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ESL strategies: bibliometric analysis through scientific mapping in WoS and Scopus

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Resumen

Los estudiantes de idiomas han aumentado su interés en explorar las estrategias de aprendizaje que utilizan para aprender más rápido y mejor un idioma. En algunos casos, el aprendizaje provoca traumas, y no saber cómo controlar la ansiedad, motivarse y mantener el ritmo puede ser abrumador. En esta revisión, se examinaron las estrategias más utilizadas en el aprendizaje de idiomas. Los artículos revisados fueron desde el año 2000 hasta el 2022 en Scopus y WoS. La metodología fue el análisis bibliométrico. La revisión encontró que los estudiantes utilizan estrategias de aprendizaje según su nivel de lengua y las habilidades que tratan de dominar. Deberían realizarse más estudios sobre este tema para aplicar estrategias comunes y útiles en las clases.

Palabras clave: enseñanza de idiomas, educación bilingüe, lenguas extranjeras, lenguas internacionales.

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Abstract

The field of language learning strategies has seen a growing interest in students who tend to recall them to learn a language faster and more effectively. In some cases, learning a language causes traumas, and not knowing how to control anxiety, follow motivation, and keep up with the task can be overwhelming. This review examines the most frequently used strategies in language learning. The articles reviewed were from 2000 until 2022 across two databases: Scopus and WoS. The methodology used was bibliometric analysis. The review found that students use their language learning strategies according to their language level and the skills they try to master. More studies should cover this area to apply common and useful strategies in regular classes.

Keywords: language teaching, Bilingual education, Foreign languages, International languages.

INTRODUCCIÓN

Language learning strategies are crucial for learning English as a foreign language (EFL) (Leba et al., 2021). The field of language learning strategies has grown significantly and experienced many twists and turns over the years (Thomas et al., 2021). The need to investigate writing strategies used in different socio-cultural contexts has been suggested as one of the primary themes in L2 writing research (Hosseinpur & Kazemi, 2022). Not knowing how to control the anxiety of learning a language may be harmful so educators must emphasize a variety of different learning strategies, depending on the speaking anxiety level of their students (Munchen et al., 2021).

This analysis aims to go deeper into the language learning strategies used in virtual environments. According to Malpartida et al. (2021), who recall Alhaysony (2017); Taheri et al., (2020), 'other studies show that language learning strategies and English proficiency have been mainly researched in face-to-face higher education settings.' Mizhe et al. (2021), identified several study limitations—uneven regional studies, insufficient research samples, single research methods, and lack of theoretical paradigms in training learning strategies. As stated by Almusharraf et al. (2021), there is a need to identify the relationship between learner characteristics and reported levels of language learning strategies and examine the influence on learning that self-efficacy, instrumental motivation, effort and persistence, and the preferences to analyze the language learning strategies needed.



Educators need to look for the most suitable teaching method in the current learning environment through the identification of the language learning strategies (LLS) which are conscious behaviors used by language learners to foster the acquisition, storage, and use of new information; although there have been several reviews of the field's output, few have targeted research in a specific context (Thomas et al., 2021). Motivational strategies have been recognized as a crucial but insufficiently explored component in second language (L2) learning (Lin et al., 2021; Thomas et al., 2021).

Informing students about how, when, and why strategies are used enables them to apply strategies in different learning tasks and transfer their implementation to new contexts and tasks, which is extremely important in autonomous learning of professionally oriented English communication for intending educators (Dmitrenko et al., 2020, cited by Dmitrenko et al., 2021).

The methodology used to achieve this goal was looking at Scopus and WoS, two databases containing a wide list of references and authors. Then, research on Scimago and the ranking of the journal where the paper was placed were done to elaborate some seeds that were loaded to R cloud and used to gather graphics for interpretation.

The article is structured in three additional sections to the introduction. The first one presents the methodology used for the search, selection, and processing of the articles, based on the use of bibliometric tools. The second section shows the results of the development of the research and the findings. Finally, the third part of the document, presents the main conclusions and findings, the limitations of the study, and recommendations for further research of this type.

