted English learning is shaped not only by technological affordances but also by pedagogical purpose, learner agency, interaction, and contextual conditions. Future research should further investigate how VR-based tasks, teacher support, and learner readiness jointly influence language development in diverse educational settings.

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Declarations

The authors declare no conflict of interest.

Data Availability and Sharing Policy

All bibliometric data used in this study were extracted from the Web of Science Core Collection.

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