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Strategies for learning English in higher education: a systematic mapping

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The prevalence of English in higher education has necessitated its learning and mastery, both for the internationalization of the language across countries and for its utility as a crucial tool in scientific and educational interactions. Consequently, this study aimed to identify and characterize scientific articles published between 2020 and 2024, focusing on metacognitive, cognitive, socio-emotional, and technological strategies in the learning of English among university students. This was achieved through a qualitative systematic mapping using databases such as Scopus, ERIC, EBSCO, and Web of Science. The methodology, with a qualitative orientation, incorporated the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) processes, encompassing three moments: (1) Search approach, (2) Development of the search protocol, and (3) Analysis of results and classification and synthesis process. A total of 80 articles were selected based on quality, inclusion, and exclusion criteria. The findings indicated that China and the United States have the highest number of studies; the most cited author has 32 citations; methodological perspectives include quantitative, mixed, and qualitative approaches; and the questionnaire was the most frequently used instrument. The journals of interest span all four quartiles. Notable technological strategies include augmented reality, artificial intelligence, and the metaverse, while metacognitive and cognitive strategies such as self-regulated learning are emphasized. Research lines highlight the interactivity and effectiveness of pragmatic strategies in English feedback and trends in identifying factors that cause anxiety during English classes. It is concluded that English is instrumental in enhancing article writing strategies and scientific dialogue in English. It is recommended to implement strategies to develop the competence of writing scientific articles in English and to utilize educational platforms for learning scientific and communicative English.

KEYWORDS

English language, higher education, self-learning, self-regulation, teaching-learning strategies

1 Introduction

Higher education encounters significant challenges in the teaching and learning of English, necessitating a reconceptualization of its practices in the contexts of socialization and internationalization (Capocasale Bruno, 2023). This need arises because the current teaching strategies are inadequate and not tailored to the appropriate level of study, resulting in diminished interest, demotivation, and poor performance among many students, who possess varying levels of proficiency and learning objectives (UNESCO, 2023). The acquisition of English during teacher training is hindered by insufficient theoretical and methodological frameworks, both epistemologically and practically (Cruz Rizo et al., 2021). Consequently, the teaching of English presents challenges, as students rely not only on instruction but also on their language skills to overcome difficulties in learning English (Noprival et al., 2023).

The suboptimal academic performance in English among university students is not confined to Peru but is also observed in other countries such as Mexico (Guerrero Rodríguez et al., 2022; Jaime Romero et al., 2021) and Chile (Muñoz and Correa Perez, 2023) among others. This issue is attributed to the limited use of English and structural deficiencies in the implementation of language teaching-learning strategies. According to the 2010 University Census, only 43.7% of students in Peru were proficient in English (Arce-Villalobos et al., 2017). Fourteen years later, EF Education First (2024) reported that Peru ranks 53rd, indicating a moderate level of competence, thus highlighting the ongoing challenge to improve these statistics. This persistent issue necessitates that higher education instructors enhance their pedagogical approaches with innovative English teaching strategies, taking into account the educational and social contexts of their students (López Basilio et al., 2024).

Didactic strategies refer to the techniques employed during the instructional process, encompassing a series of deliberate actions aimed at fostering meaningful learning environments, enhancing student self-regulation, and affirming the educator's role (Duarte-Herrera et al., 2019; Tapullima-Mori et al., 2024). The implementation of cognitive strategies (CS) significantly influences the comprehension and retention of a second language, facilitates the acquisition of novel structures, and enriches vocabulary. This necessitates the mastery of memory techniques, repetition, information organization, concept elaboration, and consistent reading (Bernal and Vélez, 2009). Ellis (2005) noted that CS enable active language processing, thereby aiding the acquisition of grammatical structures and vocabulary. Oxford (1990) categorized CS into techniques such as practice, inference, and deduction, which assist in the internalization of language.

The implementation of metacognitive strategies (MS) significantly enhances students' autonomy, enabling them to plan, monitor, and evaluate their own learning processes, thereby identifying areas for improvement to expedite language acquisition. Individuals who consciously employ these strategies effectively regulate their language learning process by setting goals, scheduling study sessions, conducting self-assessments, and reflecting on their errors (Izquierdo-Magaldi et al., 2016). The concept of metacognition was introduced by Flavell (1979), who underscored the critical role of self-regulation in learning. Oxford (1990) further identified MS as encompassing the student's planning, self-assessment, and progress monitoring. Salazar Béjar and Cáceres Mesa (2022) emphasized that proficient students utilize metacognitive strategies to effectively self-regulate their language learning.

Similarly, the use of socio-emotional strategies minimizes emotional obstacles, improves social interaction, and improves confidence in the practice of another language, which requires collaboration, negotiation of meaning, immersion in communities of speakers, participation in social events such as face-to-face and virtual debates with university students from other countries, role-playing, making intrinsic motivations and participating in guidance on the management of anxiety when learning another language, in this way, the student will be able to determine their own English learning goals (Ferrando, 2023). (Vygotsky, 1980), with his sociocultural theory, emphasized the importance of social interaction in language learning; Long (1996) proposed an 'Interaction Hypothesis', which argued that the negotiation of meanings in conversations improved the acquisition of another language and (Yim and Norton, 2001) determined that identity and access to communities of native speakers influence the learning of a second language.

Despite the challenges higher education faces in adopting new technologies, the implementation of technological strategies (TS) remains an appealing prospect (Mora-Barzola, 2023). This approach involves utilizing digital tools to enhance second language acquisition, including applications, online learning platforms, and multimedia resources. Levy (1997) introduced the concept of Computer-Assisted Language Learning (CALL), emphasizing technology's role in language instruction. Warschauer (2000) examined how technology can enhance interaction and motivation in language learning, while (Chapelle, 2001) proposed criteria for evaluating the effectiveness of technologies in this context.

Conversely, Izquierdo-Magaldi et al. (2016) identified metacognitive strategies such as planning, textualization, and revision, alongside technological resources that students employ to support language learning. Additionally, the gamification technique is posited to facilitate English language learning by stimulating attention, enhancing memory, and enabling the assimilation of lexical, syntactic, and morphological structures (Chaves Yuste, 2019; Molina-García et al., 2021). However, these benefits may not be realized without personal self-learning goals. Students with high self-efficacy are likely to set goals and employ self-regulated strategies to achieve them (Fuentes et al., 2023).

Self-regulation in students refers to the process by which they stimulate their thoughts, behaviors, and emotions to achieve their goals in learning a new language (Covarrubias-Apablaza et al., 2019; Sáez-Delgado et al., 2022). It is crucial for students to have confidence in their ability to attain these goals. Understanding students' perspectives on English teaching-learning strategies is essential, as innovations in this area are continually evolving due to increasing demand (Donoso Cedeño et al., 2023; Gómez et al., 2021). The teaching of English is expanding within universities globally, as it is considered a central component of the internationalization process. Critical information is required from studies regarding the design, implementation, and evaluation of English programs across various educational contexts, where diverse strategies are impacting the teaching and learning of English (Lasagabaster, 2022). Internationalization involves the process by which universities incorporate international, multicultural, and academic dimensions, thereby promoting English language learning as a vital tool for global communication and professional development (Solís Navarro and González Bello, 2023).

While no systematic mappings were identified concerning the topic under investigation, reviews such as that conducted by Hein et al. (2021) in Germany systematically examined 54 articles published between 2001 and 2020. Their findings concentrated on the role of immersive technologies in the teaching and learning of foreign languages at cognitive, affective, and conative levels, highlighting gaps in the areas of teacher involvement and virtual reality. Similarly, Ang and Yunus (2021) applied the methodology proposed by Khan et al. (2003) to review 21 articles, noting that this approach facilitates the analysis, evaluation, and synthesis of complex ideas from another language. Their results indicated that students found learning English online and with technology to be enjoyable.

In Peru, Noa et al. (2022) conducted a systematic review utilizing the PRISMA methodology. Their findings indicated that experiences with blended learning were advantageous in the context of English language

instruction. Furthermore, in a study by Valera Yataco et al. (2023), it was concluded that methodologies integrating digital tools can be effectively employed to enhance English language proficiency in higher education.