METHODOLOGY

The methodological process developed involves two major steps: first, scientific mapping of the area, which was carried out through a bibliometric analysis of the scientific production registered in Scopus and WoS, and second, network analysis that allows identifying the most relevant documents on learning strategies and establishing the main groups in which



research in the area is currently framed.

SCIENTIFIC MAPPING

To conduct a production analysis and scientific mapping, the five bibliometric methods suggested by Zupic & Čater (2015) were used: citation, word co-occurrence, co-citation, co-authorship, and bibliographic coupling analyses. The two databases were used together because according to Echchakoui (2020), it allowed having a broader view of the topic being studied. WoS and Scopus are also well-known around the world as stated by Pranckutė (2021) and Zhu & Liu (2020).

Table 1. Research Criteria

Bases	Scopus / WoS
Consulting period	2000-2022
Consulting date	January 27 th , 2022
Document Type	Article, book, book chapters, conference proceedings
Type of journal	All
Search field	Title
Search terms	"Language learning strateg*"
Results	300 with Scopus and 158 with WoS
General results	360

These search criteria yielded 158 records in WoS and 300 in Scopus, which became 360 because there was an overlap of 27.3 % between these two databases. R cloud was used to see how many of them concurred twice. The search using the terms 'language learning strateg*' intended to cover the largest number of records within these databases by including them in the search parameters. As a result, 88% of publications in this area were found in



English, because, as Vera-Baceta et al. (2019) mentioned, journals and authors use that language to be more visible in the learning community. The files found in Spanish and German were just 4% of the publications gathered.

Table 2. Languages Percentages

<i>Language</i>	<i>Percentag e</i>
English	0.88
German	0.04
Spanish	0.04
Turkish	0.02
Unspecified	0.02
Others	0.00

The tool used for the bibliometric analysis was the free tool Bibliometrix. According to Aria and Cuccurullo (2017), this analysis allows working with different databases considering all their properties. It has also been used and validated by other types of research (Acevedo et al., 2020; Di Vaio et al., 2021; Duque, Samboni, et al., 2020; Duque, Trejos, et al., 2021; Landinez et al., 2019; Queiroz & Fosso Wamba, 2021; Secinaro et al., 2021; Tani et al., 2018).

NETWORK ANALYSIS

Once the records obtained in WoS and Scopus were merged, duplicates were eliminated with the R software, the bibliography was gathered, and a network of citations was structured using graph theory as a model, which is a technique that facilitates the generation of information on the typology and characteristics of the network and all the documents that comprise it (Wallis, 2007; Yang et al., 2016).



Subsequently, three bibliometric indicators were calculated: the Indegree — the number of times that others have referenced a document— (Wallis, 2007), the Outdegree — the number of times that a particular node cites others or the number of connections of each document— (Wallis, 2007), and the Betweenness — the degree of intermediation and centrality of each element within the network— (Freeman, 1977). The betweenness indicator takes place when one file is referenced and it references the others (Zhang & Luo, 2017).

The knowledge network of this area is the result of all the documents obtained from the databases and their respective references, which implies that those results come from multiple sources that are not only part of WoS and Scopus but also from other databases and scientific publications. This co-citation map allows the visualization of the structure of a knowledge area. It makes easier the identification of its sub-areas or research currents (Gurzki & Woisetschläger, 2017; Zuschke, 2020). To facilitate the graphic visualization of the knowledge network of the study area on learning strategies, the Gephi tool was used (Bastian et al., 2009).

