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Global Bibliometric Mapping of Didactic Research in Language Teaching: Trends, Collaborations, and Emerging Themes (2015–2025)

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ABSTRACT

Didactic approaches have long been significant in mathematics education, but their application to language teaching remains underexplored. This bibliometric study maps the research landscape on didactics in language teaching over the past decade from 2015 to 2025. Data were extracted from Scopus using the search string "didactic AND language AND (teaching OR pedagogy)". After applying inclusion and exclusion criteria, 467 publications were analyzed using Harzing's Publish or Perish, VOSviewer, Microsoft Excel, and Biblioshiny (RStudio). The results show publication volume rising from 2015, peaking in 2022, followed by a decline toward 2025. Russia, Brazil, and the United States were the most productive countries. Citation and thematic analyses revealed six main clusters focused on pedagogical innovation, communicative competence, and emerging technologies like artificial intelligence and augmented reality. Crucially, while concepts such as 'didactic transposition' appeared sporadically, the systematic transfer of classical mathematical didactics, particularly from Brousseau or Chevallard, to language education remains highly marginal. Consequently, this study empirically validates a persistent research gap in adapting exact science didactic concepts to the dynamic needs of language learning. Ultimately, this paper offers global insights and recommendations for future research to bridge this interdisciplinary divide.

1. INTRODUCTION

Language education is one of the fields that continues to grow along with the global need to master language skills (Dooly & Vinagre, 2022). However, although many studies have examined language teaching, very few have specifically explored didactic approaches in language teaching. At the outset, it is crucial to clarify the operational distinction between "didactic" and "pedagogic," as these terms carry different theoretical emphases across academic traditions. In the Continental European tradition, "didactics" specifically refers to the science and art of teaching a particular subject, focusing heavily on the triad relationship between the educator, the student, and the specific subject matter being taught.

Conversely, in the Anglo-Saxon tradition, "pedagogy" generally encompasses broader strategies of teaching, classroom management, and the holistic psychological development of learners. Within this study, the term "didactics" is operationalized specifically as the subject-focused frameworks and instructional designs applied to facilitate language content acquisition. This suggests the importance of further research on how didactic theory can be applied to improve language learning. The use of appropriate didactic approaches in language teaching is in line with the fourth goal of the Sustainable Development Agenda, namely to ensure inclusive, equitable, and quality education for all (Yu et al., 2024).

By implementing these theories in the classroom, educators can develop strategies that reach a wide range of student profiles, including those with unexpected learning disabilities. The quality of teaching materials, the distribution of resources, and measurable emotional support are central to this effort barriers (Tilemachou et al., 2025).

Several studies have been conducted on applying didactic principles to language teaching. One study examined didactic sequences as a theoretical and practical framework, focusing on knowledge construction through dialectical interaction in the classroom (Denardi, 2017). Another study linked digital storytelling to didactic scenarios, finding that media-based narratives helped EFL learners reach everyday communication contexts (Torres & Ponce, 2012). Instructional software was also initially investigated in a similar context; Kanselaar (1993) reported that computer-assisted interactive methods promoted vocabulary comprehension through a communicative approach. On the other hand, several researchers have examined conventional and digital didactic games and found both to function as innovative tools in L2 and L3 (Kamola & Dildora, 2022). Finally, the broader impact of technology on language education continues to be discussed, noting that such innovations provide easier access to information and potentially improve academic achievement (Rocha et al., 2019).

When looking at the outline of the body of literature, it is clear that didactics related to language teaching are still marginalized. The number of papers containing the phrase teaching didactics and language on the Scopus platform between 2015 and 2025 did not exceed 467. Other academic channels recorded much more massive figures: teaching didactics and mathematics produced 730 titles while teaching didactics and science reached 1,618. The percentages of each domain also speak loudly: mathematics didactics is only 3.9 percent of the total, science didactics 8.3 percent, and language didactics 2.8 percent. These concise statistics

often ignore their narrative tone, but when read slowly, they call for greater attention and equality for language studies. The didactic approach was initially designed to understand and design learning in the context of exact sciences. However, in the context of language, learning involves not only cognitive understanding but also communication skills that are dynamic and contextual. Therefore, it is important to investigate whether the Didactic approach can suit the needs of more flexible and interactive language teaching.

Deepening the development of research related to didactics in language teaching requires a method that can identify patterns, trends, and relationships between topics and disciplines involved. The application of trend analysis is crucial for understanding the evolution of a given methodology in relation to different educational contexts through time. An effective method for this purpose is bibliometric analysis, which enables researchers to measure and map the development of literature using quantitative data (Ninkov et al., 2021). Bibliometrics provides an overview of scientific publication and citation patterns, as well as topical interrelations within a discipline, hence can be employed to establish the direction and focus of dominantly held theories within a given timeframe (Pessin et al., 2022; Yan & Zhiping, 2023).

A literature review on didactics in mathematics education suggests active research interest, particularly in formulating principles for innovative model frameworks based on learning outcomes design. Bibliometric studies such as “Crafting math minds: A bibliometric odyssey into innovative didactical designs for learning” by Dasari et al., (2024) “A Half Century of Didactic Design in Mathematics Education” by Fardian et al., (2024) reveal sharply increasing publication growth trends starting from 2019 along with identification of new themes, including technology integration into mathematics education focusing on specific competencies. In addition, the research “Didactical Design Research: A Bibliometric Analysis” by Supriyadi et al., (2023) highlights the significant role of DDR concerning productivity augmentation of publications and identifying emerging topics within scholarly works. Overall, these studies express and portray growth in didactic design research alongside increasing collaboration and exploration of new and diverse rich issues that enhance mathematics education and other educational fields. Thus, exploring whether the didactic concepts used in teaching mathematics can also be effectively applied in language teaching is interesting.

No research has systematically mapped publication trends, growth patterns, and institutional and country contributions to didactics in language teaching studies using bibliometric analysis based on Scopus data. An in-depth search using the Publish or Perish tool also shows the lack of tracking of geographical distribution, the number of international collaborations, and new themes that emerge in this field. The asymmetry in the number of articles, the lack of a global partnership map, and the unmapped central issues that dominate are wide-open research gaps. The efforts made in this study are intended to provide a visual and analytical picture of the rate, distribution, and thematic focus of language didactics research over the past ten years. In other words, this investigation aims to trace publication trends and the capacity of countries or research institutions and, at the same time, identify hot topics and opportunities for future collaboration. The final findings will provide concrete references for academics and practitioners to formulate more innovative and evidence-based

language teaching strategies.

Bibliometric analysis in this study uses field data from Scopus to observe the publication trend of didactics in language teaching from 2015 to 2025. This kind of bibliometric study is essential to evaluate the development of existing research in language teaching, in addition to looking for patterns of growth, stagnation, or fluctuations in research activities in the field. In addition, this kind of analysis provides information on the institutions and countries that are most active or contribute to publications related to didactics in language teaching. The results of this study will likely show the contribution and role of didactics in language teaching in education at the global level. This study is also expected to explore new relevant topics and enrich research to improve the effectiveness of language teaching. This study not only compiles a theoretical mapping of didactic design but has become a recommendation for practicing educators and researchers to intensively find issues in language teaching that require further development.

2. METHODS

This study uses a bibliometric approach to see the picture and identify patterns and trends in developing scientific publication topics sourced from academic databases (García & Capoano, 2023). This research process uses two techniques, bibliometric analysis, and bibliometric visualization, which are included in the quantitative approach. Bibliometric analysis is used to analyze research trends, the influence of publications seen from the number of citations, and researcher productivity, such as scientific publications and collaborations between institutions (Hassan & Duarte, 2024) (García & Capoano, 2023). Then, bibliometric visualization functions to create a picture of the relationship in the form of a map or graph from the results of bibliometric analysis and shows the collaboration network between authors or institutions; the relationship between research topics changes and develops over time (Arruda et al., 2022). The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach can be used as a systematic framework to filter and report literature data transparently. PRISMA helps ensure that the process of identifying, selecting, filtering, and reporting data in bibliometric analysis is structured and traceable so that the analysis results are more valid and reliable (Pham & Le, 2024).