Klimova et al. (2023) conducted a systematic review in the Czech Republic and Norway, revealing that the integration of emerging technologies is recommended for foreign language instruction at the university level. They further noted that speech skills can be enhanced through the use of chatbots. Similarly, Ren (2024) employed Big Data technology in China to develop a personalized English teaching system. The study concluded that student satisfaction levels increased from 75.37 to 91.23%, and improvements were observed in English writing and listening scores. Additionally, personalized teaching using the MOOC platform was found to be more effective than traditional methods.

Conversely, Cock Martínez (2022) conducted a documentary review of articles published between 2011 and 2021 in Colombia. The findings indicated a decline in motivation to learn English, attributed to the educational context being the sole environment for constructing and practicing the language. The study concluded that didactic strategies and the use of English are intrinsically linked to the enthusiasm for learning within the classroom. In Mexico, Roux et al. (2023) performed a systematic review of foreign language teaching and learning, focusing on four components: problems, theories, methodologies, and results. They advocated for increased emphasis on the instruction of academic writing and the training of foreign language educators.

While there exists a body of scientific literature on English learning strategies, there is a notable absence of an updated systematization that facilitates the identification of predominant methodological patterns. This gap may be attributed to the scarcity of studies, which hinders the recognition of emerging trends and the identification of gaps in the literature, thereby limiting the advancement of new research. Consequently, there is a pressing need to organize, describe, and systematize recent studies on this topic to furnish the educational and scientific community with a structured overview of the current state of research in the field and to elucidate the available sources (Cordero Arroyo et al., 2022; Martínez Sierra et al., 2022).

This study seeks to address the existing gap by contributing emerging data to enhance the utilization of English learning strategies. The primary objective is to identify and characterize scientific articles published between 2020 and 2024 that focus on metacognitive, cognitive, socio-emotional, and technological strategies in English learning among university students. This will be achieved through a qualitative systematic mapping to discern predominant trends in the literature. The research aims to answer the following central question: What is the scientific production on metacognitive, cognitive, socio-emotional, and technological strategies in English learning among university students published between 2020 and 2024, and what are its predominant trends according to a qualitative analysis of a systematic mapping?

2 Methods and results

2.1 Method

This study was conducted through a Systematic Mapping Study (SMS) with the objective of identifying and characterizing scientific articles published between 2020 and 2024. The focus was on metacognitive, cognitive, socio-emotional, and technological strategies in the learning of English among university students. A qualitative systematic mapping approach was employed to synthesize the selected data, thereby demonstrating the evidence, available information, and the state of the art regarding the activities and evolution of the topic (Villar and Matalonga, 2013; Estrada Carmona and Pérez Aranda, 2024; Guajardo Leal et al., 2019).

The methodological approach of the SMS in this study is qualitative, aiming to deliver a comprehensive thematic analysis, meticulous interpretation of the results, and a robust foundation for future research. SMS are particularly valuable in fields where the literature is extensive and varied, as they facilitate the efficient organization and categorization of information (Kitchenham and Charters, 2007).

While it is evident that SMS and systematic reviews exhibit common characteristics, they should not be conflated. Both methodologies share the following attributes: (a) they are scientific investigations that analyze original studies, (b) they examine production and can address specific questions, (c) they identify relevant literature, (d) they pinpoint gaps in the research, (e) they enhance understanding of a particular field, (f) they provide insights into current trends and future challenges, (g) they compile sources of information on key authors, (h) they identify journals with significant output, and (i) they offer citations beneficial for research development. However, the distinction between them lies in their data analysis objectives. This SMS has concentrated on the classification, thematic analysis, and identification of published scientific articles, but it does not encompass the comprehensive evaluation of study quality, which is a hallmark of systematic reviews (Esquer Zárate and Fernández Morales, 2020; Ferreira González et al., 2011; García-Peñalvo, 2022; Kitchenham and Charters, 2007; Sánchez-Serrano et al., 2022).

The significance of this SMS lies in its provision of a comprehensive overview of how strategies for learning English among higher education students have been addressed and studied (Salas-Rodríguez and Lara, 2020). It also presents evidence and synthesizes scientific articles from primary research to address pertinent questions (Corona and Montoya, 2018) while illustrating the trends, patterns, and actions related to the findings within these articles (Cooper, 2016).

Several scholars regard SMS as a crucial initial step in identifying research gaps and themes for innovative methodologies. It aids in determining specific research areas and in developing subsequent, more comprehensive systematic reviews (Buenaño-Fernandez et al., 2019; Taipalus, 2023).

2.1.1 Structure of systematic mapping

PRISMA is considered a guideline that was originally designed for systematic reviews and meta-analyses, but is currently a flexible tool that can adapt different types of reviews, such as systematic mappings in order to ensure clarity in the search, selection and reporting processes and that these processes are adapted to the specific needs of the studies. As adapted to this study (Moher et al., 2009; Page et al., 2021).

The formulation of a Systematic Mapping Study (SMS) utilizing the PRISMA framework generally encompasses six steps: (1) formulating research questions, (2) developing a review protocol that includes criteria for inclusion and exclusion of studies, databases, search strategies, and information sources, (3)

conducting searches across various databases and sources using search terms and connectors, (4) creating a flowchart to illustrate the identified studies, (5) extracting and evaluating data through a critical review of quality and relevance, and (6) synthesizing evidence with a list and flowchart (Page et al., 2021). Nevertheless, the methodological structure employed in this SMS was developed by integrating PRISMA to ensure transparency and clarity, particularly in the steps related to the search and selection of scientific studies, with the SMS Model of Guajardo Leal et al. (2019). This model considers three central moments in the study's development: "Moment one: Search approach," "Moment two: Development of the search protocol," and "Moment three: Processes of analysis and classification," which corresponds to the results section of this study.

In this SMS, the PRISMA framework and the model proposed by Guajardo Leal et al. (2019) were integrated into the initial four steps of PRISMA due to their analogous processes. Significant and distinct actions were subsequently undertaken in steps five and six of PRISMA to tailor the analysis and synthesis processes to align with the model's nature and the specific requirements of this SMS.

The integration and specific processes of this SMS are described below:

1 In "Moment One: Search Approach," nine questions were posed to systematically and methodically develop the SMS.
2 The four databases of interest, namely Scopus, ERIC, EBSCO, and Web of Science, were selected for conducting the searches. In "Moment two: Development of the search protocol," a flow diagram of the search protocol was developed (Figure 1), taking into account the inclusion and exclusion criteria of the studies and sources of information.
3 In the sources and four databases, the search terms and connectors "Strategies for English Class" or "Strategies for English Class in Higher Education" were exclusively employed to identify the relevant fields of interest and proceed with the study.
4 The Search Protocol Flowchart (Figure 1) was devised to illustrate the number of articles identified and those ultimately selected for further analysis.
5 A qualitative meta-synthesis was conducted by Carrillo-González et al. (2007) to integrate and synthesize findings for a more comprehensive understanding of the studies on strategies for learning English at the higher education level. This synthesis involved the analysis of four databases, resulting in the generation of figures, thematic tables, and narratives that illustrated the trends, patterns, methods, and characteristics of the studies. However, a meta-analysis employing statistical processes to assess the quality of the data, as is commonly performed in systematic reviews and those adhering to PRISMA guidelines, was not undertaken.
6 An interpretative qualitative analysis was conducted, as presented in the results section titled "Analysis of results and classification and synthesis process." This section includes tables, figures, narratives, and categories that highlight findings, under-researched areas, countries where the articles were published, authors of the most cited articles, and strategies and trends in emerging studies. However, a synthesis of evidence using a list and a PRISMA flowchart was not performed (Page et al., 2021).

2.1.1.1 Moment one: search approach

This initial moment involved posing nine questions (Dyba et al., 2007; Guajardo Leal et al., 2019; Petersen et al., 2015) that were instrumental in directing the inquiry, review, and analysis of the SMS:

1 What is the number of articles published between 2020 and 2024 concerning English learning strategies among university students?
2 In which countries have articles been published concerning English learning strategies for university students?
3 Who are the most frequently cited authors in the articles you have published regarding English learning strategies among university students?
4 What perspectives, research designs, and methodological approaches are most prevalent in the published literature addressing English learning strategies for university students?
5 Which types of instruments are most frequently employed in scholarly articles that examine English learning strategies among university students?
6 In what contexts are scholarly articles that explore English learning strategies among university students typically developed?
7 What categories of academic journals have shown interest in publishing articles that investigate English learning strategies for university students?
8 What strategies are identified in the literature as effective for enhancing English language acquisition among university students?
9 What novel research directions are suggested by the literature concerning English language learning strategies for university students?