The indegree, outdegree, and betweenness indicators were calculated for each network record, allowing its classification using the tree metaphor (Robledo et al., 2014; Valencia-Hernández et al., 2020). Taking this analogy into account, three categories emerged: The roots (high indegree), where classic documents are observed, especially contemplating publications that are cited but do not cite others (Wallis, 2007). Then there is the trunk (high betweenness), the documents that cite but at the same time are cited by others (Zhang & Luo, 2017). In this component, the structural works are grouped, which connects the theoretical foundation of the classics with this research. Finally, the leaves (high outdegree) focus on the most recent documents that the others cite (Wallis, 2007). This methodological procedure has been used and validated in previous studies (Buitrago et al., 2020; Clavijo-Tapia et al., 2021; Duque, Meza, Giraldo, et al., 2021; Duque, Meza, Zapata, et al., 2021; Duque, Toro, et al., 2020; Duque & Cervantes-Cervantes, 2019; Ramos et al., 2021; Rubaceti et al., 2022; Torres et al., 2021; Trejos-Salazar et al., 2021).

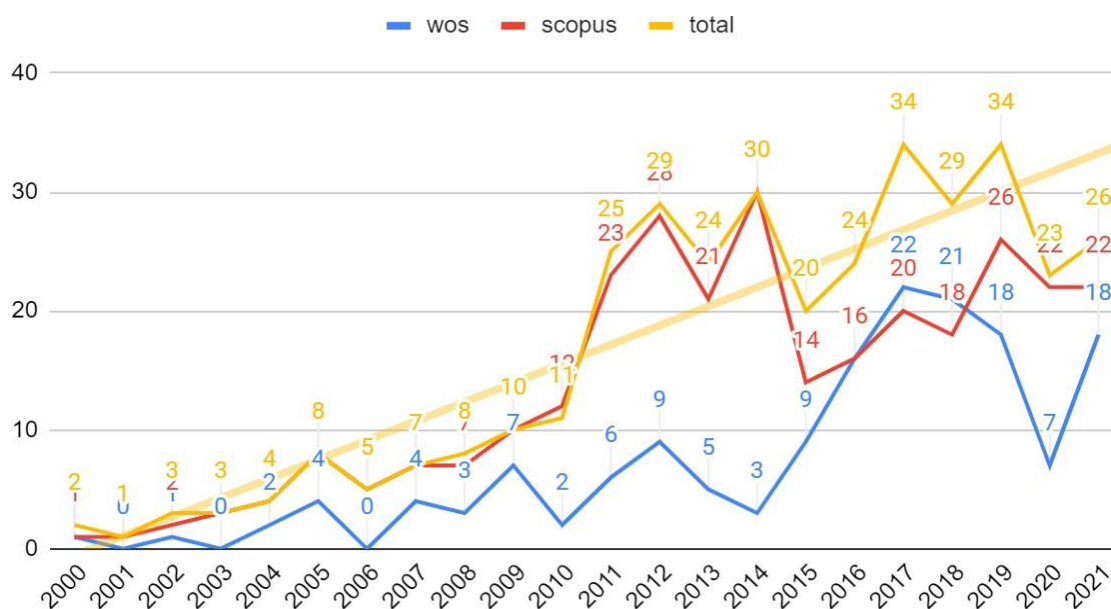


RESULTS

BIBLIOMETRIC ANALYSIS

Publications started to grow dramatically in 2011. The highest number of publications was 34 in 2017 and 2019. Still, there were years in which the publications on learning decreased; for example, in 2015, they only came to 20. By reading the Scopus results per year, it could be assumed that 2014 was the year in which there were more publications in that area, while in Scopus, it was 2017 and 2018, the years in which the production of papers increased.