By using these two techniques, the study not only displays numbers but also provides a more comprehensive picture of the direction and pattern of research that has been carried out. Researchers collected data directly from the Scopus database. First, the identification phase was conducted by searching for the search string “didactic AND language AND (teaching OR pedagogy)”. From this initial search, 1348 publications were identified. The bibliographic metadata, including citation details, were then directly exported from Scopus in RIS and CSV formats. Harzing’s Publish or Perish software was subsequently employed not for primary data retrieval, but specifically to calculate and evaluate citation metrics over time, such as the h-index and g-index. The exported RIS files were imported into VOSviewer to visualize publication patterns. Furthermore, Microsoft Excel and Biblioshiny from RStudio were used to tidy up the data and present statistical visualizations. All stages of data collection and analysis

can be seen in Figure 1.

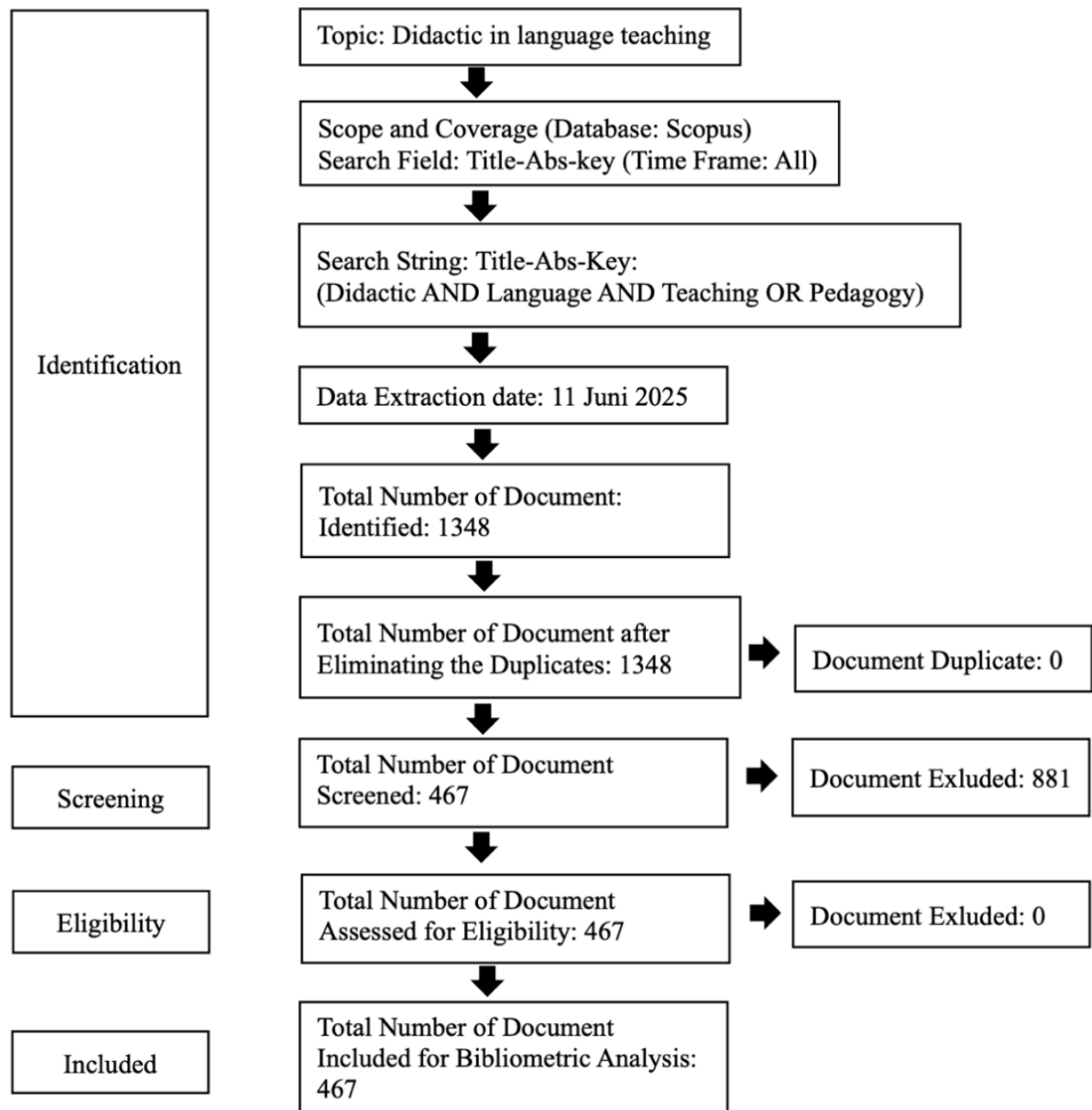


Figure 1. Data selection process

The researcher began the data collection process by searching for data with the search string “didactic AND language AND (teaching OR pedagogy)” in the Scopus database on June 11, 2025. The initial results in the Scopus database were 1348 publications from articles and conference papers. Furthermore, the researcher conducted the inclusion stage using the applied criteria, selecting only articles and conference papers published from 2015 to 2025. Crucially, because the data retrieval was conducted on June 11, 2025, all data recorded for the year 2025 represents a partial, running year and does not reflect a complete 12-month publication period. Then, publications related to the search string “didactic AND language AND

(teaching OR pedagogy)” were taken for the exclusion stage. The relevance of the publications taken is an important consideration, where researchers filtered publications based on titles and abstracts to ensure that the topic matches the focus of the research. Meanwhile, exclusion criteria were applied to publications outside the specified period, irrelevant in content based on the title and abstract review results, or not available in full format, so they could not be analyzed further.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Year	2015-2025	Before 2015
Document Type	Article, Conference Paper	Review, Book Chapter, Book
Publication Stage	Final	Article in Press

From 2015 to 2025, there were 1348 publications. After the researcher conducted the exclusion process according to the criteria that had been applied, 881 documents were excluded because they did not meet the requirements, and 467 publications remained that met the criteria. A total of 467 publications that were declared to meet the inclusion criteria were then downloaded in RIS and CSV formats to be analyzed and visualized using Microsoft Excel software. In this study, the researcher presents the trend in the number of publications each year, citation patterns (TP, NCP, Tc, h-index, and g-index), and a geographic distribution map of research contributions using VOSviewer. The analysis of the study focus is illustrated through network and overlay visualization. At the same time, research gaps and new findings were mapped based on keywords and author relationships with the help of Biblioshiny in R. The results are expected to provide a comprehensive picture of the development of didactics in language teaching studies and identify areas that require further research attention.

3. RESULTS AND DISCUSSION

3.1 Results

The empowerment of Arabic language teachers’ linguistic competence in Greater Malang through a two-day combination of flashcards and the Digital Madinah Mushaf showed several tangible forms that were observable in classroom practice, teacher interaction, and their strategies for integrating the media. Based on in-depth interviews, questionnaire distribution, and participant observation, it was found that this empowerment occurred not only at the technical level of media use, but also touched epistemological, pedagogical, and affective dimensions that shaped teachers’ linguistic competence more comprehensively.

This study aims to map the development of didactic studies in language teaching for the period 2015–2025 through a bibliometric approach. The analysis encompasses publication trends, research growth and fluctuations, contributions and collaborations between countries, thematic maps, and scientific impact as measured through citation analysis. Bibliographic metadata were extracted from Scopus, analyzed using Harzing’s Publish or Perish for citation metrics, and visualized through Microsoft Excel, VOSviewer, and Biblioshiny. Importantly, in interpreting annual publication trends, the apparent decline in publications recorded for 2025

must be attributed strictly to the data collection cutoff date (June 11, 2025), representing only a partial running year, rather than any diminish in academic interest in language didactics. This study explores the geographical distribution, thematic focus, gaps, and novelty of research to provide a comprehensive picture of the position, contribution, and future direction of didactic studies in language teaching.