2.1.1.2 Moment two: development of the search protocol

In this second moment, the search protocol guiding the development of this Systematic Mapping Study (SMS) was formulated and implemented, drawing upon the model proposed by Guajardo Leal et al. (2019) for the selection and analysis of scientific literature (Petersen et al., 2015). The procedural steps of the search process are illustrated in Figure 1. The databases utilized for this research included Scopus, the Education Resources Information Center (ERIC), the Elton B. Stephens Company (EBSCO), and the Web of Science (WoS).

Searches conducted in Scopus on July 20 and 21, 2024, identified three documents, and on October 14, 2024, an additional 27 documents were found, resulting in a total of 30 documents. In ERIC, on September 17, 2024, 27 documents were identified. In EBSCO, on September 19, 47 documents were identified. In WoS, on October 1, 2024, 10 documents were identified, and on October 12, an additional 29 documents were found, culminating in a total of 39 documents.

Search expressions are detailed in Table 1, which presents the individual search expressions and the corresponding results obtained from Scopus, ERIC, EBSCO, and WoS, identifying a total of 143 documents. These databases were selected based on the following quality criteria (Guajardo Leal et al., 2019): (a) the inclusion of digital tools for tracking and visualizing research studies, such as Scopus, ERIC, EBSCO, and WoS; (b) the global integration of scientific research, which necessitates access to international databases; and (c) the inclusion of peer review.

The inclusion and exclusion criteria were meticulously selected to delineate the study's scope, ensure quality and relevance, minimize bias, and facilitate reproducibility. These criteria also aimed to manage

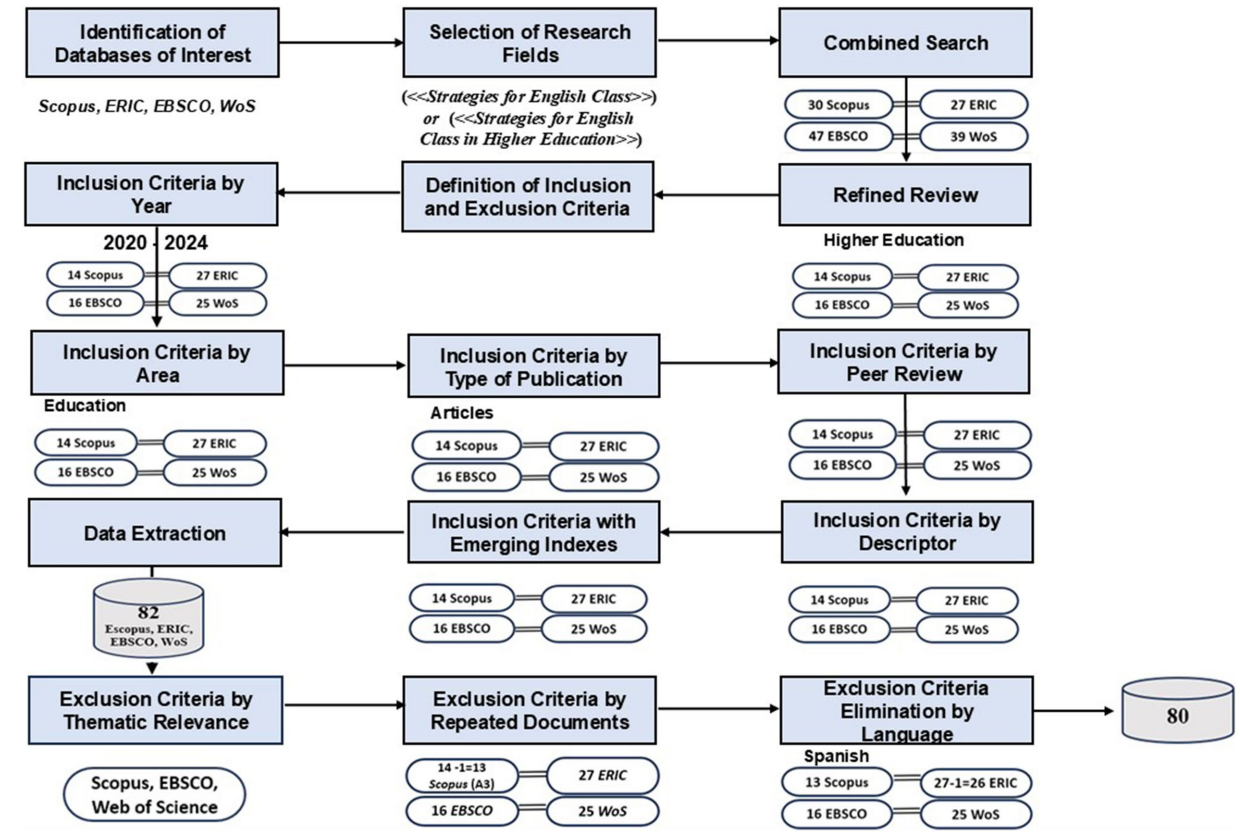


FIGURE 1
Search protocol flowchart. Figure developed by the authors based on the model of Guajardo Leal et al. (2019).

TABLE 1 Search expressions in Scopus, ERIC, EBSCO, Web of Science.

Database	Search expressions	Boolean operators	Filters applied	Articles detected
Scopus	"Strategies for English Class" "Strategies for English Class in Higher Education"	AND OR	Period: 2020–2024. Document type: Original open-access articles; theses and reviews were not considered. Language: Articles published in English. Digital tools: The academic database Scopus was used. Global integration of scientific research: Access to an international database: Scopus. Evaluation: Peer-reviewed.	30
ERIC	"Strategies for English Class" "Strategies for English Class in Higher Education"	AND OR	Period: 2020–2024. Document type: Original open-access articles; theses and reviews were not considered. Language: Articles published in English. Digital tools: The academic database Scopus was used. Global integration of scientific research: Access to an international database: Scopus. Evaluation: Peer-reviewed.	27
EBSCO	"Strategies for English Class" "Strategies for English Class in Higher Education"	AND OR	Period: 2020–2024. Document type: Original open-access articles; theses and reviews were not considered. Language: Articles published in English. Digital tools: The academic database Scopus was used. Global integration of scientific research: Access to an international database: Scopus. Evaluation: Peer-reviewed.	47
Web of Science (WoS)	"Strategies for English Class" "Strategies for English Class in Higher Education"	AND OR	Period: 2020–2024. Document type: Original open-access articles; theses and reviews were not considered. Language: Articles published in English. Digital tools: The academic database Scopus was used. Global integration of scientific research: Access to an international database: Scopus. Evaluation: Peer-reviewed.	39

Table was prepared by the authors.

the heterogeneity and variability of the studies (Ferreira González et al., 2011; Ramos-Galarza and García-Cruz, 2024). Through a systematic, artisanal, and manual analysis, which notably excluded automated tools to emphasize the researchers' meticulous approach (Rentería-Pérez et al., 2023) the analysis of the articles was refined in two distinct moments.

During the initial moment of the review, the researchers conducted a comprehensive manual analysis to extract and select data from the

four specified databases. A total of 143 articles were identified, and the complete documents were subsequently saved and organized into four matrices, with each matrix corresponding to one database. The matrices included columns for the following characteristics: article titles, authors, journals of publication, publication dates, countries of publication, number of citations, quartile rankings, methods and instruments employed, conclusions, and notable results.

In order to proceed with the analysis, the following exclusion criteria were applied: (a) articles that addressed topics of lesser interest than the proposed subject; (b) studies conducted at educational levels other than Higher Education; (c) studies situated in non-educational contexts; (d) studies that did not focus on the specified population, as the analysis was restricted to university students; (e) duplicate articles; (f) publications that were not scientific research articles; (g) articles that did not present novel trends in processes and results; and (h) articles written in languages other than English, as the analysis was limited to English-language articles from any global source. Consequently, 61 out of 143 articles were excluded, resulting in the selection of 82 articles for the analysis of results.