Figure 1. Bibliometric Analysis



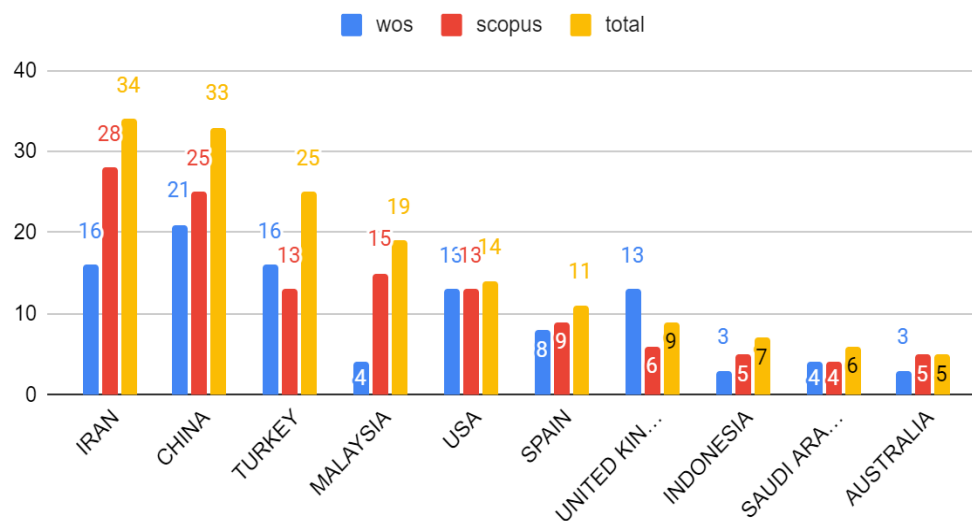
YEAR

Countries located in Asia command the topic of learning strategies. In contrast, Europe and the rest of the countries only have a dozen articles written. Collaboration between authors from the same nationality is also evidenced. Something interesting is that authors from the trunk of the science tree, who work in South America, end up adding publications and



numbers to the country they are initially from.

Figure 2. Production by Countries



COUNTRIES

System is the leading journal in this field; it has a classification of Q1 in Scimago and gathers around 20 publications in this field. Not far away is English Language and Teaching and Theory and Practice in Language Studies which is also Q1 in Scimago and holds the same number of publications. The journals at the top have more than five publications compared to the one that takes third place in the ranking of journals in language learning strategies (Table 3).

Table 3. Major Journals

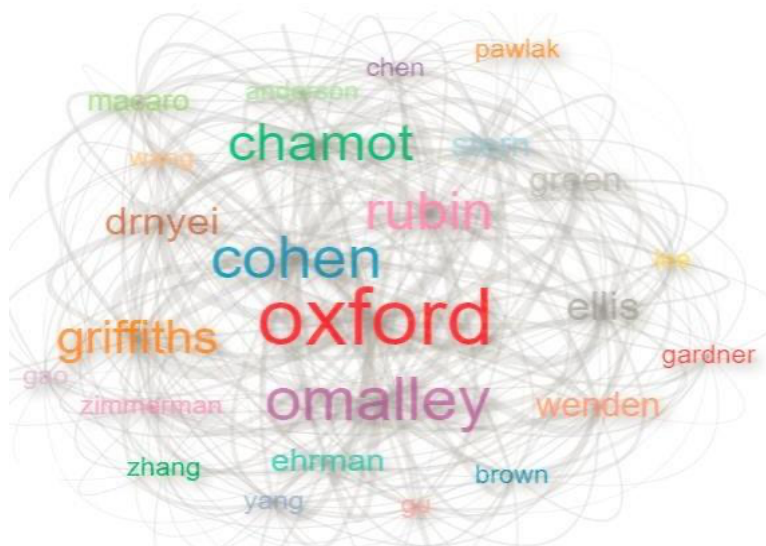
	<i>Journal</i>	<i>Publications</i>	<i>Database</i>
1	English Language Teaching	20	Scopus
2	System	20	Scopus
3	Language Learning Journal	14	Scopus



4	Asian EFL Journal	13	Scopus
5	Theory And Practice in Language Studies	13	Scopus
6	International Journal of Applied Linguistics And E...	10	Scopus
7	Studies In Second Language Learning and Teaching	9	Scopus
8	Language Learning and Technology	8	Scopus
9	Indian Journal of Science And Technology	6	Scopus

The prominent authors in language learning strategies are Mirosław Pawlak (2021), Carol Griffiths and Rebecca Oxford (1982, 1989, 1992). They have more than six articles each. Also, by the research done in Google Academics, it can be inferred that Griffiths worked with Oxford in 2014 and published two articles in System. In 2016, she published with Incecey in the journal New Directions and, in 2020, she published alone in Applied Linguistics. At the same time, although Pawlak (2021) is the most published author, Griffiths has more than 100 citations. Oxford is the most cited author with more than 4500 citations, which is nine times higher than Pawlak (2021), the most published author.