In examining the technology integration cluster—particularly regarding Artificial Intelligence (AI) and Augmented Reality (AR)—the thematic mapping provides critical insights into their theoretical positioning. Currently, the majority of scholarly works treat these emerging technologies at an instrumental level, positioning them primarily as advanced media or instructional tools to facilitate immersion and engagement. However, a deeper theoretical synthesis of the network reveals an ongoing shift: AI and AR are beginning to challenge the traditional didactic triad (teacher–student–content). By serving as adaptive tutors, diagnostic facilitators, and interactive context generators, these technologies do not merely augment media delivery, but fundamentally alter the structural dynamics and agency within language didactic environments.

Publication Trend

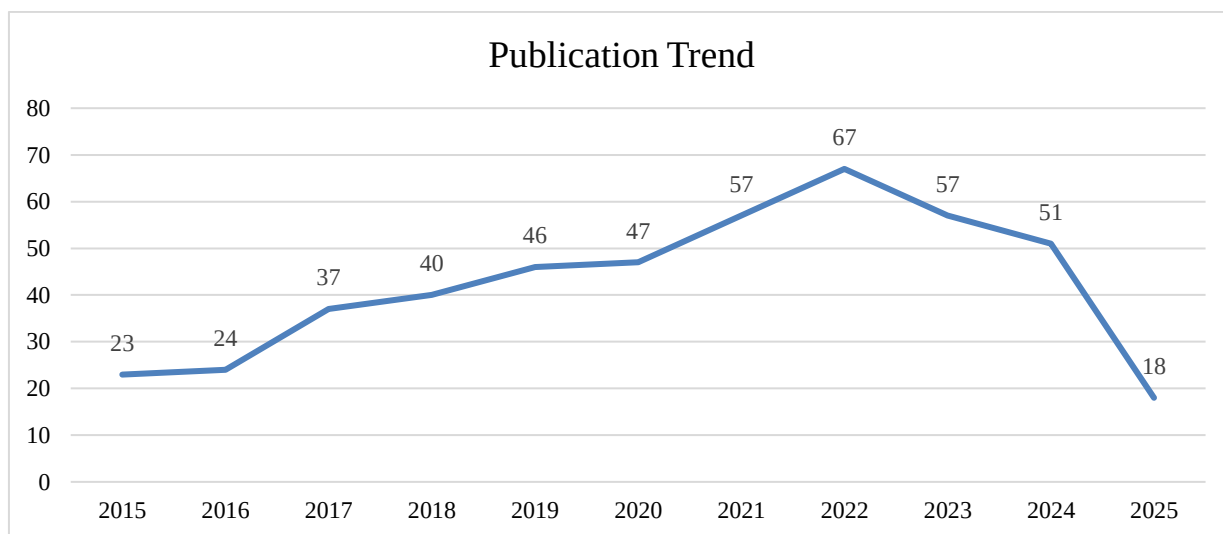


Figure 2. Publication Trend

The graph in Figure 2 shows fluctuations in research on didactics in language teaching from 2015 to 2025. Publications increased steadily from 23 in 2015, peaking at 67 in 2022. A notable rise occurred in 2017 (37 articles), with consistent growth in subsequent years. After 2022, the trend declined: 57 in 2023, 51 in 2024, and a sharp drop to 18 in 2025. This decline may be due to policy changes, shifting research focus, or incomplete data for 2025. Overall, the graph reflects steady growth until 2022, followed by a gradual and then sharp decrease.

Table 2. Citation Analysis of Publication

Year	TP	NCP	TC	H-Index	G-Index
2015	23	6	238	6	15
2016	24	4	112	5	10
2017	37	14	254	11	15
2018	40	12	235	9	14
2019	46	11	239	8	14
2020	47	14	162	7	11
2021	57	14	267	6	15
2022	67	16	115	6	8
2023	57	13	117	6	10
2024	51	10	30	4	4
2025	18	3	15	2	3

Notes. TP: total of publication, NCP= number of cited publication, TC= total citation, H= h-index, G= g-index.

The Table 2 presents citation data for scientific publications on didactics in language teaching from 2015 to 2025, based on 467 documents. It reflects the extent of scholarly attention through annual citation counts. In 2015, citations were relatively high at 238 but dropped to 112 in 2016. From 2017 onward, the trend steadily rose, peaking in 2021 with 267 citations, marking it as the most influential year. It is crucial to note that the lower citation count recorded for 2025 (15 citations) reflects incomplete data for the ongoing year, rather than a downward trend in scholarly interest. Because these publications are highly recent, they have not yet had the necessary timeframe to circulate and accumulate citations. The highest Number of Cited Publications (NCP) occurred in 2022, with 16 cited documents. This suggests that publications from 2021 and 2022 had a notable impact on the field. Despite fluctuating citation numbers across the decade, certain periods showed strong scientific influence, indicating important phases in the development of didactic studies. These dynamics merit further investigation. The table below lists the most cited documents from 2021.

Table 3. Publication with the highest number of citation

No	Author	Title	Sources	Citation
1	(Cano et al., 2021)	Chatbot to improve learning punctuation in Spanish and to enhance open and flexible learning environments	International Journal of Education Technology in Higher Education	126
2	(Costales, 2021)	Audiovisual translation in primary education. Students' perceptions of the didactic possibilities of subtitling and	Meta	26

		dubbing in foreign language learning		
3	(Kobylarek et al., 2021)	The significance of a pandemic in teaching foreign languages, with special regard to the teaching of seniors	XLinguae	13
4	(Vera, 2021)	Building bridges between audiovisual translation and English for Specific Purposes	<i>Ibérica</i>	11
5	(Elmer, 2021)	Song Transmission as a Formal Cultural Practice	<i>Frontiers in Psychology</i>	8
6	(Steingartner, 2021)	On some innovations in teaching the formal semantics using software tools	<i>Open Computer Science</i>	8
7	(Eduardo, Jose, et al., 2021)	Augmented Reality to facilitate the process of Teaching—Learning in school textbooks	IEEE	6

The Table 3 shows a list of 7 documents on didactics in language teaching published in 2021, each accompanied by information about the author, title of the article, name of the journal or publication source, and number of citations. Based on these data, the article with the most citations is the work of Cano, Andrés, et al. (2021), published in the International Journal of Educational Technology in Higher Education, with 126 citations. Occupies the top position in the number of citations in the table, which, on average, only received between 6 and 26 citations. The second article with the most citations is Costales's (2021b) work, which discusses subtitling and dubbing in teaching English to elementary school students. It was published by Meta and received 26 citations. The third article with the highest number of citations is the work of Kobylarek et al. (2021b) evaluate how the COVID-19 pandemic has impacted foreign language teaching, especially in the elderly group (seniors), published by XLinguae, which received 13 citations. Meanwhile, the other four articles each have citations ranging from six to eleven, including Vera (2021b), Elmer (2021) Steingartner (2021b), Eduardo, Jose, dkk. (2021). The difference in the number of citations shows that although the seven articles were published in the same year and discuss similar themes, their level of influence and acceptance among academics varies greatly. Several factors that likely influence this variation include how relevant the article topic is to global issues or current research trends, how broad the scope of the discussion is, and the reputation of the journal in which the article was published. Articles published in highly reputable journals and issues currently being widely discussed are usually cited faster and more frequently by other researchers.