During the second moment of the review process, a duplicate article from Scopus was identified among the 82 articles and subsequently removed. Additionally, despite the review being restricted to articles written in English, an article in Spanish was discovered in the ERIC database and was also excluded.

Following the two moment of sequential reviews, 63 articles were excluded, resulting in the selection of 80 articles from an initial pool of 143 for the analysis of results in this SMS. Table 2 delineates the criteria for inclusion and exclusion.

2.2 Results

2.2.1 Moment three: analysis of results and classification and synthesis process

In this study, interpretative qualitative analysis is employed throughout, with a more intensive application in the third moment. This moment is further enhanced by qualitative meta-synthesis (Carrillo-González et al., 2007) which involves the synthesis, classification, analysis, and interpretation of data. Each of the 80 articles was meticulously reviewed and analyzed to extract pertinent information and address the nine questions formulated in the initial moment. During this third moment, the researchers maintained a systematic, artisanal, and manual approach to analysis to ensure comprehensive results for this SMS, utilizing Microsoft Excel for the creation of figures.

Below are the questions with their respective answers.

What is the number of articles published between 2020 and 2024 concerning English learning strategies among university students?

Between 2020 and 2024, a total of 80 articles on English learning strategies were published. Based on the analyses and the established inclusion and exclusion criteria, the following articles were selected for extraction, analysis, and classification of results: 13 articles from Scopus, 26 from ERIC, 16 from EBSCO, and 25 from WoS.

1 In which countries have scholarly articles been published concerning English language learning strategies for university students?

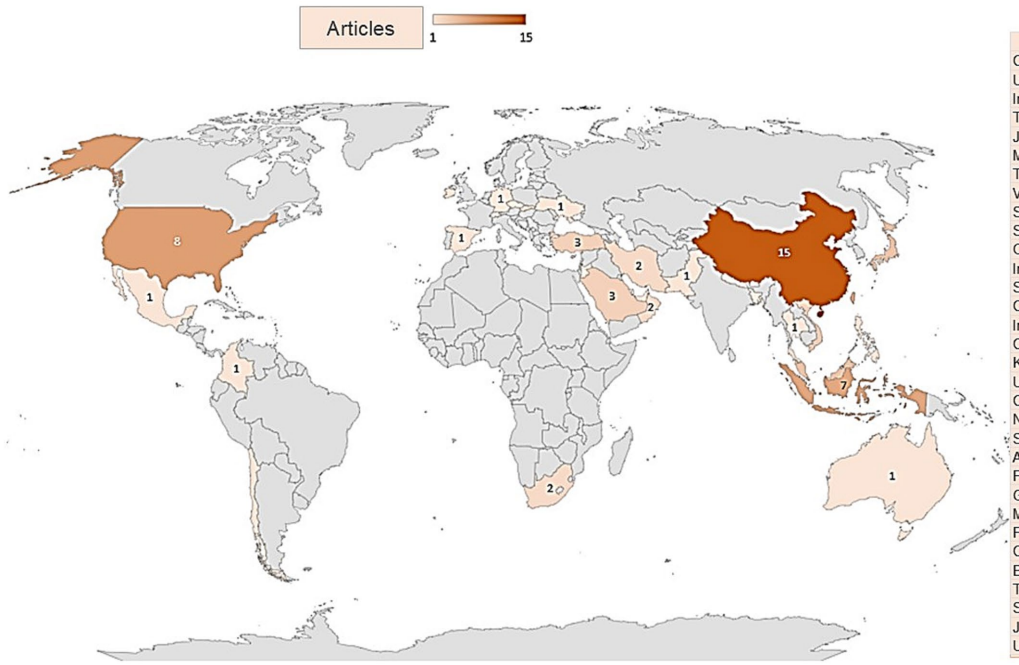
Research on English language learning strategies for university students has been disseminated across 32 countries. Figure 2 illustrates the frequency and geographical distribution of the 80 articles published. Notably, China leads in the number of publications, followed by the United States, with other countries contributing in descending order. Presently, there is an increasing emphasis on English language acquisition among university students globally, driven by factors such as international competitiveness, technological advancement, scientific engagement, and student exchange programs, among others (UNESCO, 2022).

Asian universities are at the forefront in offering English language teaching courses. As illustrated in Figure 2, Asia leads in

TABLE 2 Results of the inclusion and exclusion criteria.

Criteria	Scopus		ERIC		EBSCO		WoS	
	S	R	S	R	S	R	S	R
Inclusion								
Year	From 2020 to 2024	30	From 2020 to 2024	27	From 2020 to 2024	47	From 2020 to 2024	39
Area	Education	14	Education	27	Education	16	Education	25
Type of publication	Article	14	Article	27	Article	16	Article	25
Peer review	Yes	14	Yes	27	Yes	16	Yes	25
Emerging indices (EI)	(EI)	14	(EI)	27	(EI)	16	(EI)	25
Descriptor: Strategies for English Classes in Higher Education (SECHE)	SECHE	14	SECHE	27	SECHE	16	SECHE	25
Exclusion								
Thematic relevance		14		27		16		25
Repeated documents		13		27		16		25
Spanish language	English	13	English	26	English	16	English	25
Total: 80 Items selected for analysis								

Table was prepared by the authors. S = Selection, R = Results.



Countries	Articles
China	15
United States	8
Indonesia	7
Taiwan	5
Japan	4
Malasia	4
Turkey	3
Vietnam	3
Saudi Arabia	3
South Africa	2
Oman	2
Iran	2
Slovakia	2
Chile	1
Ireland	1
Czech Republic	1
Kingdom of Bahrain	1
Ukraine	1
Cisjordania	1
Nepal	1
Switzerland	1
Australia	1
Philippines	1
Germany	1
Mexico	1
Pakistan	1
Colombia	1
Bangladesh	1
Thailand	1
Spain	1
Jordan	1
United Arab Emirate	1

FIGURE 2
Countries where the studies were published. Figure was prepared by the authors.

the publication of articles on English learning strategies, with contributions from 11 countries. Notably, China and Japan have enacted national policies to promote English as a pivotal language for the internationalization of higher education. Additionally, Malaysia provides programs incorporating English learning strategies, thereby reinforcing its status as a significant global educational hub.

Chile, Colombia, Mexico, and other Latin American countries are listed among publishers with a lower proportion of international publications. However, these nations are actively working to enhance their international and intercultural competencies through improved English proficiency. The acquisition of English is crucial in non-Anglophone countries, as it is considered a language of the future. Its usage and mastery in academic contexts serve as indicators of the internationalization of universities worldwide (Solís Navarro and González Bello, 2023).

For many years, the United States has been a leader in the production of English-language articles and international research. Its academic infrastructure, encompassing universities and research centers, is highly advanced. This is largely driven by the significant demand for English, which encourages the exploration and promotion of innovative strategies in English studies, utilizing technological and didactic resources (Crystal, 2003).

2 Which authors are most frequently cited in the articles you have published concerning English learning strategies among university students?

Among the 80 articles reviewed, six authors emerged as the most frequently cited. These authors are recognized for their contributions to the field of English learning strategies. Through an analysis of their work, significant trends, research trajectories, and methodological approaches pertinent to this systematic mapping study (SMS) were identified. Their inclusion in this study is justified by the relevance of their scientific contributions, which serve as essential references for future research in this domain, thereby enhancing the study's credibility and scientific rigor.

- With 32 citations
- Rubena Trigueros, José Aguilar-Parra, Remedios Lopez-Liria, Adolfo Cangas, Jerónimo González y Joaquín Álvarez (2020, A13, *S*), of the article "The role of perception of support in the classroom on the students' motivation and emotions: The impact on metacognition strategies and academic performance in math and English classes."
- With 26 citations
- Khalid Mohiuddin, Mohammad Islam, Sharif Aminul, Nur Mansoor, Talukder Shakila, Shahrear Md y Mohammed Alghobiri (2021, A64, *WoS*), of the article "Inequalities reinforced through online and distance education in the age of COVID-19: The case of higher education in Nepal."
- Ritesh Chugh y Darren Turnbull (2023, A58, *WoS*), of the article, "Gamification in education: A citation network analysis using CitNetExplorer."
- With 16 citations
- John Walsh y Angelica Risquez (2020, A70, *WoS*), of the article "Using cluster analysis to explore the engagement with a flipped classroom of native and non-native English-speaking management students."
- With 15 citations
- Yu Sun, Tzu-Hua Wang y Li-Fe Wang (2021, A9, *S*), of the article "Implementation of Web-based dynamic assessments as sustainable educational technique for enhancing reading strategies in English class during the covid-19 pandemic."

