Technology-Enhanced Language Learning in Higher Education: A Prisma-Guided Systematic Literature Review of Learner Motivation, Collaborative Engagement, and Assessment

Noor Hanim Rahmat[1], Nur Faiqah binti Mohamed Ismail[2*], Amy Sofeena binti Kamarulzaman[3], Zarina Razlan[4] Haekal Kamarulzaman[5], Muhammad Raziq Othman Ghani[6], Mohamed Ismail Ahamad Shah[7], Wang Rui[8]

[1,2,3,4,5,6] Akademi Pengajian Bahasa, Universiti Teknologi MARA, Shah Alam, Malaysia,

[7]Faculty of Education, Languages, Psychology and Music, SEGi University, Kota Damansara, Malaysia,

[6]Wang Rui

***Corresponding Author**

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ABSTRACT

Technology-enhanced language learning (TELL) has emerged as a transformative approach in higher education, leveraging digital technologies to improve language acquisition, learner engagement, and educational outcomes. Despite the growing body of research on technology integration, learner motivation, collaborative engagement, and digital assessment, existing evidence remains fragmented, with limited synthesis of how these interconnected dimensions collectively influence language learning. This study presents a PRISMA-guided systematic literature review to synthesise contemporary evidence on technology-enhanced language learning in higher education, with particular emphasis on learner motivation, collaborative engagement, and assessment. Following the PRISMA 2020 guidelines, peer-reviewed studies published between 2021 and 2026 were systematically identified from the Scopus and Web of Science databases. After a rigorous screening and quality appraisal process, 21 empirical studies were included for thematic synthesis.

The findings reveal four major themes: (1) technology-enhanced language learning, (2) learner motivation, self-regulation, and psychological factors, (3) collaborative learning and engagement, and (4) assessment, language proficiency, and learning outcomes. The review demonstrates that digital innovations, including artificial intelligence, MOOCs, gamified platforms, learning management systems, and online assessment tools, promote learner autonomy, motivation, collaborative participation, and continuous formative assessment, resulting in improved language proficiency and academic achievement. The review further highlights the complementary roles of the Technology Acceptance Model, Self-Regulated Learning Theory, Social Constructivist Theory, and Assessment for Learning Theory in explaining effective technology-enhanced language learning practices. These findings provide a comprehensive evidence base for educators, curriculum developers, researchers, and policymakers seeking to design learner-centred, technology-driven language education and identify priorities for future research on sustainable digital pedagogies in higher education.

Keywords: Technology-Enhanced Language Learning (TELL); Higher Education; Learner Motivation; Collaborative Engagement; PRISMA Systematic Literature Review.

INTRODUCTION

Background of the study

The rapid advancement of digital technologies has significantly transformed language education in higher education, creating new opportunities for more flexible, interactive, and learner-centred learning environments. Technology-enhanced language learning (TELL) integrates digital tools such as learning management systems, Massive Open Online Courses (MOOCs), artificial intelligence (AI), gamified platforms, mobile applications, and online assessment systems to support language acquisition and improve learning outcomes. These technologies not only facilitate access to authentic learning resources but also encourage learner autonomy, collaboration, and self-regulated learning through personalised and engaging instructional experiences. Grounded in the Technology Acceptance Model (Davis, 1989), Self-Regulated Learning Theory (Zimmerman, 1989), Social Constructivist Theory (Vygotsky, 1978), and Assessment for Learning Theory (Black & Wiliam, 1998), technology-enhanced language learning has become an essential component of contemporary higher education by promoting meaningful interaction, motivation, and continuous assessment.

Statement of Problem and Research Gap

Despite the increasing adoption of digital technologies in language education, existing studies have largely examined technology integration, learner motivation, collaborative engagement, and assessment as separate areas of inquiry. While previous research has demonstrated the effectiveness of AI-assisted learning, MOOCs, gamification, online collaborative environments, and digital assessment in enhancing language proficiency and learner engagement, there remains limited synthesis of how these dimensions interact to influence language learning outcomes in higher education. Furthermore, the rapid emergence of artificial intelligence and other digital innovations has created a need to consolidate recent empirical evidence that reflects current educational practices. To address this gap, this PRISMA-guided systematic literature review synthesises evidence frompeer-reviewed studies published.

Research Questions

Research questions are important to a systematic literature review (SLR). The questions provide the foundation and direction for the entire review process. A well-defined research question ensures that the literature search is exhaustive and systematic, covering all relevant studies that address key aspects of the topic (Kitchenham, 2007). The research questions in this SLR are formulated based on the PICo framework. This framework is a mnemonic style used to formulate research questions, particularly in qualitative research, proposed by Lockwood et al. (2015).PICo stands for Population, Interest, and Context. This SLR is done to answer the four research questions below;

RQ1

What technology-enhanced pedagogical approaches have been implemented to support language learning in higher education?

RQ2 How do learner motivation, self-regulation, and other psychological factors influence technology-enhanced language learning in higher education?

RQ3

How do learner motivation, self-regulation, and other psychological factors influence technology-enhanced language learning in higher education?

RQ4

What is the impact of technology-enhanced assessment practices on language proficiency and learning

outcomes in higher education?

LITERATURE REVIEW

THEORETICAL FRAMEWORK

Technology Acceptance Model by Davis (1989) that justifies Technology-Enhanced Language Learning

The Technology Acceptance Model (TAM), proposed by Davis (1989), provides a strong theoretical foundation for understanding the adoption and effective use of technology in technology-enhanced language learning. TAM posits that individuals' acceptance and use of a technological system are primarily influenced by two key determinants: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which users believe that a particular technology will improve their learning performance, while perceived ease of use reflects the degree to which they perceive the technology as effortless to learn and operate. According to Davis (1989), these perceptions shape users' attitudes toward technology, which subsequently influence their intention to use and actual technology usage.