The first document by Cano, Andrés, et al. (2021) has a high number of citations due to the relevance of its topic to technological developments in education. Using chatbots as a

learning aid, especially in the context of learning punctuation in Spanish, offers an innovative approach that aligns with the digital and flexible learning trend after the pandemic. In addition, this article was published in a highly reputable international journal with a wide readership in educational technology. Other factors that contributed to the high citations were the urgent need for interactive technology-based learning media and the increasing interest of the academic world in artificial intelligence in the context of education. The combination of an actual topic, an innovative approach, and a credible journal made this article more widely referred to in further research.

Geographical Distribution and Relations Between Countries

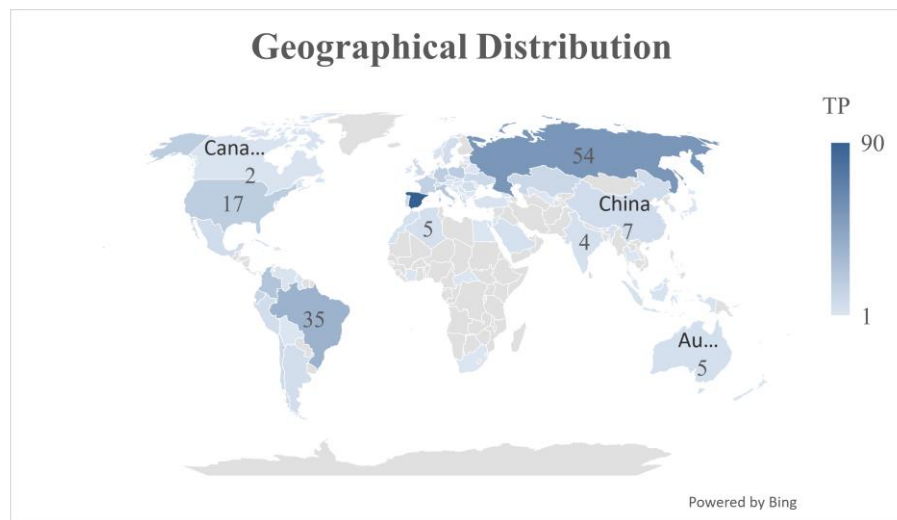


Figure 3. Geographical Distribution

The Figure 3 displays the geographical distribution of publications on the theme of didactics in language teaching in the form of a world map, with a color scale indicating the Total Publications (TP) from each country. Darker blue indicates a higher number of publications. From the map, it can be seen that Russia is the most productive country with 54 publications, followed by Brazil (35 publications) and the United States (17 publications). Countries such as Spain, Italy, China, and India show moderate contributions (4 to 10 publications), while nations like Canada, Egypt, Australia, Argentina, and several regions in Africa have lower outputs (1 to 6 publications).

Rather than simply reflecting general research capacity, this distribution strongly aligns with specific scholarly traditions. The dominance of Russia, Brazil, Spain, and Italy highlights the profound influence of the Continental European didactics tradition, where "didactics" is historically established as a distinct field of study applied to both first language (L1) and second/foreign language (L2/FL) contexts. Conversely, the Anglo-Saxon tradition conventionally favors terms such as "pedagogy" or "curriculum studies." Therefore, the notable presence of the United States in this dataset may reflect specialized research intersections, such as cross-cultural L2/FL education or bilingual instructional strategies. Ultimately, this geographical map underscores how regional theoretical traditions and specific linguistic contexts shape the global discourse on language teaching.

Russia and Brazil are the countries with the most publications, which can be considered centers of research in this field. However, on the other hand, the difference in the number of publications between countries shows a gap in access to research resources and scientific publications. Therefore, this map can be used to encourage cooperation between countries and increase the involvement of countries that still contribute little to international publications. This distribution indicates that scientific contributions worldwide remain uneven. Countries with well-developed education and research facilities tend to produce more research, including in the field of language teaching. Meanwhile, developing countries are still less visible due to limited resources, difficult access to reputable journals, or language barriers. This map provides a comprehensive picture of the state of global research and can serve as a basis for encouraging cooperation between countries and strengthening research capabilities in areas where contributions are still limited.

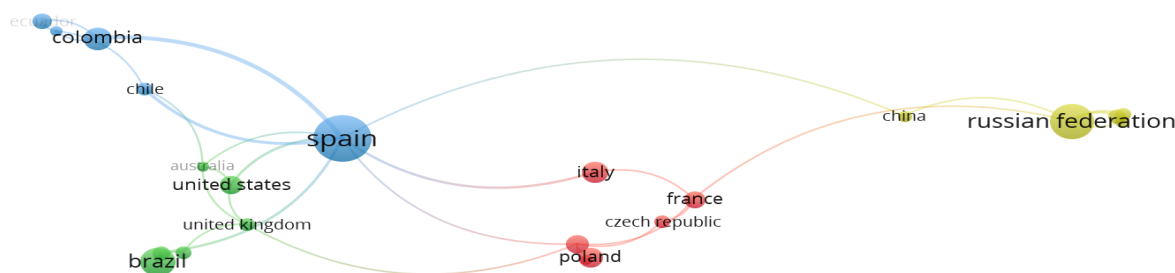


Figure 4. Relations Between Countries

The Relations Between Countries in Figure 4 shows the network of collaboration between countries in research, especially in the field of language teaching with a didactic approach. From the picture, it can be seen that Spain is the main center, widely connected to other countries, such as Colombia, the United States, Brazil, and Italy. This demonstrates that Spain plays a significant role in international collaboration, both in research and the exchange of ideas in the field of language education. The large node size of the Spanish circle also indicates the high number of collaborations that have been carried out. In addition to Spain, countries such as Russia, the United States, and Brazil are also quite active, although not as large as Spain. Central and Eastern European countries, such as Poland, the Czech Republic, and Hungary, are forming their networks, indicating strong domestic collaboration. These connections can occur due to similar education policies or shared interests, such as the use of technology in teaching during and after the pandemic. This image shows that the stronger the connections between countries, the greater the opportunities for engaging in innovation and scientific development.

Good relations between countries allow for cooperation in research, exchange of ideas, and development of new technologies and methods that can improve the quality of education, especially in language teaching. Countries that actively collaborate internationally have wider access to information, resources, and networks of scientists or educators from various parts of

the world. Collaboration between countries also plays an important role in strengthening a country's academic position. Through international cooperation, countries can share knowledge, support each other in research, and learn from the experiences and approaches implemented by other countries. In addition, this close relationship can also be a means to share resources in learning, such as educational technology, learning media, and teaching methods that have been proven effective elsewhere so that they can be applied and adapted to local needs. In language teaching, broad connections between countries are critical because they allow for richer cultural exchanges and multilingual perspectives. This can broaden the perspective of students and teachers in understanding language as a means of communication and as a bridge between cultures. Through this cooperation, the approach to language learning can become more diverse, innovative, and contextual, ultimately improving students' motivation and learning outcomes in various parts of the world.