- Diana Erlina, Lennya Marzulina, Kasinyoa Harto, Muhamada Holandyah, Indraa Sukamti, Akhmadb Habibi, Nunungb Fajaryani y Amirul Mukminin (2021, A10, *S*), of the article "Challenges and coping strategies in teaching English to large classes: The case of non-English-speaking."

3 What perspectives, research designs, and methodological approaches are predominantly employed in scholarly articles that examine English learning strategies among university students?

Figure 3 illustrates the predominant perspectives, designs, and methodological approaches employed in the 80 articles analyzed. This figure was developed using the perspective classification scheme model, the methodological designs of Creswell (2014), Denzin (2018) and Patton (2015), as well as de Hurtado Barrera (2010) classification of research approaches, which was also utilized by Guajardo Leal et al. (2019).

In addressing question four, it was imperative to identify the prevailing perspectives, designs, and methodological approaches within the domain of English learning strategies as utilized in the articles. This process ensured a critical comprehension of the current state of research in the field, facilitated an exploration of the diverse methodological approaches, and enabled an assessment of the scientific rigor and reliability of the studies. The identified perspectives, designs, and methodological approaches serve as a predominant framework for guiding future research endeavors.

The concept of "intervention" as a methodological design warrants attention. It is a well-established approach in experimental and quasi-experimental studies within the quantitative research paradigm, as it facilitates the measurement of effects, enables comparisons, and allows for the establishment of causal relationships in a controlled manner. The complexity arises in the design process, specifically in determining which variables can be controlled and how the results can be interpreted. For instance, assessing the impact of a strategy on English language learning may be influenced by various external factors, necessitating careful control and measurement (Creswell, 2014; McMillan and Schumacher, 2014).

The methodological design of a platform incorporating a metaverse within a mixed-method study on English learning strategies is noteworthy. This design encompasses technological, cognitive, and socio-emotional strategies, facilitating the exploration of novel modalities for teaching and learning English in immersive environments. Such environments promote collaboration between students and teachers in virtual spaces and enable the personalization of learning according to each student's pace and style. Immersive environments have the potential to enhance student motivation, participation, and interest. However, a significant challenge is the lack of access to necessary technology for all individuals, and the potential need for training to effectively utilize the platform (Anacona Ortiz et al., 2019).

The application of a qualitative perspective through netnography is noteworthy, as it facilitates the exploration of student interaction and learning within virtual communities, forums, digital platforms, and social networks, without the need for questionnaires or interviews. This approach allows for the evaluation of online conversations and behaviors without researcher influence, and it enables the analysis of the evolution of learning strategies in digital and collaborative environments. However, it is important to acknowledge that information may be altered or deleted, and the authenticity of participants and the meaning of their comments cannot always be verified (Kozinets, 2017).

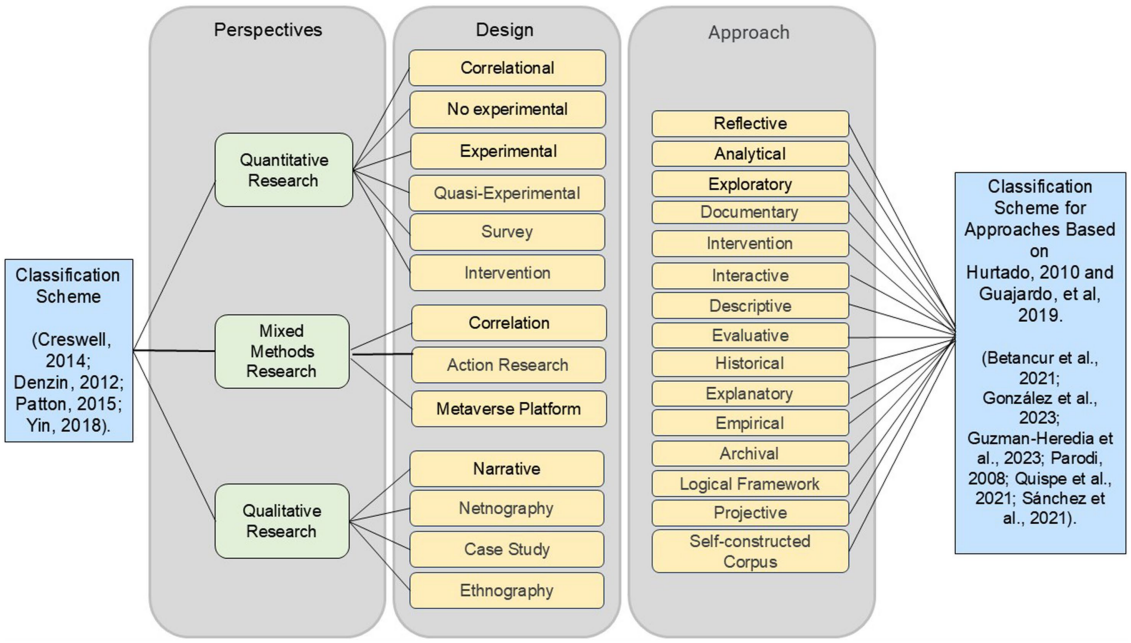


FIGURE 3
Most commonly used perspectives, designs and approaches. Figure developed by the authors based on the model of Guajardo Leal et al. (2019).

4 Which instruments are predominantly utilized in scholarly articles that examine English learning strategies among university students?

Figure 4 illustrates the most frequently employed types of instruments, highlighting the questionnaire, observation, documentary analysis, interview, review, pre-survey, and post-survey, among others. The selection of instruments in a study is crucial for ensuring the reliability of the results. In this systematic mapping study (SMS), it was possible to identify articles utilizing instruments with advanced and less commonly known technological structures and tools, such as writing performance tests, reflective diaries, the self-constructed corpus method, Big Data technology, and data recording. Additionally, narrative inquiry, platforms incorporating the metaverse, and public speaking tests were identified as potentially beneficial for future research. The study also uncovered patterns in authors' preferences and the development of methodological practices in fieldwork. A detailed description of these instruments will enable other researchers to replicate the studies with consistency.

5 In which contexts are the published articles that examine English learning strategies among university students developed?

The studies are conducted within higher education institutions, primarily universities, located in the countries identified in Figure 2.

The context was delineated in this SMS from the primary research question to facilitate a more efficient examination within a pre-established setting, such as universities. English language learning strategies in higher education have advanced through the integration of communicative approaches and digital technologies. Therefore, it is crucial to develop strategies that effectively integrate traditional teaching methods with digital tools and student-centered approaches (Juárez Díaz and Hernández, 2022).

6 Which types of academic journals have shown an interest in publishing articles that explore learning strategies?

Journals interested in publishing articles on learning strategies span Quartiles 1 to 4. These high-impact journals, characterized by rigorous peer review processes, ensure that their published articles adhere to high standards of scientific quality. Analyzing these journals in this SMS enabled us to identify the current approach to English learning strategies and facilitated an understanding of their trends.

Conversely, the characteristics of the journals offer a comprehensive understanding of the academic landscape concerning English learning strategies. Esteemed and influential authors have shaped this academic domain by proposing strategies that emphasize social interaction, contextual language use, motivation, and learner autonomy. Krashen (1982), through his immersion-based approach and theory of second language acquisition, underscored the significance of comprehensible input, motivation, and the reduction of the affective filter to facilitate English acquisition. Similarly, Vygotsky (1980), through his sociocultural theory of learning, emphasized the role of social interaction in language acquisition, suggesting that students learn more effectively when guided by someone with greater expertise. Likewise, Nunan (1989) advocated for the communicative approach in teaching, emphasizing that English learning should focus on practicing the language in its context rather than solely on grammatical structures. Oxford (1990) also contributed to the field by classifying language learning strategies into cognitive, metacognitive, affective, and social categories, which aid students in becoming aware of their own English learning processes.