In the context of language learning, TAM explains why learners and educators are more likely to adopt digital tools such as learning management systems, Massive Open Online Courses (MOOCs), artificial intelligence applications (e.g., ChatGPT), gamified platforms, online assessment systems, and mobile language learning applications when they perceive these technologies as beneficial and user-friendly. The reviewed studies consistently demonstrate that technology-enhanced learning environments promote learner engagement, motivation, self-regulated learning, and language proficiency by providing interactive, flexible, and personalized learning experiences. Consequently, TAM offers an appropriate theoretical lens for explaining learners' acceptance of educational technologies and justifies the integration of digital innovations into language education. By emphasizing the importance of usability and perceived instructional value, the model supports the design and implementation of effective technology-enhanced language learning environments that foster meaningful learning outcomes in higher education.

Self-Regulated Learning (SRL) by Zimmerman, 1989)That justifies Learner Motivation, Self-Regulation, and Psychological Factor

The Self-Regulated Learning (SRL) Theory, proposed by Zimmerman (1989), provides a comprehensive theoretical framework for understanding how learners actively manage their own learning processes to achieve academic success. According to Zimmerman (1989), self-regulated learners are proactive individuals who set learning goals, select appropriate strategies, monitor their progress, regulate their motivation and emotions, and reflect on their learning outcomes. Rather than being passive recipients of instruction, learners take responsibility for planning, implementing, and evaluating their learning activities through three cyclical phases: forethought, performance, and self-reflection. In technology-enhanced language learning, SRL is particularly relevant because online and digital learning environments require learners to exercise greater autonomy, persistence, and self-discipline.

Learners must independently manage their time, monitor their engagement, regulate their motivation, and adapt their learning strategies while interacting with digital platforms, online assessments, and educational technologies. The studies reviewed in this SLR consistently demonstrate that learner motivation, self-efficacy, grit, emotional regulation, and self-regulated learning strategies are significant predictors of language achievement and engagement in online learning environments. Consequently, Zimmerman's SRL Theory provides a strong theoretical justification for the theme Learner Motivation, Self-Regulation, and Psychological Factors, explaining how cognitive, motivational, and behavioural processes interact to enhance learners' language proficiency, persistence, and academic performance. The theory also underscores the importance of designing technology-enhanced learning environments that cultivate learners' autonomy, motivation, and reflective practices to support successful and lifelong language learning.

Social Constructivist Theory by Vygotsky (1978) that justifies Collaborative Learning, and Engagement

The Social Constructivist Theory, proposed by Vygotsky (1978), provides a strong theoretical foundation for understanding collaborative learning and learner engagement in technology-enhanced language learning. The theory posits that learning is a socially mediated process in which knowledge is actively constructed through interaction with others rather than acquired individually. Vygotsky emphasized that cognitive development occurs through meaningful social engagement with teachers, peers, and more knowledgeable individuals within the Zone of Proximal Development (ZPD), where learners can accomplish tasks with guidance that would otherwise be beyond their independent capabilities. This guidance, commonly referred to as scaffolding, enables learners to progressively develop higher-order thinking and language skills. In higher education, collaborative learning activities such as group discussions, peer feedback, collaborative projects, online forums, and synchronous or asynchronous communication create opportunities for learners to exchange ideas, negotiate meaning, and co-construct knowledge.

These interactions not only strengthen language proficiency but also promote learner engagement, critical thinking, communication skills, and social connectedness. The studies reviewed in this SLR demonstrate that technology-enhanced collaborative environments—including MOOCs, gamified platforms, digital discussion spaces, and virtual classrooms—encourage active participation, motivation, and meaningful interaction among learners. Consequently, Vygotsky's Social Constructivist Theory provides an appropriate theoretical justification for the theme Collaborative Learning and Engagement, as it explains how social interaction, collaborative knowledge construction, and instructional scaffolding contribute to effective language learning and sustained learner engagement in digital higher education environments.

Assessment for Learning (AfL) Theory by Black and William (1998) that justifies Assessment, Language Proficiency, and Learning Outcomes

Assessment for Learning(AfL) Theory, proposed by Black and Wiliam (1998), provides a robust theoretical foundation for understanding the relationship between assessment, language proficiency, and learning outcomes in technology-enhanced language learning. Unlike traditional assessment, which primarily evaluates learners' achievement at the end of instruction, AfL emphasizes the use of formative assessment to improve learning throughout the instructional process. Black and Wiliam (1998) argue that continuous assessment, constructive feedback, self-assessment, and peer assessment enable learners to identify their strengths and areas for improvement, thereby fostering deeper learning and higher academic achievement. In technology-enhanced language learning, digital assessment tools such as online quizzes, AI-assisted feedback systems, learning management systems, and gamified platforms provide immediate, personalized feedback that supports learners' language development and self-monitoring.

Such formative practices encourage learners to reflect on their progress, regulate their learning strategies, and actively engage in the learning process, leading to improved language proficiency and overall academic performance. The studies reviewed in this SLR demonstrate that technology-supported assessment enhances learners' motivation, reading comprehension, communicative competence, and language achievement by providing timely feedback and opportunities for continuous improvement. Consequently, Assessment for Learning Theory offers an appropriate theoretical lens for this review, as it explains how effective assessment practices can promote meaningful learning, strengthen language proficiency, and improve learning outcomes within technology-enhanced higher education environments.