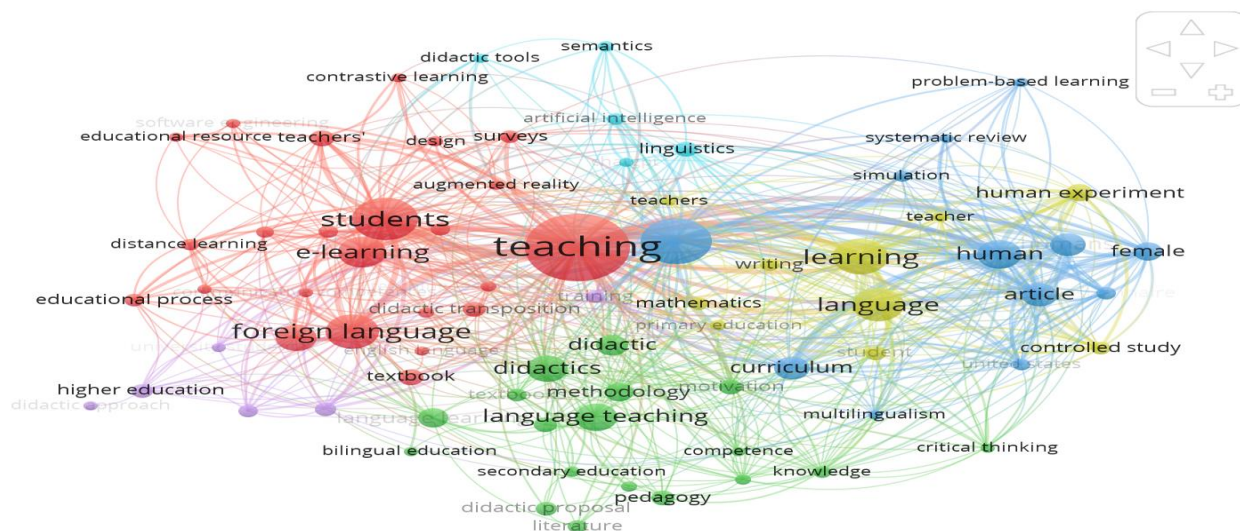


Figure 5. Network Visualization

In this study, the researcher set a minimum threshold of five publications containing the exact keywords to be included in the network visualization analysis. This approach ensured that the relationships between visualized research topics have an adequate basis for repeatability and are not random occurrences. Based on these criteria, 75 research focuses were successfully mapped and grouped into six main clusters identified through network analysis. The six clusters displayed in the network visualization in the image above are marked with different colors to facilitate thematic identification and interpretation, namely red, green, dark blue, yellow, purple, and light blue clusters. Each cluster represents a particular thematic concentration interconnected through keywords often appearing together in publications. The patterns of relationships between these clusters provide an initial picture of how the knowledge structure in the field being studied is distributed and interconnected.

Of the seven identified clusters, the red cluster emerged as the most dominant cluster regarding the number of keywords and the density of connections between the terms that form it. The dominance of the red cluster indicates that the themes in this cluster are the primary

focus or most researched in the field of study. The green and dark blue clusters occupy the second and third positions, respectively, in terms of size and internal connectivity, indicating that the themes in this cluster also have a high level of relevance and significance in developing scientific discourse in the related field.

The First Cluster (Red)

The first cluster includes 24 items such as augmented reality, e-learning, software engineering, communicative competence, and foreign language teaching, particularly English. This cluster highlights the integration of technology, especially augmented reality, to support distance and online learning. It reflects a shift in educational paradigms toward more effective and engaging tech-based learning. Keywords like communicative competence and contrastive learning indicate a focus on enhancing students' communication skills beyond grammar mastery. The use of didactic transposition shows the application of pedagogical strategies tailored to learning contexts and student needs.

The Second Cluster (Green)

The second cluster comprising 18 keywords, includes bilingual education, blended learning, competence, critical thinking, didactic, didactic proposal, didactics, knowledge, language learning, language teaching, literature, methodology, motivation, pedagogy, secondary education, teacher training, textbooks, and translation. This cluster highlights pedagogical approaches, competence development, and language learning strategies in formal education. The emphasis on keywords like didactic, methodology, and pedagogy reflects a focus on instructional design and implementation. Keywords such as bilingual education, language teaching, and translation suggest a multilingual context in teaching practices, while competence, critical thinking, and motivation emphasize 21st-century skills, including higher-order thinking and student engagement. The inclusion of secondary education, teacher training, and textbooks indicates a broader focus beyond learners, extending to teacher professionalism and educational resources. In essence, the green cluster represents a pedagogical-strategic domain that integrates learning theories with practical demands in formal language education.

The Third Cluster (Dark Blue)

The third cluster includes 12 keywords: article, curriculum, education, female, human, humans, multilingualism, problem-based learning, questionnaire, simulation, systematic review, and the United States. This cluster reflects a contextual and interdisciplinary research focus that blends curriculum, innovative teaching methods, and socio-geographical factors. Keywords like curriculum, education, and systematic review suggest a comprehensive evaluation of educational systems through literature analysis. Meanwhile, problem-based learning, simulation, and questionnaire indicate experiential and problem-solving approaches aimed at fostering active student engagement and critical thinking. The use of simulation also implies the integration of technology or context-driven learning. Overall, this cluster highlights contextual studies emphasizing learning innovation, curriculum development, and social dynamics in language education.

The Fourth Cluster (Yellow)

The fourth cluster includes 10 items: controlled study, human experiment, language, learning, mathematics, primary education, student, teacher, teachers, and writing. This cluster highlights experimental research in primary education, focusing on language teaching and writing skills. Terms like controlled study and human experiment reflect the use of experimental or quasi-experimental methods involving students and teachers to assess specific learning strategies. Keywords such as primary education, student, and teacher emphasize the focus on elementary level and student-teacher interactions. Teachers are involved not just as subjects but also as implementers of instructional methods. Additionally, terms like language, learning, writing, and mathematics show cross-disciplinary attention and the development of basic literacy skills. Overall, this cluster represents practical, evidence-based research aimed at enhancing instructional methods in primary education.

The Fifth Cluster (Purple)

The fifth cluster consists of 6 items: didactic approach, foreign language, higher education, professional aspects, training, and university students. The keywords in cluster five describe the research focus on the didactic approach in foreign language learning at the higher education level. Keywords such as didactic approach, foreign language, and higher education show that research in this cluster focuses on how teaching strategies are designed and implemented to support foreign language acquisition in a university or college environment. The keywords training, professional aspects, and university students indicate that this cluster focuses on professional development for prospective educators and students as prospective workers. Language learning here aims not only to improve language skills but also to equip students with the skills needed in the global world, such as cross-cultural communication, academic literacy, and the use of foreign languages in the workplace. Overall, the purple cluster illustrates efforts toward integrating structured teaching approaches and the needs of the ever-evolving world of higher education.

The Sixth Cluster (Light Blue)

The sixth cluster consists of 5 items: artificial intelligence, ChatGPT, didactic tools, linguistics, and semantics. Keywords that indicate the focus of recent technology-oriented research, especially using artificial intelligence (AI) in language learning and linguistics. Keywords such as artificial intelligence and ChatGPT suggest that research in this cluster discusses the use of advanced technology in developing more interactive and adaptive didactic tools. Other keywords, such as didactic tools, linguistics, and semantics, indicate that AI supports the learning process and analyzes language, meaning, and linguistic structure. This means that language teaching is shifting from traditional methods to high-tech approaches, where understanding of meaning and language interaction can be learned or trained with the help of AI, such as ChatGPT. Overall, this light blue cluster reflects the emergence of a new field combining technology and language education, focusing on how AI and digital tools can improve the effectiveness, personalization, and reach of language teaching and analysis.

these themes contribute significantly to the progress of the field of education as a whole. These themes have broad connections with other fields and are developing intensively. In educational practice, this reflects actively implemented topics and the primary focus of learning innovation. In everyday educational practice, these themes are widely used as a basis for developing more modern and effective learning methods. For example, blended learning, or a mixture of face-to-face and online learning, is now widely implemented in various schools and universities in response to the need for flexible learning post-pandemic.

Basic Themes (Bottom Right)

Basic themes such as teaching, foreign language, language teaching, and didactics are included in the category of themes that have a high level of relevance, meaning they are essential and widely used in various educational research and practices. These themes are the primary foundation or basis in the world of education because they concern very general and basic things, such as the teaching process, foreign language teaching, and didactic principles or how to deliver material to students. However, these themes still have a limited level of internal development and have not been further developed with new approaches, more creative methods, or the application of modern technology. Research on this theme often still uses traditional methods, so innovation is needed so that these themes can develop and adapt to today's educational needs. Therefore, researchers and educational practitioners need to study and develop these basic themes through a more innovative and contextual approach. This approach is needed so that fundamental themes such as teaching, language teaching, and didactics remain relevant to the dynamics of development and can respond to the challenges of education in the era of increasingly complex globalization and digitalization.