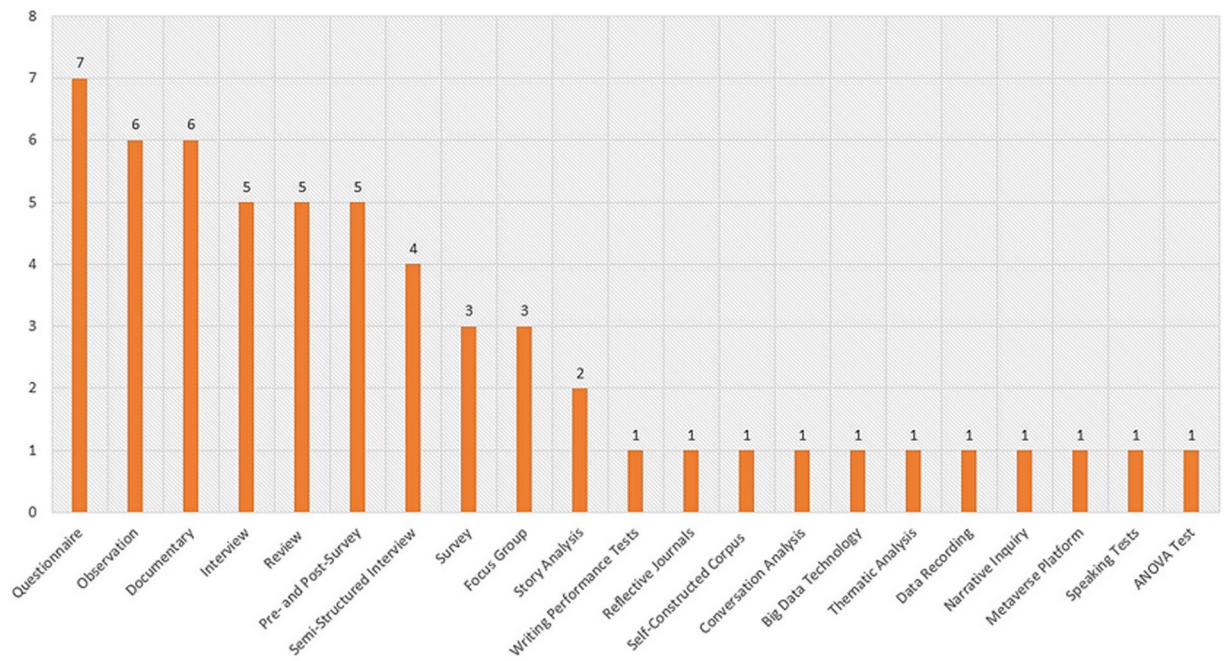


FIGURE 4
Most used instruments. Figure was prepared by the authors.

The journals identified and their presentation in this SMS are detailed as follows: Within the parentheses, the Impact Factor, the H-Index, the frequency of publication, and the databases are specified. Journals with high impact factors and quartiles are more esteemed and prestigious within their respective fields; publishing in such journals could enhance the visibility and credibility of a study.

Some journals that are not specified in a quartile may not be indexed on certain platforms due to their focus on highly specialized areas. At the time of this systematic mapping study (SMS), these journals may not have been assigned an impact factor or indexed in databases such as the Journal Citation Reports, Scimago Journal and Country Rank, or Resurchify. Additional reasons for their exclusion may include their status as lesser-known transdisciplinary studies, their focus on fields such as alternative education, regional studies, or innovative methodologies, or their affiliation with universities lacking indexing in databases like Scopus or Web of Science (WoS). Furthermore, these journals may be underrepresented in bibliometric rankings due to their methodologies, or they may be new publications undergoing the indexing process or failing to meet indexing criteria. Despite a low citation rate and absence from quartile rankings, these journals can possess significant scientific value within their respective specialties.

Quartile 1

Applied Mathematics and Nonlinear Sciences (0.95-23-1-*Scopus*), *Computer-Assisted language Learning Electronic Journal* (n/e-n/e-1-*Scopus*), Sustainability (3.251-169-1-*Scopus*), *Studies in English language and education* (1.57-8-1-*Scopus*), *Journal of Economic Perspectives* (8.43-213-4-*Ebsco*), *Journal of Ethnic and Cultural Studies* (n/e-11-1-*Ebsco*), *Daedalus* (2.88-65-1-*Ebsco*), *Education and Information Technologies* (7.65-61-1-*WoS*), *Higher education* (n/e-127-1-*WoS*), *International Review of Education* (2.45-46-1-*WoS*), *International Journal of Management Education* (6.0-53-1-*WoS*), *Language Testing in Asia* (3.10-19-1-*WoS*), *Australasian Journal of Educational Technology* (4.1-61-1-WoS), *Education and Information Technologies* (7.65-61-1-*WoS*), *BMC Medical Education* (3.08-97-1-*WoS*).

Quartile 2

MEXTESOL Journal (0.42-6-1-*Scopus*), *Journal of University Teaching and Learning Practice* (2.50-22-1-*Scopus*), *Frontiers in Psychology* (2.89-184-2-*Scopus*), *Wireless communications and mobile computing* (1.67-81-1-*Scopus*), *Education Sciences* (3.48-53-1-*WoS*), *Contemporary Educational Technology* (3.95-20-1-*WoS*), *Journal of Education and Health Promotion* (162-24-1-*WoS*), *Journal of Language and Education* (1.03-8-1-*WoS*), *Education Science* (n/e-53-1-*WoS*), *Advanced education* (n/e-28-1-*WoS*), *International Journal of Emerging Technologies in Learning* (2.33-46-3-*WoS*), *Frontiers in Education* (2.43-40-1-*WoS*), *Education Science* (3.48-53-2-WoS), *Cogent Education* (2.32-36-1-*WoS*).

Quartile 3

Theory and Practice in Language Studies (n/e-19-1-*Scopus*), *Journal of Teaching English for Specific and Academic Purposes* (0.71-5-1-*WoS*), *REDU Revista de Docencia Universitaria* (0.7-n/e-1-*WoS*), *Education Research International* (1.66-18-1-*WoS*), *Problems of Education in the 21st Century* (n/e-11-1-*WoS*).

Quartile 4

Forum for Linguistic Studies (0.20-2-1-*Scopus*), *In Esse: English Studies in Albania* (0.00-2-1-*Scopus*), *The Radical Teacher* (0.26-5-1-*Esbco*).

Not specified (n/s)

English Language Teaching Educational Journal (*ELTEJ*) (n/e-n/e-1-*Scopus*), *Canadian Center of Science and Education*. *English Language Teaching* (n/e-112-25, *Eric*), *The Writing Center Journal* (n/e-n/e-9-*Ebsco*).

7 What strategies are identified in peer-reviewed literature as effective for enhancing English language acquisition among university students?

The strategies for learning English employed by university students, as identified in the literature, are categorized into five descriptive groups: the utilization of technology, the promotion of strategies, the employment of didactic resources, the adoption of approaches, and the engagement in practical activities. These categories were derived inductively to effectively summarize and organize the data (Vives Varela and Hamui Sutton, 2021).

The strategies identified are of fundamental importance as they represent the current state of English language learning strategies, highlighting both the advancements and the gaps in the reviewed literature. Furthermore, they uncover underexplored aspects or areas in development, thereby directing attention toward new research questions and methodologies. The cognitive (CS), metacognitive (MCS), socio-emotional (SES), and technological (TS) strategies for English language learning identified correspond to each strategy detected in the articles. The identification of recurring themes, areas of interest, and predominant focuses within these categories ensures a level of academic and scientific rigor in this systematic mapping study (SMS).

Use of technology

- TS: Employ tools such as video conferencing and chat platforms to enhance student engagement and academic performance.
- TS: Integrate educational technologies, including augmented reality and artificial intelligence.

Promotion of strategies

- SES: Formulate strategies for internationalization to sustain and enhance global networks.
- MCS: Encourage the use of self-regulated learning strategies and self-assessment.