Figure 3. Main Authors by Database



This collaboration network shows the authors have been working together and enjoy publishing in teams. Figure 4 shows that the highest work is done among the authors in green in this net; authors have worked together from 2014 until 2019 on AIP Conference Proceedings. Although Sulaiman has the highest H index, which is 17, at the same time, he is ten times more cited than the authors in the green net. This figure also allows analyzing a strategy to grow up in terms of research. For instance, authors who do not usually work together tend to look for more popular authors to increase their popularity levels in the field. One of these examples is seen in authors who are not even shown in the image because their number of articles is just a few.

Figure 4. Collaboration Network between Authors



Figure 5 shows how Asia leads the research, although they are linked to North America and Europe. There is a connection that is not usual, and that is India with Chile, but as explained before, it is a matter of professors being Indian and working in South America for a long time.

Figure 5. Collaboration Network between Countries



Figure 5 shows the words 'systems' and 'students' are the most quoted ones, which could result from many strategies being applied by pupils instead of teachers. On the top are words such as metacognitive and compensation, which are the most common learning strategies nowadays. Technology is not a word included on the net, but according to the search done through a thesaurus, the related term would be systems.

Figure 6. Word Co-Occurrence Network

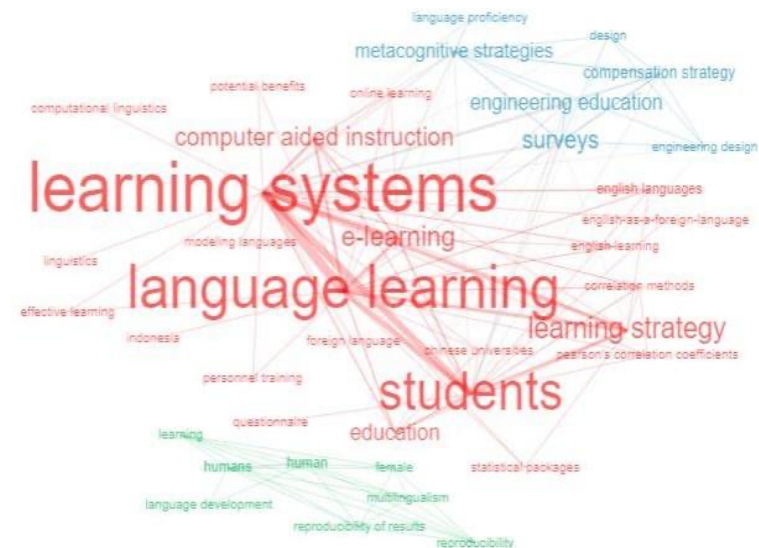
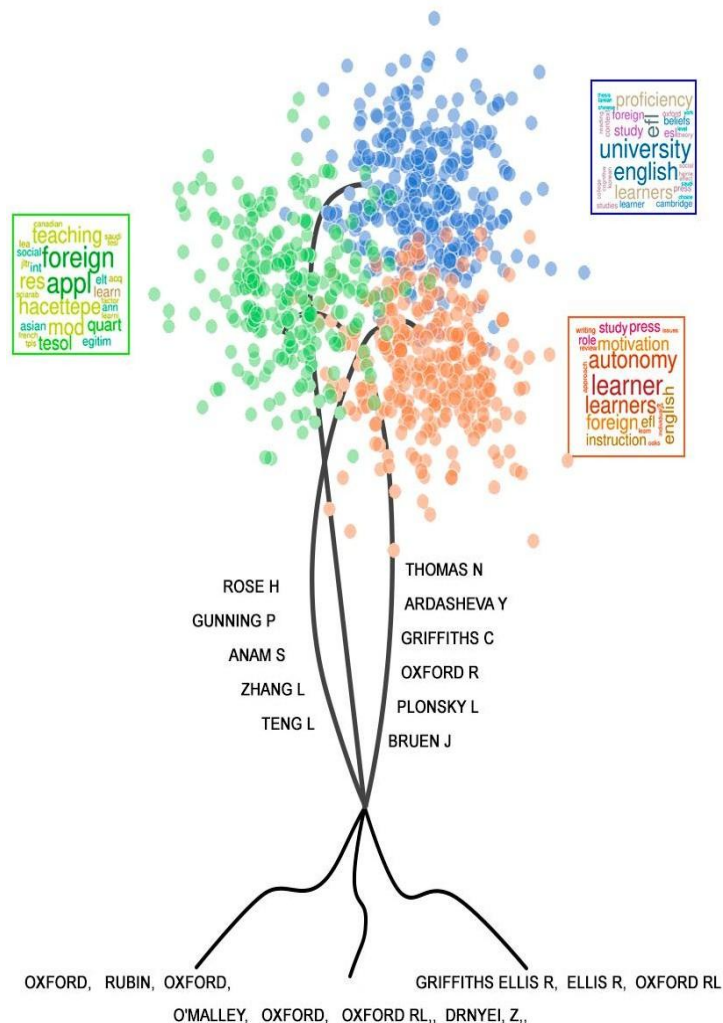