Niche Themes (Top Left)

Niche themes in quadrants such as biology, experimental study, translation, and flipped classroom have a high level of development, meaning that these topics are pretty mature and have been studied in depth by many researchers. However, these themes are still less connected or unrelated to other main themes in the general education field. These themes are particular and are usually only discussed by specific scientific communities in a limited research scope. For example, the flipped classroom or inverted learning model is more widely used and studied in the context of modern learning but has not been widely integrated into the general school curriculum. Likewise, themes such as translation often only appear in certain language studies or applied linguistics. Although not very popular on the broader research scope, these themes have great potential to be developed. If associated or combined with other major themes, such as teaching or language learning, these themes can be an enjoyable and valuable new approach in educational practice. Therefore, researchers can open up collaboration space and bridge these specific themes with other fields of study so that these themes can develop more widely.

Emerging Or Declining Themes (Bottom Left)

Declining themes still emerging or starting to be abandoned, such as critical thinking, collaboration, and ontology. These themes can indicate initial interest that is not yet stable or even a decline in attention from the scientific community. In education, themes such as critical thinking are still very relevant, so further analysis is needed to see whether these themes are

truly declining or are under-indexed in specific databases. These themes usually do not yet strongly influence the overall research map because their connections to other major themes are still weak, and their development is not yet intense. This could mean that these topics are still in their early stages and have not been widely explored by researchers. However, it could also indicate that attention to these themes is declining, so they are no longer the primary focus of educational research. However, it is important not to immediately conclude that these themes are unimportant. For example, critical thinking is a critical thinking skill that is very much needed in today's education world, especially to face the challenges of the 21st century that require students to think logically, analytically, and independently. Likewise, collaboration is key in modern learning, emphasizing student cooperation and interaction. Therefore, although these themes appear to be in a weak position in the thematic map, this could be due to the limited number of publications or the lack of indexing in the database used in the analysis. Thus, further study and observation of these themes are needed because they have great potential to be developed in the future, primarily when associated with current relevant educational issues. Researchers need to reconsider these themes so that they are not neglected because they could be the key to the educational renewal and innovation that is currently needed.

In the last quadrant, namely, basic themes, which are basic themes located at the bottom right of the thematic map, several relevant keyword groups were found but have not been widely explored in previous studies. Some keywords included in this group are "teaching, learning, didactical, English, foreign language, higher education, writing, didactic approach, teachers, language teaching, didactic transposition, pedagogy, teacher training, and culture." Although these themes are considered important and have great potential to support the development of studies in foreign language teaching and pedagogy in higher education, the frequency of their appearance in published academic documents is still relatively low. This means these themes have not been the primary focus of existing scientific studies, thus offering a vast space for further exploration. Some examples of studies that have begun to fill this literature gap include: "Didactic and Linguistic Approaches and EFL Teachers' Skilled Development in Benin" by Evariste et al. (2024) which highlights the relationship between didactic approaches and EFL teacher professional development in the African context; "Learning Language, Learning Culture: Teaching Language to the Whole Student" by Kim (2020) which emphasizes the importance of integrating language acquisition and cultural understanding in the learning process; and "From Assessment to Practice: Implementing the AIAS Framework in EFL Teaching and Learning" by Roe et al. (2025), This presents an assessment-based learning model to develop foreign language skills more structured and effectively. Research with the keywords above is very relevant and rarely discussed, thus opening up great opportunities for further exploration. Therefore, further researchers are expected to take advantage of this opportunity to add insight into the literature and strengthen more contextual, innovative, and culture-based foreign language teaching practices in higher education.

This study provides a comprehensive overview of the development of didactic studies in language teaching at the global level over the past ten years, using a bibliometric approach from Scopus data. The results show increased publications until 2022, with the most significant contributions from Russia, Brazil, and the United States. In addition, new themes, such as artificial intelligence and augmented reality in language teaching, have begun to emerge. (Eduardo, Jose, et al., 2021; Kamola & Dildora, 2022). The analysis of collaboration networks highlights the central role of Spain in strengthening cross-country research connections, while thematic mapping identifies mature areas and those that still need further exploration (Arruda et al., 2022).

Theoretically, the results of this study emphasize the importance of expanding the classical didactic framework to accommodate digital innovations and the needs of 21st-century learning (Eduardo et al., 2021). Integrating technologies such as artificial intelligence and augmented reality in language teaching strengthens constructivist learning theories and communicative approaches while challenging traditional models focusing on one-way knowledge transfer (Kamola & Dildora, 2022; Rocha et al., 2019). Another implication is the need for international collaboration and recognition of multilingual contexts in curriculum design, as recommended by UNESCO and global education policy studies (Tilemachou et al., 2025; Yu et al., 2024).

From a practical perspective, the results of this mapping can be used by policymakers to formulate more inclusive and evidence-based language education development strategies. For example, Russia and Brazil have integrated digital technologies in language learning and teacher training, while in Europe, plurilingual approaches and cross-country collaboration are adopted to support linguistic diversity and improve the quality of language education (Dooly & Vinagre, 2022). In Germany, implementing classroom observation and teacher tandem models has been shown to improve the quality of foreign language teaching through peer feedback and didactic innovation. Meanwhile, in Asia, online platforms and mobile applications are expanding access to language learning in remote areas, adapting to local needs and infrastructure limitations.

However, this study has several limitations that need to be acknowledged. Using the Scopus database may lead to representation bias, as English-language publications and countries with better access to reputable journals tend to be over-represented (Ninkov et al., 2021; Yan & Zhiping, 2023). Bibliometric indicators such as h-index and citation count also tend to favor older works and extensive collaborations and do not fully reflect the quality of content or pedagogical innovations that have a local impact (Pessin et al., 2022). Furthermore, bibliometric analysis cannot replace in-depth qualitative studies of classroom learning processes or their real-world impact on learners and needs to be combined with mixed-methods approaches to obtain a more complete picture (Pham & Le, 2024).

Compared to bibliometric studies in mathematics or science education, results in the field of language teaching show its challenges related to the diversity of cultural contexts, national language policies, and the highly varied needs of learner (Dasari et al., 2024) (Fardian et al., 2024). However, cross-disciplinary and cross-country collaboration opportunities are open,

especially in developing adaptive learning models, technology integration, and strengthening research-based teacher training.

Overall, this study provides a theoretical basis and practical suggestions that can be applied in various countries, regardless of their level of educational progress. The results of this study encourage policymakers and practitioners to design language teaching policies that utilise technology, are tailored to local needs, and can respond to global challenges. Cooperation between countries and innovation in teaching methods are key to creating quality and inclusive education in the digital era. This study also provides a comprehensive overview of the development of didactic studies in language teaching worldwide over the past decade. Its main findings include an increase in the number of publications up to 2022, the dominance of contributions from countries such as Russia, Brazil, and the United States, and the emergence of new themes, including artificial intelligence and augmented reality, in language learning (Eduardo, Jose, et al., 2021; Kamola & Dildora, 2022). The analysis of collaboration networks also shows that Spain is vital in strengthening cross-country research collaborations. At the same time, thematic mapping identifies areas already developing and those still needing further exploration (Arruda et al., 2022).

This research has significant global implications for the language education community. One of the main findings is the disparity in geographic distribution, which suggests the need for concerted efforts to expand access and encourage participation in didactic research in language teaching in developing countries (Dooly & Vinagre, 2022). Cross-country collaboration can strengthen knowledge exchange, enrich pedagogical perspectives, and accelerate the adoption of educational technology innovations across cultural and economic contexts (Tilemachou et al., 2025). Second, the emergence of new themes such as AI and augmented reality indicates a significant shift in the way languages are taught. This requires adjustments to education policies and the upgrading of teacher skills worldwide (Eduardo et al., 2021).