Use of teaching resources

- In the context of Computer Science (CS) and Socioeconomic Status (SES), it is essential to develop teaching materials that are both accessible and engaging. This includes the creation of interactive activities and games designed for large student cohorts, ensuring uniform progression among all participants.

Using Approaches

- CS: Implement pedagogical strategies that emphasize the active production of English language skills.
- CS and SES: Employ corpus analysis to identify and rectify errors in the usage of frequently utilized verbs.
- TS and CS: Utilize the Flipgrid online platform to foster the practice of speaking and interaction.
- CS and CES: Apply the reading circle method to enhance student autonomy and develop reading comprehension skills.

- TS, CS and SES: Utilize metaverse-based platforms for flipped learning and the creation of engaging educational experiences (Laurens-Arredondo, 2024).

Use of hands-on activities

- CS: Incorporate narrative forms, poetry, novels, and theatrical works into the curriculum to enhance language proficiency.
- TS, CS: Develop projects utilizing innovative visual media to facilitate the interpretation of English texts.

8 What novel research trajectories can be identified from the analysis of published and peer-reviewed articles concerning English language learning strategies among university students?

The newly identified research trajectories, as delineated in the published studies, are categorized into four descriptive domains (Vives Varela and Hamui Sutton, 2021). These trajectories signify the progression of knowledge within the field, offer avenues for future investigation, and highlight the focal points of scientific inquiry. They are associated with cognitive (CS), metacognitive (MCS), socio-emotional (SES), and technological (TS) strategies, as detailed below:

Technology in English Teaching

- TS: Assess the application of Big Data in developing systems that tailor English content and instructional strategies to align with students' realities (Laurens-Arredondo, 2024).
- TS: Examine the efficacy of technologies such as augmented reality, artificial intelligence, and virtual learning platforms in enhancing academic objectives.

Strategy Research

- CS and MCS: To evaluate the efficacy of interactive intervention strategies compared to traditional methods in enhancing scientific English speaking and writing skills.
- CS: To examine the interactivity and effectiveness of pragmatic strategies in English feedback.
- MCS: To assess the effectiveness of self-regulated learning strategies among remote English learners.

Investigation of methods, models and approaches

- CS: Employ convolutional neural networks to enhance English language instruction within flipped classroom settings.
- CS and TS: Use the matrix model for teaching English presentation skills in a virtual format.
- CS and MCS: Implement the reading circle method in student autonomy and academic performance.
- CS: Adapt the neurodidactic model in English classes in Higher Education.

Trends in English Teaching

- SES: Identify the factors contributing to anxiety among students in communicative and scientific English classes.
- CS and SES: Assess the academic performance of English learners to demonstrate the consistency of enjoyment in English classes across varying proficiency levels.
- SES, MCS, and CS: Analyze the impact of motivation and self-efficacy on the effectiveness of English reading comprehension activities.

3 Discussion

Despite the evident and increasing interest in English learning strategies at the higher education level, a comprehensive and updated systematization of scientific article production on this topic has not been observed in recent years. The absence of systematic and structured reviews may impede the identification of predominant methodological trends and research gaps, potentially hindering the development of innovative studies on cognitive, metacognitive, socio-emotional, and technological strategies in the acquisition of English as a second language among university students. According to the evidence and analysis presented in this SMS, studies on this subject are scarce globally, as there remains a lack of consensus on the necessity for students to engage in English during their university tenure and subsequently perform high-level tasks with bilingual skills in international contexts (Beltrán, 2017; Donoso Cedeño et al., 2023). This underscores the importance of conducting this SMS, given the challenges universities face in English language learning (Capocasale Bruno, 2023). Kitchenham and Charters (2007) noted that if a study reveals limited empirical evidence on a subject or if the field is too broad for analysis, an SMS is appropriate as it provides exhaustive evidence and is designed to offer updated information across various research areas.

In this context, an effort was made to identify and characterize scientific articles published between 2020 and 2024 on metacognitive, cognitive, socio-emotional, and technological strategies in English learning among university students through a qualitative systematic mapping. This was undertaken to recognize predominant trends in the literature, employing a process of qualitative analysis and meta-synthesis. A total of 80 articles were highlighted, selected, and analyzed based on abstracts and content, providing sufficient information to comprehend the current state of research in this area (García-Peñalvo, 2022) across Scopus, ERIC, EBSCO, and Web of Science. The study is presented not as a systematic review but as an SMS with broad analytical coverage (Petersen et al., 2015).

In this analysis, evidence was gathered from various perspectives. Upon classifying the information, it was observed that numerous studies do not specifically address English teaching strategies in higher education. Instead, they focus on disparate situations and contexts, often with more specific interests, which leads to confusion. This confusion arises from the increasing demand among students to learn English, contrasted with the lack of proportional growth in the production of studies on this topic (Juárez Díaz and Hernández, 2022). This is evident in the results from the four databases, where only 80 articles were identified, despite the vast amount of global information available. The teaching and learning processes of English have historically held significant importance and are currently even more critical due to the internationalization of the language and the trend toward globalization (Cruz Rizo et al., 2021; Rumbley et al., 2023), as well as its use in the scientific community.

The study revealed two significant findings: (a) there is a lack of systematic mapping regarding strategies for learning English among university students, despite the presence of notable trends and evidence, and (b) many Hispanic countries do not emphasize research on strategies that aid in English acquisition, nor do they publish articles in English. Only Colombia and Chile were identified as having English-language publications. This indicates that the lack of English proficiency may discourage researchers from writing and publishing their research in English (Solís Navarro and González Bello, 2023). However, other factors may also play a role, such as (1) linguistic hegemony, which involves the dominance of one language over others in terms of prestige, global usage, and access to resources. English, for example, has become the dominant language for science, technology, education, and international communication, with many high-impact journals publishing exclusively in English. This could create barriers for researchers who prefer to publish in other languages (Balsa, 2020); (2) linguistic processes, which include the knowledge of English and the use of phonology, syntax, lexicon, and semantics, while communicative competence involves understanding the rules of the language and its connection to cultural and social contexts (Guevara-Betancourt, 2019); (3) research funding, as seen in Mexico, where public and private funding significantly influences national scientific output. In one study, 68.13% of publications funded by Conacyt were inaccessible to most Mexicans due to being published in restricted access journals, thereby impeding researchers' progress (Ugarte and Parra, 2021), among other factors.

Sukying (2021) demonstrated a direct correlation between the employment of learning strategies and students' proficiency in English. Furthermore, Klimova et al. (2023) advocated for experimental studies involving English courses to substantiate their internalization and efficacy. In this context, it is imperative for university students to employ teaching-learning strategies to fulfill their interaction and developmental needs within society. It is advisable to implement suitable resources, feedback, and individualized tutorials to enable students to independently eliminate deficiencies in their understanding of English grammatical rules, thereby enhancing their self-efficacy and self-regulation skills in academic activities (Beltrán, 2017; Donoso Cedeño et al., 2023; Petersen et al., 2015; Sun et al., 2024).

To enhance individualized English language learning feedback, universities should establish programs that integrate technological strategies utilizing Generative Artificial Intelligence (GenAI). Lo et al. (2025) observed that statistical correlations in their study indicated that participants receiving feedback via GenAI exhibited improved scores compared to the control group. Specifically, GenAI-generated feedback enhanced writing scores and essay quality, as students receiving such feedback outperformed those receiving teacher feedback or no feedback. For instance, feedback based on Large Language Models (LLM), such as ChatGPT 3.5, positively influences test scores by providing specific and effective feedback, evaluating data against quality criteria, and offering practical suggestions to enhance students' autonomous and self-regulated learning, language performance, and self-efficacy in scientific writing proficiency. In the realm of academic and scientific writing, as well as self-regulated learning, GenAI offers advanced tools that foster idea development and continuous improvement in written production. It facilitates iterative writing by enabling students and scholars to generate drafts, receive immediate feedback, and make successive revisions, thereby reducing editing time, improving writing clarity through style corrections, and allowing for the logical and persuasive structuring of arguments. In self-regulated learning, GenAI serves as an active tool that encourages students to engage actively in their learning process by exploring ideas through guided questions or AI-generated suggestions, providing relevant examples and references independently of a teacher, and promoting collaboration by fostering critical thinking and team writing. Academic and scientific writing involves not only text production but also reflection on the process, and GenAI enhances linguistic self-awareness and argument coherence review. Although it does not replace critical thinking and human creativity, it efficiently augments the writing process. GenAI has evolved beyond mere grammar and spelling correction, becoming a catalyst for deeper engagement with writing, peer review, and formative feedback.