CONCEPTUAL FRAMEWORK

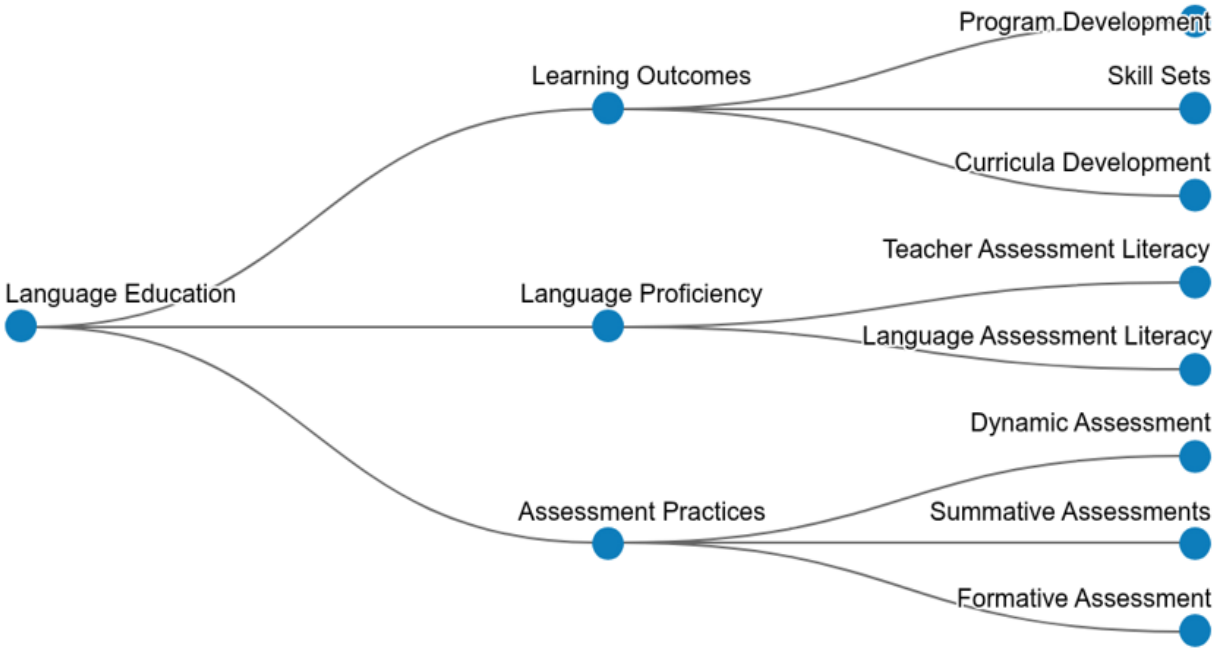


Figure 1 Conceptual Framework of the Study

Figure 1 presents the conceptual framework for this PRISMA-guided Systematic Literature Review (SLR), illustrating the interrelationships among the key dimensions that influence language education in higher education. As shown in the figure, language education serves as the central construct and is supported by three interconnected outcome domains: learning outcomes, language proficiency, and assessment practices. Learning outcomes encompass programme development, curriculum development, and skill sets, highlighting the role of educational planning in equipping learners with the competencies required for successful language acquisition. Language proficiency is associated with teacher assessment literacy and language assessment literacy, emphasizing the importance of educators' assessment competence and learners' understanding of assessment criteria in improving language performance.

Assessment practices comprise formative assessment, summative assessment, and dynamic assessment, reflecting the diverse methods used to monitor, evaluate, and enhance students' language learning. This framework is theoretically anchored in the Technology Acceptance Model (TAM) (Davis, 1989), which explains learners' and educators' acceptance of digital technologies that support technology-enhanced language learning, including online learning platforms, artificial intelligence, digital assessment systems, and interactive learning tools. It is further supported by Self-Regulated Learning (SRL) Theory (Zimmerman, 1989), which emphasizes learners' ability to plan, monitor, and evaluate their own learning, thereby strengthening motivation, self-regulation, and other psychological factors essential for successful language learning in technology-rich environments.

The framework is further underpinned by Social Constructivist Theory (Vygotsky, 1978), which posits that knowledge is constructed through meaningful social interaction and collaborative engagement. This theoretical perspective explains how collaborative learning activities, peer interaction, and technology-mediated communication promote active participation, critical thinking, and deeper language acquisition. Digital platforms, collaborative projects, and online discussion environments create opportunities for learners to exchange ideas, receive scaffolding, and co-construct knowledge, thereby enhancing engagement and communicative competence. Finally, the framework is supported by Assessment for Learning (AfL) Theory (Black & Wiliam, 1998), which views assessment as an integral part of the learning process rather than merely a mechanism for measuring achievement.

Through formative assessment, timely feedback, self-assessment, and reflective learning, assessment practices foster continuous improvement in language proficiency and overall learning outcomes. Collectively, these four theories provide a comprehensive conceptual foundation for the review by demonstrating that effective language education is shaped by the interaction of technology-enhanced learning, learner motivation and self-regulation, collaborative engagement, and evidence-based assessment practices. Together, these dimensions contribute to improved language proficiency, curriculum quality, and the development of transferable skills required for academic and professional success in higher education.

METHODOLOGY

For conducting systematic literature reviews, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach is a widely accepted standard that guarantees transparency, completeness, and consistency throughout the procedure by Page et al. (2021). guide how to systematically identify, screen, and include studies in their review. In the context of this SLR, the writers involved in this article act as researchers and work together to analyse the articles deemed relevant for the title. Two important databases, Web of Science and Scopus, were used in this analysis because of their wide coverage and robustness.

The PRISMA approach is organized into four key stages: (i) identification, (ii) screening, (iii) eligibility, and (iv) data abstraction. In the identification phase, databases are searched to locate all relevant studies. The screening phase then involves evaluating these studies against predefined criteria to eliminate irrelevant or low-quality research. During the eligibility phase, the remaining studies are thoroughly assessed to confirm they meet the inclusion criteria. Finally, data abstraction focuses on extracting and synthesizing data from the included studies, which is essential for deriving meaningful and reliable conclusions. This structured method ensures that the systematic review is conducted with rigor, leading to trustworthy results that can guide future research and practice. The PRISMA framework lists three main stages for analysis: (i) identification, (ii) screening, (iii) eligibility, (iv) data abstraction and analysis, as well as (v) quality of appraisal.