These findings are also relevant to the Sustainable Development Goals (SDGs) agenda, especially in supporting quality and inclusive education globally (Yu et al., 2024). Several limitations must be acknowledged to maintain a proportional interpretation of the results. First, this study only used the Scopus database, so publications outside Scopus, including national or regional journals, were not included. This may lead to bias in representing global trends (Ninkov et al., 2021). Second, the bibliometric analysis is quantitative and does not explore in depth the quality of content or the practical impact of each publication (Pessin et al., 2022). Third, the data for 2025 may not have been fully accumulated, so the downward trend in that year should be interpreted cautiously. Furthermore, differences in terms and keywords across countries or disciplines may cause some relevant publications to go unidentified in the search (Yan & Zhiping, 2023).

Several future research agendas can be proposed based on the above findings and limitations. First, comparative bibliometric studies that integrate more databases (e.g., Web of Science, ERIC) are needed to obtain a more inclusive and representative picture (Pham & Le, 2024). Second, in-depth qualitative research is required to examine how didactic innovations such as AI and augmented reality are implemented in different contexts and their impact on

learning outcomes (Rocha et al., 2019). 2019 Third, new or under-researched themes, such as critical thinking and flipped classrooms, must be further explored to enrich the literature and practice of language teaching (Kim, 2020; Roe et al., 2025). Finally, it is essential to encourage broader international collaboration, especially involving countries with low publication numbers, to create a more equitable and sustainable research ecosystem globally (Dooly & Vinagre, 2022).

Overall, this study maps the development of didactic research in language teaching and shows various challenges and opportunities for advancing science and practice at the global level. The implications of the findings recognized limitations, and suggestions for further research are expected to be a reference for researchers, practitioners, and policymakers in improving the quality and relevance of language education in the digital era.

4. CONCLUSION

This study has comprehensively mapped the development of didactic research in language teaching globally over the past decade using a bibliometric approach based on Scopus data. The main findings show a consistent upward trend in publications until 2022, with Russia, Brazil, and the United States as the main contributors and emerging new themes such as artificial intelligence and augmented reality in language teaching. Collaboration network analysis highlights the central role of Spain in strengthening cross-country research connections, while thematic mapping identifies mature research areas and themes that still need further exploration. The study also reveals the imbalance in contributions between countries and the need to expand global collaboration, especially to increase the participation of developing countries.

The global implications of these findings emphasize the importance of integrating technological innovation and international collaboration to enrich language teaching practices and support the goal of inclusive quality education. However, limitations of the study, such as the coverage of the database only on Scopus and the nature of the analysis, which is still quantitative, need to be acknowledged so that the interpretation of the results remains proportional. In the future, comparative bibliometric research across databases and in-depth qualitative studies are needed to examine the implementation of didactic innovation in various contexts and identify new relevant themes. Overall, this research provides a significant contribution as a primary reference for researchers, practitioners, and policymakers in developing innovative, evidence-based, and adaptive language teaching strategies to technological developments and global education needs in the digital era.

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6. REFERENCES

Arruda, H., Silva, E. R., Lessa, M., Proença Jr., D., & Bartholo, R. (2022). VOSviewer and Bibliometrix. *Journal of the Medical Library Association*, 110(3), 392–395.

- <https://doi.org/10.5195/jmla.2022.1434>
- Artigue, M. (2024). A Tribute to Guy Brousseau. *International Journal of Research in Undergraduate Mathematics Education*, 10(1), 4–6. <https://doi.org/10.1007/s40753-024-00235-5>
- Aziiza, Y. F., Rosjanuardi, R., & Juandi, D. (2022). Didactic Design of the Concept of Surface Area of Flat-Sided Prism Based on van Hiele's Theory in Online Learning. *Jurnal Pendidikan Matematika*, 16(1), 73–88. <https://doi.org/10.22342/jpm.16.1.13789.73-88>
- Biehler, R., Durand-Guerrier, V., & Trigueros, M. (2024). New trends in didactic research in university mathematics education. *ZDM – Mathematics Education*, 56(7), 1345–1360. <https://doi.org/10.1007/s11858-024-01643-2>
- Cano, E. V., Andrés, S. M., & López-Meneses, E. (2021). Chatbot to improve learning punctuation in Spanish and to enhance open and flexible learning environments. *International Journal of Educational Technology in Higher Education*, 18(1), 33. <https://doi.org/10.1186/s41239-021-00269-8>
- Costales, A. F. (2021). Audiovisual translation in primary education. Students' perceptions of the didactic possibilities of subtitling and dubbing in foreign language learning. *Meta*, 66(2), 280–300. <https://doi.org/10.7202/1083179ar>
- Dasari, D., Muhammad, I., & Juandi, D. (2024). Crafting math minds: A bibliometric odyssey into innovative didactical designs for learning (2006-2023). *Jurnal Elemen*, 10(1), 181–198. <https://doi.org/10.29408/jel.v10i1.24935>
- Denardi, D. A. C. (2017). Didactic Sequence: A Dialectic Mechanism for Language Teaching and Learning. *Revista Brasileira de Linguística Aplicada*, 17(1), 163–184. <https://doi.org/10.1590/1984-6398201610012>
- Dooly, M., & Vinagre, M. (2022). Research into practice: Virtual exchange in language teaching and learning. *Language Teaching*, 55(3), 392–406. <https://doi.org/10.1017/S0261444821000069>
- Eduardo, N., Jose, O., & Marcelo, Z. (2021a). Augmented Reality to facilitate the process of Teaching—Learning in school textbooks. *2021 Fifth World Conference on Smart Trends in Systems Security and Sustainability (WorldS4)*, 316–321. <https://doi.org/10.1109/WorldS451998.2021.9514007>
- Elmer, S. (2021). Song Transmission as a Formal Cultural Practice. *Frontiers in Psychology*, 12, 654282. <https://doi.org/10.3389/fpsyg.2021.654282>
- Evariste, K. A., Pedro Marius, E., & Toboula Coffi Martinien, Z. (2024). Didactic and Linguistic Approaches and EFL Teachers' Skilled Development in Benin. *Sylwan*. <https://doi.org/10.59879/OsHSs>
- Fardian, D., Suryadi, D., Prabawanto, S., Putri, A. D., & Qamariah, N. (2024). A half century of didactic design in mathematics education: A bibliometric analysis. *Jurnal Gantang*, 9(1), 71–82. <https://doi.org/10.31629/jg.v9i1.6905>
- Febrianti, T. S., Fatimah, S., & Dahlan, J. A. (2024). Identifying Learning Obstacles in Pre-Service Mathematics Teachers' Understanding of Circle Concepts: A Preliminary Study within A Didactical Design Research Framework. *Jurnal Pendidikan MIPA*, 25(1), 419–439.