In order to cultivate cognitive and metacognitive strategies, universities should consider implementing maker education and design thinking as pedagogical approaches that foster practical autonomy, collaboration, innovation, creativity, and exploration in the context of learning English. Students engage in the creation of interactive games in English, such as board games, applications, and augmented reality experiences, to enhance grammar and vocabulary, thereby reinforcing language skills while designing immersive experiences. Additionally, they can design, construct, and participate in facilitating situations and events to acquire a new language and enhance critical thinking. Both strategies involve active cognitive processes, self-direction, and self-regulation. The principles of maker education, including hands-on projects, collaborative problem-solving, and interdisciplinary integration, can be adapted to English language acquisition, particularly to develop communicative, academic, and digital literacies (Lo, 2024). Rather than relying solely on textbooks or theoretical classes, students would learn by utilizing and creating technological, didactic, electronic, and other tools. Cognitive strategies facilitate the processing and storage of information, and through the maker approach and design thinking, students can learn vocabulary and grammar by creating interactive games or manipulative materials, such as cards, models, or applications; perfect pronunciation by constructing electronic devices that reproduce English words or designing, for instance, a karaoke of phrases and keywords; and apply English in real-world projects, such as writing scientific papers or articles in English. Metacognitive strategies enable learners to reflect on their self-directed English learning and adapt it to their needs. With the maker approach and design thinking, they can self-evaluate and correct their mistakes, for example, by recording their conversations in English and adjusting their pronunciation; they can set goals such as designing a prototype with instructions in English; learn autonomously and create meaningful and motivating project-based learning plans.

Conversely, to enhance students' socioemotional strategies, universities should adopt the versatile approach of gamification. According to Chan and Lo (2024), recent findings expand the understanding of gamification, demonstrating its applicability beyond English vocabulary enhancement to encompass a broad spectrum of linguistic domains, including grammar, listening comprehension, speaking, reading, writing, and pronunciation, among others. This versatility is exemplified by its integration with flipped classroom and ubiquitous learning environments. In the inverted classroom model, students engage in self-directed learning activities both prior to and during classes, such as the application, analysis, and evaluation of learned material. Ubiquitous learning environments, which utilize digital technologies to facilitate educational experiences, enable

students to practice English listening and speaking skills using mobile devices and platforms like YouTube. Online games promote virtual communication with other players, fostering a self-learning community and enhancing socioemotional resilience. In this sense, game elements can foster more engaging and interactive English learning environments, providing support in both traditional and online educational settings. The same authors highlight that gamification's role in English proficiency positively influences students' attitudes and emotional engagement, creating an immersive language learning environment. It enhances behavior, socialization, participation, and motivation while alleviating the linguistic anxiety associated with learning a foreign language. Activities such as playing video games and listening to music were identified as particularly enjoyable in English classes, underscoring the importance of optimizing students' positive emotions, which significantly contribute to their socioemotional wellbeing and the effectiveness of foreign language proficiency. Although gamification is well-received in higher education, its implementation may face challenges due to the constraints of tight class schedules when incorporating games into the curriculum.

This study acknowledges several limitations, including: (a) the validity and credibility (Villar and Matalonga, 2013) of certain articles, which fail to clearly delineate their methodological perspectives or paradigms as qualitative, quantitative, or mixed; instead, some authors merely describe their techniques or instruments; (b) the variability in the number of citations of the reviewed articles over time, which implies that citation information available today may differ in the future; (c) the potential for formulating additional review and analysis questions. For instance, in the initial phase, questions such as: What studies focus exclusively on English teaching and learning strategies between 2021 and 2025? could be incorporated, contingent upon the temporal and spatial framework proposed in their delimitations; What are the profiles of the authors? aimed at identifying the professional, scientific, and academic profiles of the most influential authors in specific knowledge domains; What types of references were utilized in the articles? to discern trends in analysis and processes of the most frequently cited articles that significantly contribute to the relevant academic community; What are the recommendations for each article? to identify gaps and future methodological directions in subsequent studies; (d) the limitation of the search to articles in English, suggesting that future studies could also consider and select articles published in languages other than English, such as Portuguese, Spanish, and other European and Asian languages; and (e) the specification of English learning strategies, with future articles potentially analyzing research focused solely on particular strategies, such as technological ones, many of which remain unexplored, for instance, the utilization of Generative AI, such as Talkpal, facilitates dynamic and interactive dialogues alongside personalized feedback. Similarly, Coursebox AI offers interactive lessons that incorporate quizzes, while Memrise AI provides resources for teaching English through authentic sentences and everyday scenarios. Additionally, Artificial Intelligence tools like Kahoot! AI are capable of generating trivia questions by tailoring quizzes to the student's proficiency level, and Labster creates simulations of virtual science experiments with immediate feedback, among others.

4 Conclusion

The research problem and objective guided the study by delineating the processes with scientific rigor. The study aimed to address the problem by identifying and characterizing scientific articles published between 2020 and 2024 concerning metacognitive, cognitive, socio-emotional, and technological strategies in the learning of English among university students. This was achieved through a qualitative systematic mapping. To this end, the initial four steps of the PRISMA framework and the three methodological moments of Guajardo Leal et al. (2019) model were integrated: 1. Search approach, 2. Development of the search protocol, and 3. Analysis of results and classification and synthesis process, which formed the foundation of the systematic mapping study (SMS). In the first moment, nine questions were formulated; in the second moment, the search protocol was developed, resulting in the selection of 80 articles based on quality, inclusion, and exclusion criteria. In the third moment, the questions were systematically, orderly, and categorically addressed in tables and figures to demonstrate the evidence and significance of the topic.

The findings indicate that (1) 80 articles addressing the construct were published between 2020 and 2024; (2) China and the United States lead in the production and publication of these articles; (3) the most frequently cited author has received 32 citations, as recorded in Scopus, while the subsequent five most cited authors have garnered between 15 and 26 citations, as documented in both WoS and Scopus; (4) the methodological approaches and designs predominantly include quantitative (experimental), mixed (correlational), and qualitative (netnography, ethnography) research, as well as interactive, analytical, exploratory, historical, and empirical studies, among others; (5) the most commonly employed instruments were questionnaires, observations, documentary analyses, interviews, reviews, and pre- and post-surveys, among others; (6) the studies were primarily conducted within university settings; (7) the journals interested in publishing on the construct span all four quartiles, reflecting its relevance, quality, and impact; (8) a notable technological strategy that emerged involved the use of technologies incorporating augmented reality and artificial intelligence; and (9) among the research lines, there is a focus on determining the effectiveness of self-regulated learning strategies in remote English learners, particularly involving metacognitive strategies.

Consequently, it is concluded that: (a) the acquisition and internalization of English, beyond being a linguistic skill, is a crucial tool for facilitating coexistence, interaction, research experiences, and addressing the professional challenges faced by university students who are increasingly engaging in international contexts; (b) there is a need to reconsider proposals aimed at enhancing the strategies employed by educators to improve global English proficiency assessments and statistics; and (c) strategies for fostering interaction, scientific article writing, and scientific dialogue in English among students from various universities should be evaluated.

In light of the critical role of English proficiency in higher education, it is recommended to conduct new research on the construct using SMS and systematic reviews. Additionally, evaluations of the design and implementation of strategies aimed at enhancing the competence in writing and publishing scientific articles in English are suggested. Furthermore, the utilization of social networks and educational platforms for the collective learning of scientific and communicative English should be explored.

In light of the critical role of English proficiency in higher education, it is recommended to conduct new research on the construct using SMS and systematic reviews. Additionally, evaluations of the design and implementation of strategies aimed at enhancing the competence in writing and publishing scientific articles in English are suggested. Furthermore, the utilization of social networks and

educational platforms for the collective learning of scientific and communicative English should be explored.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

Author contributions

NS-Z: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Writing – original draft, Writing – review & editing. DM-A: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

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