Identification

In accordance with the PRISMA framework, the identification phase represents a critical starting point in the systematic literature review process, as it is designed to ensure exhaustive coverage of relevant studies while reducing the risk of selection bias. In this study, a structured and comprehensive search was conducted across two leading bibliographic databases, Scopus and Web of Science (WoS), using the keywords "foreign language" , "motivation", "student", teaching", "university", "digital age". Table 1 below shows the search string. These databases were deliberately selected because of their extensive multidisciplinary coverage, stringent indexing criteria, and strong representation of high-quality, peer-reviewed journals. The search process resulted in the retrieval of 63 records from Scopus and 100 records from Web of Science, yielding a combined total of 163 records prior to the removal of duplicates.

The higher number of results obtained from Scopus can be attributed to its broader inclusion of journals and stronger coverage in the social sciences, whereas WoS contributed a more targeted collection of highly cited and methodologically rigorous studies. As shown in Table 1, the identification of 163 records reflects the growing academic interest in writing within higher education and highlights the conceptual diversity of research spanning linguistic, pedagogical, and psychological perspectives. Employing multiple databases enhances the methodological robustness of the review by minimizing database-specific bias and increasing the likelihood of capturing diverse research traditions and geographical contexts. Additionally, the use of carefully designed search terms ensured sensitivity to terminological variation while maintaining alignment with the review's objectives. Overall, this transparent and systematic identification process establishes a strong foundation for subsequent screening and eligibility stages, consistent with PRISMA standards and expectations for rigorous, replicable research.

Table 1 The search string

Scopus	TITLE-ABS-KEY (("foreign language" OR "second language" OR "foreign language learning" OR "language acquisition") AND (motivation OR "motivational factors" OR "learner motivation" OR "student motivation") AND (teaching OR "language teaching" OR "foreign language teaching" OR "instruction") AND (university OR "higher education" OR "tertiary education") AND ("digital age" OR "digital era" OR "technology in education" OR "online learning"))
WebofScience	TITLE-ABS-KEY (("foreign language" OR "second language" OR "foreign language learning" OR "language acquisition") AND (motivation OR "motivational factors" OR "learner motivation" OR "student motivation") AND (teaching OR "language teaching" OR "foreign language teaching" OR "instruction") AND (university OR "higher education" OR "tertiary education") Extracted July 2026

Screening

During the screening stage of the systematic literature review, potentially relevant studies were evaluated to ensure their alignment with the four established research questions. This phase focused on refining the initial pool of records by removing duplicates and applying predefined inclusion and exclusion criteria. Following the initial review, 129 publications were excluded for failing to meet the scope and relevance requirements of the study, leaving 34 (Scopus=21; Wos; 13) articles for further consideration, as outlined in Figure 2. The primary inclusion criterion was the type of literature, with priority given to scholarly sources that offer substantive and empirical insights. As a result, materials such as book reviews, book series, meta-syntheses, meta-analyses, conference proceedings, and book chapters not directly related to the core focus of the review were excluded. To ensure consistency and relevance to contemporary academic discourse, only peer-reviewed publications written in English and published between 2021 and 2026 were retained. Additionally, a duplication check led to the removal of 0 repeated records across the databases. This systematic and criteria-driven screening process enhanced the focus and quality of the evidence base, ensuring that only the most relevant and methodologically sound studies progressed to the subsequent stages of analysis.

Eligibility

For the third step, known as eligibility, a total of 34 articles were prepared. All articles' titles and key content were thoroughly reviewed at this stage to ensure that the inclusion requirements were fulfilled and fit into the present study with the current research aims. Finally, 21 articles are available for review (see Table 3).

Table 2 The selection criterion

Criterion	Inclusion	Exclusion
Language	English	Non-English
Timeline	2021 – 2026	< 2021
Literature type	Journal (Article)	Conference, Book, Review
Publication Stage	Final	In Press
Subject Area	Foreign Language	Besides Foreign Language

Data Abstraction and Analysis

An integrative analysis was used as one of the assessment strategies in this study to examine and synthesize a variety of research designs (quantitative, qualitative, and mixed methods). To develop themes, the authors carefully analyzed 21 publications for relevant material related to the study's topics. They examined the methodology and research results of significant studies on foreign language", "motivation", "student", teaching", "university", "digital age". The authors collaborated to develop themes based on the evidence presented throughout the study. They kept a log of their data analysis process to document relevant

perspectives, analyses, or ideas. The authors ensured consistency in theme design by comparing the results and discussing disagreements between themselves. This expert review phase established the validity of each subtheme by ensuring clarity, importance, and suitability (Refer to Appendix 1).

Quality of Appraisal

According to Kitchenham and Charters (Kitchenham, 2007), the researchers need to assess the quality of the research chosen. The next stage is applying the quality assessment suggested by Abouzahra et al., (2020), which consists of six questions complying with a scoring procedure for evaluating each criterion. The possible ratings are "Yes" (Y) with a score of 1 if the criterion is fully met, "Partly" (P) with a score of 0.5 if the criterion is somewhat met but contains some gaps or shortcomings, and "No" (N) with a score of 0 if the criterion is not met at all.

Table 3 Possible ratings for 6 questions by Abouzahra et al. (2020)

No	Question
QA1	Is the purpose of the study clearly stated?
QA2	Is the interest and the usefulness of the work clearly presented?
QA3	Is the study methodology clearly established?
QA4	Are the concepts of the approach clearly defined?
QA5	Is the work compared and measured with other similar work?
QA6	Are the limitations of the work clearly mentioned?