- <https://doi.org/10.23960/jpmipa/v25i1.pp419-439>
- García, L. D. C. M., & Capoano, E. (2023). Estudo Bibliométrico Sobre Jornalismo de Qualidade na Base de Dados Scopus: Evolução do Tema e Características. *Comunicação e Sociedade*, 44, e023024. [https://doi.org/10.17231/comsoc.44\(2023\).4751](https://doi.org/10.17231/comsoc.44(2023).4751)
- Godino, J. D., Batanero, C., & Burgos, M. (2023). Theory of didactical suitability: An enlarged view of the quality of mathematics instruction. *Eurasia Journal of Mathematics, Science and Technology Education*, 19(6), em2270. <https://doi.org/10.29333/ejmste/13187>
- Goldin, G. A. (2020). Mathematical Representations. In S. Lerman (Ed.), *Encyclopedia of Mathematics Education* (pp. 566–572). Springer International Publishing. https://doi.org/10.1007/978-3-030-15789-0_103
- Hassan, W., & Duarte, A. E. (2024). Bibliometric analysis: A few suggestions. *Current Problems in Cardiology*, 49(8), 102640. <https://doi.org/10.1016/j.cpcardiol.2024.102640>
- Isnawan, M. G., Suryadi, D., Turmudi, T., & Marfuah, M. (2022). Parental Obstacles During Distance Learning Mathematics in Indonesia: A Phenomenology Study. *European Journal of Educational Research*, volume–11–2022(volume–11–issue–2–april–2022), 873–883. <https://doi.org/10.12973/eu-jer.11.2.873>
- Jatisunda, M. G., Suryadi, D., & Prabawanto, S. (2021). Development of competencies for teaching geometry through an analysis learning obstacle. *Journal of Physics: Conference Series*, 1806(1), 012114. <https://doi.org/10.1088/1742-6596/1806/1/012114>
- Kamola, B. A. M., & Dildora, M. (2022). Peculiarities of Didactic Methods in Foreign Language Teaching. *Miasto Przyszłości*, 24(1).
- Kanselaar, G. (1993). The Didactics of Foreign Language Teaching with Multimedia. *Journal of Information Technology for Teacher Education*, 2(2), 251–265. <https://doi.org/10.1080/0962029930020212>
- Kim, D. (2020). Learning Language, Learning Culture: Teaching Language to the Whole Student. *ECNU Review of Education*, 3(3), 519–541. <https://doi.org/10.1177/2096531120936693>
- Kobylarek, A., Alaverdov, E., & Jakubowska, L. (2021). The significance of a pandemic in teaching foreign languages, with special regard to the teaching of seniors. *XLinguae*, 14(1), 73–80. <https://doi.org/10.18355/XL.2021.14.01.06>
- Ninkov, A., Frank, J. R., & Maggio, L. A. (2021). Bibliometrics: Methods for studying academic publishing. *Perspectives on Medical Education*, 11(3), 173–176. <https://doi.org/10.1007/S40037-021-00695-4>
- Oktaviani, W. R., Herman, T., & Darhim, D. (2022). Didactic design to improve mathematical reasoning ability of high school students on derivative application materials. 020047. <https://doi.org/10.1063/5.0096139>
- Pessin, V. Z., Yamane, L. H., & Siman, R. R. (2022). Smart bibliometrics: An integrated method of science mapping and bibliometric analysis. *Scientometrics*, 127(6), 3695–3718. <https://doi.org/10.1007/s11192-022-04406-6>
- Pham, X.-L., & Le, T. T. (2024). Bibliometric Analysis and Systematic Review of Research on Expert Finding: A PRISMA-guided Approach. *The International Arab Journal of Information Technology*, 21(4). <https://doi.org/10.34028/iajit/21/4/9>

- Prabowo, A., Suryadi, D., Dasari, D., Juandi, D., & Junaedi, I. (2022). Learning Obstacles in the Making of Lesson Plans by Prospective Mathematics Teacher Students. *Education Research International*, 2022, 1–15. <https://doi.org/10.1155/2022/2896860>
- Puspita, E., Suryadi, D., & Rosjanuardi, R. (2023). The Effectiveness of Didactic Designs for Solutions to Learning- Obstacle Problems for Prospective Mathematics Teacher Students: Case Studies on Higher-Level Derivative Concepts. *Mathematics Teaching-Research Journal*, 15(3), 5–29.
- Riegel, U., & Rothgangel, M. (2022). Designing Research in Subject Matter Didactics. Results and Open Questions of a Delphi Study. *Research in Subject-Matter Teaching and Learning (RISTAL)*, 5(1), 56–77. <https://doi.org/10.2478/ristal-2022-0106>
- Rocha, S., Paula, S., Au-Yong-Oliveira, M., & Branco, F. (2019). Technology as a didactic method of language teaching An approach to the impact, advantages and future. *2019 14th Iberian Conference on Information Systems and Technologies (CISTI)*, 1–6. <https://doi.org/10.23919/CISTI.2019.8760619>
- Roe, J., Perkins, M., & Furze, L. (2025). *From Assessment to Practice: Implementing the AIAS Framework in EFL Teaching and Learning* (Version 1). arXiv. <https://doi.org/10.48550/ARXIV.2501.00964>
- Rohaeti, E. E., Nurjaman, A., Sari, I. P., Bernard, M., & Hidayat, W. (2019). Developing didactic design in triangle and rectangular toward students mathematical creative thinking through Visual Basic for PowerPoint. *Journal of Physics: Conference Series*, 1157, 042068. <https://doi.org/10.1088/1742-6596/1157/4/042068>
- Senjayawati, E., Isnawan, M. G., Sugiman, S., & Arliani, E. (2025). Didactical Design Based on Lesson Studies for Enhancing Problemsolving Abilities when Learning Numerical Patterns. *Mathematics Teaching-Research Journal*, 17(2), 129–153.
- Steingartner, W. (2021). On some innovations in teaching the formal semantics using software tools. *Open Computer Science*, 11(1), 2–11. <https://doi.org/10.1515/comp-2020-0130>
- Straková, N., & Hrmo, R. (2024). Didactic Design of Teaching Materials Created by Future Teachers in the Czech Republic. *International Journal of Engineering Pedagogy (ijEP)*, 14(5), 4–23. <https://doi.org/10.3991/ijep.v14i5.47441>
- Sulistiyani, N., Prasajo, L. D., Purnomo, Y. W., Ardhana, S. S., Fitriya, Y., & Putri, Y. D. (2024). Epistemological Didactical Situation of Learning Factors and Multiples in Elementary School Students. *Mathematics Teaching-Research Journal*, 16(5), 66–91.
- Supriadi, S. (2022). Elementary school students reflection: Didactical design analysis on integer and fraction operations on mathematical concepts with Sundanese ethnomathematics learning. *Pegem Journal of Education and Instruction*, 12(4). <https://doi.org/10.47750/pegegog.12.04.19>
- Supriyadi, E., Suryadi, D., Turmudi, T., Prabawanto, S., & Dahlan, J. A. (2023). Didactical Design Research: A Bibliometric Analysis. *Journal of Engineering Science and Technology*, 18(3), 153–160.
- Suryadi, D. (2019). *Penelitian Desain Didaktis (DDR) dan Implementasinya*. Gapura Press.
- Tampa, A., Ja'faruddin, & Firdaus, A. M. (2024). Manipulative interactive didactics with puzzles:

- An effective solution for overcoming junior high school students' learning obstacles to quadrilateral materials. *International Journal of Education and Practice*, 13(1), 210–229. <https://doi.org/10.18488/61.v13i1.3992>
- Tilemachou, S., Nicolaou, A., & Parmaxi, A. (2025). Integrating Sustainable Development Goals into Foreign Language Teaching and Learning Contexts with the Use of Technology: A Systematic Literature Review. In P. Zaphiris, A. Ioannou, R. A. Sottolare, J. Schwarz, & M. Rauterberg (Eds.), *HCI International 2024 – Late Breaking Papers* (Vol. 15378, pp. 137–155). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-76815-6_11
- Torres, A. R., & Ponce, E. P. (2012). Digital Storytelling as a Pedagogical Tool within a Didactic Sequence in Foreign Language Teaching. *Digital Education Review*, 22, 1–18.
- Vera, P. G. (2021). Building bridges between audiovisual translation and English for Specific Purposes. *Ibérica*, 41, 83–102. <https://doi.org/10.17398/2340-2784.41.83>
- Yan, L., & Zhiping, W. (2023). Mapping the Literature on Academic Publishing: A Bibliometric Analysis on WOS. *Sage Open*, 13(1), 21582440231158562. <https://doi.org/10.1177/21582440231158562>
- Yu, B., Guo, W. Y., & Fu, H. (2024). Sustainability in English Language Teaching: Strategies for Empowering Students to Achieve the Sustainable Development Goals. *Sustainability*, 16(8), 3325. <https://doi.org/10.3390/su16083325>