Figure 7. Science Tree Analysis



The science tree analysis allowed catching the most relevant documents in the area. The documents were selected because of their relevance in the field. For this review, the documents with the highest indicators were selected: ten classics (roots), ten structural (trunk) and ten missing words (leaves). The proposed clustering algorithm was developed to establish the sub-areas or common areas of research (Blondel et al., 2008). In this way, three main groups are identified, which can be represented on the leaves.

ANALYSIS OF THE ROOT

Various research on learning strategies has been developed over the last five decades, and important issues such as the classification of strategies and the relationship between strategy use and student progress, among others, have been defined. R. L. Oxford (1989) and Vanniarajan (1990) define a language learning strategy as the way a learner communicates. R. Oxford and Nyikos (1989) are interested in knowing what strategy the student selects. R.L. Oxford (1982) focuses on how students' learning gets lost or forgotten; there is an inventory created by R. L. Oxford and Green (1995). What is more, R. L. Oxford (1989) studies the good learners, the ones that become successful as Rubin, (1975) and Vanniarajan (1990). Rubin (1975) argues that a lot can be gathered from great students, R. L. Oxford (1992) says that students in Iran focus on metacognitive strategies; Wagner (2007) says that there are several individual differences like personality, temperament, and mood and they may change the strategy used.

ANALYSIS OF THE TRUNK

This category deals with research publications about learning strategies, related to the previous ideas from classical authors on this subject. Self-regulation remains a fundamental pillar in developing research related to learning strategies in recent years. However, it has been a difficult construct to understand. According to Teng and Zhang (2016a), and Thomas and Rose (2019), there is a need to separate the concept of self-regulation and self-directed learning, as there is a tendency to confuse their relationship with learning strategies. In addition to this, Plonsky (2011) considered that it is not conclusive. On the other hand, Anam and Stracke (2016) revealed that young learners report active use of socio-affective and metacognitive strategies and moderate use of cognitive strategies. Among the preferred strategies are learning from others and regulating one's own learning, while among the least preferred are memorizing words and practicing outside the classroom.

In addition, Bruen (2001) pointed out that the results of more proficient learners are that they use more language learning strategies, particularly more cognitive and metacognitive strategies. In this way, Rose et al. (2018), after consulting more than 1000 research articles,



commented that there are many qualitative and quantitative methods to explore the issue of learning strategies and that the use of strategies is positive in the results obtained by students. Gunning and Oxford (2014) concluded that the awareness and use of strategies help students positively in learning foreign languages.

This is likely due to the support of Gunning and Oxford (2014), who pointed out there is a strong relationship between metacognition and the success of learners who know which learning strategies they developed in their learning process. While it is true that it is essential to investigate the needs related to learners, it should be remembered that, according to Gunning and Oxford (2014), the emotions of researchers and teachers should be complemented by the diversity of complementary perspectives on language learning strategies.