Each writer independently assesses the study according to these criteria, and the scores are then totalled across all experts to determine the overall mark. For a study to be accepted for the next process, the total mark, derived from summing the scores from all three experts, must exceed 3.0. This threshold ensures that only studies meeting a certain quality standard proceed further. The results are shown in Table 4.

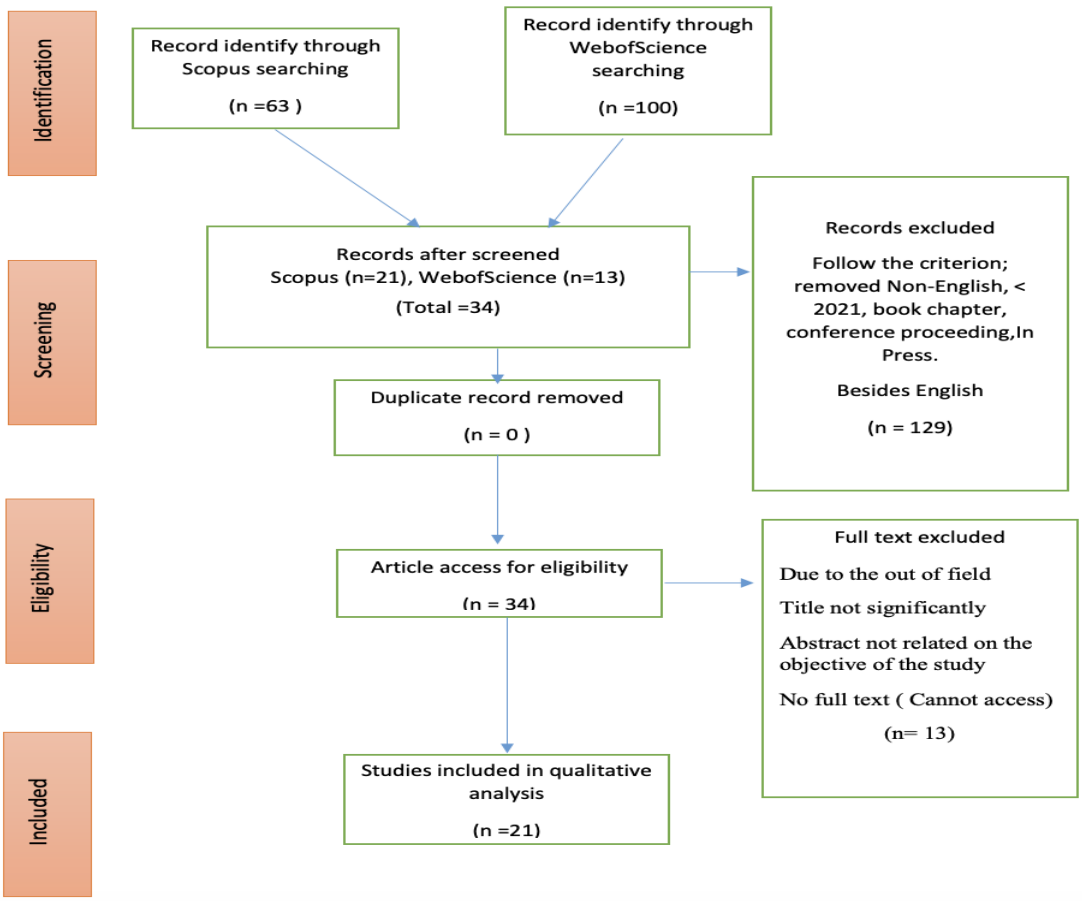


Figure 2 Flow diagram of the proposed searching study (Moher D, Liberati A, Tetzlaff J, 2009)

Result and Finding

Quality of Assessment

Table 4 shows the result of the assessment performance for selected 21 primary studies. The overall quality of the articles is as follows;

- **High quality (≥80%):** Majority of studies
- **Moderate quality (60–79%):** Conceptual or descriptive studies
- **Lower quality (<60%):** Primarily survey-only or exploratory abstracts

Table 4- Quality of Assessment of 21 selected papers

Study	Author(s) & Year	Article Title	QA1	QA2	QA3	QA4	QA5	QA6	Total Score	Percentage (%)
PS1	Hsiao, Chang, & Chen (2025)	A Tale of Two Platforms: Decoding the Digital Footprints of High School Students in Bilingual Scaffolded MOOCs	Y	Y	Y	Y	P	N	**4.5**	**75.0**
PS2	Mulyadi et al. (2024)	Fulfillment of Basic Psychological Needs of English for Specific Purpose Learners during Online Learning: Lecturers' and Learners' Perspectives	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS3	Wang (2024)	Digital Multimodal Composing as a Translanguaging Space: Understanding Students' Initial Experiences and Challenges	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS4	Shuliak, Ostapchuk, & Laborda (2024)	Online Education in Ukraine in Extreme Conditions: Constraints and Challenges	Y	Y	Y	P	N	N	**3.5**	**58.3**
PS5	Kim & Kim (2024)	Unraveling the Connections: English Proficiency, Motivational Orientations, and Online Community Engagement among ESP Students	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS6	Paustovska et al. (2024)	Approaches to Inclusive Foreign Language Instruction in Higher Education	Y	Y	P	P	N	N	**3.0**	**50.0**
PS7	Alshammari & Alrashidi (2026)	The Effects of Informal Digital Learning, Intrinsic Motivation, and Grit on Online Learning Effort Regulation and English Achievement	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS8	Karataş et al.	Incorporating AI in Foreign	Y	Y	Y	Y	P	P	**5.0**	**83.3**

	(2024)	Language Education: An Investigation into ChatGPT's Effect on Foreign Language Learners								
PS9	Zhao & Wang (2025)	Unpacking the Antecedents of Boredom and Its Impact on University Learners' Engagement in Languages Other Than English	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS10	Singh, Mulyadi, & Ong (2024)	Exploring the Use of Kahoot! to Monitor Learning Performance among Students in Higher Education	Y	Y	Y	Y	P	N	**4.5**	**75.0**
PS11	Robbins & Appel (2026)	Active Participation in Collaborative Activities as a Precursor for Emotional Engagement and Academic Success in Online Higher Education Language Learning	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS12	Al-Obaydi, Rahul, & Pikhart (2024)	The Effect of Online Oral Reading on Reading Comprehension, Reading Anxiety, and Classroom Anxiety among EFL Learners	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS13	Nassery & Osam (2026)	Transforming Language Assessment in the Digital Age: University-Level EFL Students' and Teachers' Perceptions of Traditional, Alternative, and Online Assessment Models	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS14	Song & Lee (2025)	Presence and Motivation: Comparing Synchronous and Asynchronous Learning Environments for Foreign Language Learners Using Path Analysis	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS15	Podoliak (2024)	ICT in Teaching Foreign Language in a Ukrainian University	Y	Y	P	P	N	N	**3.0**	**50.0**
PS16	Almayez et al. (2025)	Motivation and English Self-Efficacy in Online Learning Applications among Saudi EFL Learners: Exploring the Mediating Role of Self-Regulated Learning Strategies	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS17	Tang et al. (2024)	Examining Motivation and Self-Regulated Online Learning Strategy Model: A Measurement Invariance Analysis among College Students in China During COVID-19	Y	Y	Y	Y	P	P	**5.0**	**83.3**

PS18	Barani et al. (2026)	The Mediating Role of Language Learning Strategies and Motivational Learning Strategies on the Relationship between Learning Styles and Second/Foreign Language Achievement	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS19	Sun, Yang, & Sun (2026)	How Do Grit and Emotions Shape University Students' Motivation in Learning English as a Foreign Language?	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS20	Wang, Lo, & Rashid (2026)	Relationship between Internationalization, Competence-Based English Learning Motivation, and English Proficiency among Chinese EFL Students	Y	Y	Y	Y	P	P	**5.0**	**83.3**
PS21	Ebn-Abbasi, Fattahi, Noughabi, & Botes (2024)	The Strength of Self and L2 Willingness to Communicate: The Role of L2 Grit, Ideal L2 Self and Language Mindset	Y	Y	Y	Y	P	P	**5.0**	**83.3**

The quality assessment results indicate that the 21 selected studies are generally of good to high methodological quality, supporting their inclusion in this PRISMA-guided systematic literature review. Most studies **(**16 out of 21**)** achieved a total score of 5.0 out of 6.0 (83.3%)**,** demonstrating that they clearly stated their research objectives, established appropriate methodologies, defined the concepts of their approaches, and highlighted the significance and usefulness of their work. However, the majority of these studies only partially fulfilled QA5 (comparison with related studies) and QA6 (discussion of study limitations)**,** suggesting opportunities for more comprehensive reporting. Two studies (PS1 and PS10) scored 4.5 (75.0%), while PS4 obtained 3.5 (58.3%)**,** reflecting partial methodological and conceptual descriptions and limited discussion of comparative analysis and limitations. The lowest scores were recorded by PS6 and PS15, each obtaining 3.0 (50.0%)**,** primarily because their abstracts provided insufficient methodological detail, limited conceptual explanations, and did not report comparisons with previous studies or study limitations. Overall, the assessment demonstrates that the selected articles possess satisfactory methodological rigor and reporting quality, providing a credible and reliable evidence base for the thematic synthesis and conclusions of this systematic literature review on technology-enhanced language learning in higher education.

Themes

Table 5 Analysis for Themes

Theme	Number of Studies
Theme 1. Technology-Enhanced Language Learning	10
Theme 2. Learner Motivation, Self-Regulation, and Psychological Factors	10
Theme 3. Collaborative Learning, and Engagement	4
Theme 4. Assessment, Language Proficiency, and Learning Outcomes	5*

*Some studies (e.g., PS1, PS5, PS8, PS10, PS12, PS13, PS14, and PS20) contribute to more than one theme because they address multiple aspects of language learning. This overlap is appropriate in a PRISMA-guided SLR, where thematic synthesis allows studies to inform multiple conceptual categories when their findings span different research domains.

Theme 1 (T1): Technology-Enhanced Language Learning

Table 6 Theme 1

PS	Author (Year)	Article Title	Research Focus
PS1	Hsiao et al. (2025)	A Tale of Two Platforms: Decoding the Digital Footprints of High School Students in Bilingual Scaffolded MOOCs	MOOCs, bilingual online learning, self-regulated learning
PS3	Wang (2024)	Digital Multimodal Composing as a Translanguaging Space: Understanding Students' Initial Experiences and Challenges	Digital multimodal composing and translanguaging
PS4	Shuliak et al. (2024)	Online Education in Ukraine in Extreme Conditions: Constraints and Challenges	Online language learning during crisis
PS6	Paustovska et al. (2024)	Approaches to Inclusive Foreign Language Instruction in Higher Education	Inclusive digital language pedagogy
PS8	Karataş et al. (2024)	Incorporating AI in Foreign Language Education: An Investigation into ChatGPT's Effect on Foreign Language Learners	AI (ChatGPT) in language learning
PS10	Singh et al. (2024)	Exploring the Use of Kahoot! to Monitor Learning Performance among Students in Higher Education	Gamification and formative assessment
PS12	Al-Obaydi et al. (2024)	The Effect of Online Oral Reading on Reading Comprehension, Reading Anxiety, and Classroom Anxiety among EFL Learners	Online oral reading intervention
PS13	Nassery & Osam (2026)	Transforming Language Assessment in the Digital Age	Digital assessment and online assessment
PS14	Song & Lee (2025)	Presence and Motivation: Comparing Synchronous and Asynchronous Learning Environments	Online learning environments
PS15	Podoliak (2024)	ICT in Teaching Foreign Language in a Ukrainian University	ICT integration in language teaching