On the other hand, Griffiths and Oxford (2014) commented that the controversy is not only in the definitions of strategy but also in strategies and competence, theoretical foundations, categorization, context, teachability, research methodology, and analysis. Another controversy has arisen in data collection, although psychometric analyses, according to Ardasheva and Tretter (2013), have benefited the research process.

LEAVES (PERSPECTIVES)

With the bibliometric review process, three main sub-areas (clusters) emerge in this field of study, which denote the most recent lines of research. Each of them is presented below.

PERSPECTIVES CLUSTER 1

This cluster groups the importance of gender, personality, and language proficiency in the use of learning strategies. Authors claim the importance of treating everyone as a different person, and teachers can use the already listed strategies to classify each of the learners and match with him/her the strategy that better suits the learning situation.



PERSPECTIVES CLUSTER 2

In this cluster, there is a tendency to talk about motivation and different kinds of strategies, such as the social, the compensatory and the ones that deal with self-regulation and efficacy. Most authors are worried about their context; they feel that it is needed to help students learn faster and better. Even teachers in the Middle East are exploring how students would learn quickly and without suffering.

PERSPECTIVES CLUSTER 3

The authors in this cluster work more in terms of autonomy and instruction. They worry about implementing language learning strategies in their classroom. That is why they match the English language abilities with the methodology they are using. A couple of them focus on autonomy to reach objectives in the learner's way.

CONCLUSIONS

This paper examined strategies in language learning through a bibliometric analysis. The articles reviewed ranged from 2000 until 2022 across two databases, Scopus and WoS. The results were 158 records in WoS and 300 in Scopus, which became 360 papers where authors, co-citations, countries, and journals were considered. The language in which this topic is worked is English. The countries that have been working on this are in Asia. The journal that published the most on the topic was *System*. The author with a bigger database was Rebecca Oxford.

It could be observed that this field was mainly explored from 2011 to 2014 and then in 2017. However, maybe because of COVID-19, researchers decided to study this topic again. Also, it could be said that the first publications were conducted in face-to-face settings, but the latest publications included virtual environments.

Around fifty years of work have been used to promote the classification of learning strategies and the relationship between strategy use and student progress. Pawlak (2021) argues that



there is a need to research in real classrooms and find new information that can be articulated with what has already been published. Learning strategies are helpful to educators, teachers, and students and are even an index to measure how beneficial that is. The metacognitive strategies are used over the cognitive and social ones. There is a need to update conceptualizations because the research needs to be updated. The least used strategies by learners were memory and affective strategies.

There is a common characteristic when analyzing the research problem stated in the articles read: no matter the year, the country or the setting, English language teachers are looking for tools to help students in the learning process in a stress-free environment. There is a need to explore other factors that affect the learning process, such as motivation, engagement, and students' interest, which alter the learning strategies students develop when studying a language.

An extensive review of learning strategies for other learning skills could be conducted for future research. There is a need to investigate whether there is or not a relationship between self-reported learning strategies and language proficiency.

LIMITATIONS AND RECOMMENDATIONS

There are three recommendations for further research. First, it is the natural way of handling research just because of the way of being. The second suggestion is that just two databases were used, and there could be more in other databases. The final would be not working on R cloud or bibliometrics but in other programs to corroborate that what has been done is accurate.

AGENDA OF RESEARCH

Table 4. Research Agenda

Perspective	Topic	Reference
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Replicate this study with different population, if possible, a larger sample to increase the power of the statistical tests, and a suggestion to include interviews and observations to gather students' beliefs towards learning strategies	Statistical tests	(Mokhtari, 2020)
Relate the skills with the needed learning strategy (vocabulary, grammar)	Learning Strategies	
Future studies that include English proficiency as a variable may be able to provide a more comprehensive elucidation of LLSs, AGOs, and the correlations that exist among them.	Comprehensive elucidation of LLSs, AGOs,	(Shyr et al., 2017)

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