The studies categorized under Theme 1: Technology-Enhanced Language Learning demonstrate the growing integration of digital technologies to improve language teaching and learning in higher education. Collectively, the ten studies examine a wide range of technology-supported approaches, including Massive Open Online Courses (MOOCs), digital multimodal composing, online learning platforms, inclusive digital pedagogy, artificial intelligence (AI), gamification**,** online reading interventions, digital assessment, synchronous and asynchronous learning environments, and information and communication technology (ICT)**.**

Hsiao et al. (2025) and Wang (2024) highlight the potential of MOOCs and digital multimodal composing to promote learner autonomy and translanguaging practices, while Shuliak et al. (2024) and Podoliak (2024) emphasize the importance of ICT in sustaining language education during challenging circumstances. Karataş et al. (2024) demonstrate the effectiveness of ChatGPT in supporting foreign language learning, whereas Singh et al. (2024) show that gamified tools such as Kahoot! enhance learner engagement and formative assessment.

Similarly, Al-Obaydi et al. (2024), Nassery and Osam (2026), and Song and Lee (2025) reveal that online instructional strategies and digital assessment practices improve language proficiency, motivation, and learning experiences. Overall, these studies indicate that technology-enhanced language learning fosters interactive, flexible, and learner-centred environments that strengthen language acquisition, engagement, and academic performance in higher education.

Theme 2 (T2): Learner Motivation, Self-Regulation, and Psychological Factors

Table 7 Theme 2

PS	Author (Year)	Article Title	Research Focus
PS2	Mulyadi et al. (2024)	Fulfillment of Basic Psychological Needs of English for Specific Purpose Learners during Online Learning	Motivation and psychological needs
PS5	Kim & Kim (2024)	Unraveling the Connections: English Proficiency, Motivational Orientations, and Online Community Engagement among ESP Students	Motivation, self-efficacy, online engagement
PS7	Alshammari & Alrashidi (2026)	The Effects of Informal Digital Learning, Intrinsic Motivation, and Grit on Online Learning Effort Regulation and English Achievement	Motivation, grit, effort regulation
PS9	Zhao & Wang (2025)	Unpacking the Antecedents of Boredom and Its Impact on University Learners' Engagement	Boredom, engagement, emotions
PS16	Almayez et al. (2025)	Motivation and English Self-Efficacy in Online Learning Applications among Saudi EFL Learners	Motivation, self-efficacy, self-regulated learning
PS17	Tang et al. (2024)	Examining Motivation and Self-Regulated Online Learning Strategy Model	Motivation and self-regulated learning
PS18	Barani et al. (2026)	The Mediating Role of Language Learning Strategies and Motivational Learning Strategies	Learning strategies and motivation
PS19	Sun et al. (2026)	How Do Grit and Emotions Shape University Students' Motivation in Learning English as a Foreign Language?	Grit, emotions and motivation
PS20	Wang et al. (2026)	Relationship between Internationalization, Competence-Based English Learning Motivation, and English Proficiency	Motivation and English proficiency
PS21	Ebn-Abbasi et al. (2024)	The Strength of Self and L2 Willingness to Communicate	Grit, language mindset, willingness to communicate

The studies categorized under Theme 2: Learner Motivation, Self-Regulation, and Psychological Factors examine the psychological and behavioural determinants that influence language learning in technology-enhanced higher education environments. Collectively, the ten studies demonstrate that learners' motivation, self-efficacy, self-regulation, grit, emotions, and willingness to communicate play critical roles in determining language learning success. Mulyadi et al. (2024) emphasize the importance of fulfilling learners' basic psychological needs to enhance motivation during online learning, while Kim and Kim (2024) and Almayez et al. (2025) highlight the positive relationships among motivation, self-efficacy, online engagement, and language achievement. Similarly, Alshammari and Alrashidi (2026), Tang et al. (2024), and Barani et al. (2026) demonstrate that self-regulated learning strategies, intrinsic motivation, and effective language learning strategies significantly improve learners' effort regulation and academic performance. Zhao and Wang (2025) and Sun et al. (2026) further reveal that emotional factors, including boredom, grit, and positive emotions, strongly influence learner engagement and persistence in online language learning. In addition, Wang et al. (2026) and Ebn-Abbasi et al. (2024) show that motivation, language mindset, and willingness to communicate are closely associated with higher English proficiency and communicative competence. Overall, these studies underscore that psychological readiness and self-regulatory capabilities are fundamental to fostering sustained engagement, effective learning behaviours, and successful language learning outcomes in technology-enhanced higher education.4.2.3 Theme 3 (T3): Collaborative Learning, and Engagement

Table 8 Theme 3

PS	Author (Year)	Article Title	Research Focus
PS5	Kim & Kim	Unraveling the Connections: English Proficiency,	Community engagement in

	(2024)	Motivational Orientations, and Online Community Engagement among ESP Students	online learning
PS10	Singh et al. (2024)	Exploring the Use of Kahoot! to Monitor Learning Performance among Students in Higher Education	Interactive collaborative learning
PS11	Robbins & Appel (2026)	Active Participation in Collaborative Activities as a Precursor for Emotional Engagement and Academic Success in Online Higher Education Language Learning	Collaborative learning and engagement
PS14	Song & Lee (2025)	Presence and Motivation: Comparing Synchronous and Asynchronous Learning Environments	Social presence and collaborative interaction

The studies grouped under Theme 3: Collaborative Learning and Engagement highlight the importance of social interaction, learner participation, and collaborative activities in enhancing language learning within technology-enhanced higher education environments. Collectively, the four studies demonstrate that meaningful collaboration fosters greater learner engagement, motivation, and academic success. Kim and Kim (2024) examined the relationship between English proficiency, motivational orientations, and online community engagement, revealing that active participation in online learning communities strengthens learners' motivation and language development. Singh et al. (2024) investigated the use of Kahoot! as an interactive learning platform and found that gamified collaborative activities increase student participation, engagement, and continuous monitoring of learning performance. Similarly, Robbins and Appel (2026) emphasized that active involvement in collaborative learning activities serves as a key predictor of emotional engagement and academic achievement in online language learning, highlighting the value of peer interaction and shared learning experiences. Song and Lee (2025) further demonstrated that both synchronous and asynchronous learning environments promote social presence and collaborative interaction, although each offers distinct advantages for learner motivation and engagement. Overall, these studies suggest that collaborative learning supported by digital technologies creates interactive and socially rich learning environments that enhance communication, foster learner engagement, and improve language learning outcomes. The findings reinforce the importance of integrating collaborative pedagogical strategies into technology-enhanced language education to promote active participation, peer support, and meaningful knowledge construction.

Theme 4 : Assessment, Language Proficiency, and Learning Outcomes

Table 9 Theme 4

PS	Author (Year)	Article Title	Research Focus
PS1	Hsiao et al. (2025)	A Tale of Two Platforms: Decoding the Digital Footprints of High School Students in Bilingual Scaffolded MOOCs	Learning analytics and course completion
PS8	Karataş et al. (2024)	Incorporating AI in Foreign Language Education	AI-supported language achievement
PS12	Al-Obaydi et al. (2024)	The Effect of Online Oral Reading on Reading Comprehension, Reading Anxiety, and Classroom Anxiety among EFL Learners	Reading achievement and anxiety
PS13	Nassery & Osam (2026)	Transforming Language Assessment in the Digital Age	Assessment models in EFL
PS20	Wang et al. (2026)	Relationship between Internationalization, Competence-Based English Learning Motivation, and English Proficiency	English proficiency outcomes

The studies classified under Theme 4: Assessment, Language Proficiency, and Learning Outcomes emphasize the critical role of technology-enhanced assessment in improving language proficiency and overall learning achievement in higher education. Collectively, the five studies demonstrate that innovative assessment approaches, supported by digital technologies, contribute to more effective language learning and better academic outcomes. Hsiao et al. (2025) examined learning analytics within bilingual scaffolded MOOCs, showing how learners' digital footprints can be used to monitor engagement, predict course completion, and enhance learning support. Karataş et al. (2024) investigated the use of artificial intelligence (AI), particularly ChatGPT, and found that AI-assisted learning positively influences language achievement by providing personalized learning support and immediate feedback. Similarly, Al-Obaydi et al. (2024)

reported that online oral reading interventions significantly improve reading comprehension while reducing reading and classroom anxiety among EFL learners. Nassery and Osam (2026) explored traditional, alternative, and online assessment models, highlighting the growing importance of digital assessment practices in promoting fair, authentic, and learner-centred evaluation. Finally, Wang et al. (2026) demonstrated that competence-based motivation and internationalization positively influence English proficiency among university students. Overall, these studies indicate that effective assessment practices, combined with digital technologies and learner-centred instructional strategies, play a vital role in enhancing language proficiency, monitoring learning progress, and achieving meaningful learning outcomes in technology-enhanced higher education.

CONCLUSION

Summary of Findings

This PRISMA-guided Systematic Literature Review synthesized evidence from 21 peer-reviewed studies to provide a comprehensive understanding of technology-enhanced language learning in higher education, focusing on four interconnected themes: technology-enhanced language learning, learner motivation and self-regulation, collaborative engagement, and assessment practices**.** The findings reveal that digital technologies, including MOOCs, artificial intelligence (e.g., ChatGPT), ICT, gamified platforms, online assessment systems, and multimodal learning environments, have transformed language teaching by creating more flexible, interactive, and learner-centred educational experiences. Studies by Hsiao et al. (2025), Karataş et al. (2024), Nassery and Osam (2026), and Singh et al. (2024) demonstrate that technology-supported pedagogies enhance learner engagement, language proficiency, and assessment practices. Likewise, research by Mulyadi et al. (2024), Almayez et al. (2025), Tang et al. (2024), and Barani et al. (2026) confirms that motivation, self-efficacy, grit, and self-regulated learning strategies are critical determinants of successful language learning. Furthermore, collaborative learning environments supported by synchronous and asynchronous technologies foster meaningful interaction, social presence, and academic engagement, as highlighted by Kim and Kim (2024), Robbins and Appel (2026), and Song and Lee (2025). Overall, the review demonstrates that effective language learning in higher education is achieved through the integration of innovative technologies, learner-centred pedagogies, collaborative learning experiences, and formative assessment practices.

Implications and Suggestions for Future Research

The findings of this review have important implications for researchers, educators, curriculum developers, and policymakers. Higher education institutions should promote the adoption of technology-enhanced pedagogical approaches that foster learner autonomy, collaboration, and continuous assessment while ensuring equitable access to digital learning resources. Professional development initiatives should equip language educators with competencies in digital pedagogy, assessment literacy, and the pedagogically sound use of emerging technologies, particularly artificial intelligence. Future research should extend beyond predominantly cross-sectional studies by employing longitudinal and mixed-methods designs to examine the long-term effects of technology-enhanced language learning on language proficiency, learner engagement, and academic achievement.

In addition, further investigations are needed into the ethical implications of AI-assisted language learning, inclusive digital pedagogies for diverse learner populations, and culturally responsive technology integration across different educational contexts. Comparative studies across countries, disciplines, and learning environments would also provide deeper insights into how technological innovations can sustainably enhance language education and prepare learners for the evolving demands of higher education and the global workforce.

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Conflicts of Interest

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