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A Scientometric Analysis and Critical Review of Research on English for Specific Purposes

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Abstract

A few researchers conducted systematic reviews of literature on this field to understand the historical development of English for Specific Purposes. However, a holistic review combining scientometric analysis and critical review in the last ten years is still lacking. Based on 1528 bibliometric records from 2011 to 2022 retrieved from the Web of Science core collection, the study aims to provide a systematic and objective overview of ESP research via Citespace. The results provide references for understanding this field's research status quo, themes, and current trends.

Keywords: English for Specific Purposes; Scientometric analysis; Trends; Citation

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1.0 Introduction

English for Specific Purposes (ESP), mostly involving non-native speakers of English in academic and professional settings, focuses on studying, teaching, and researching specialized English varieties (Liu & Hu, 2021). Research on ESP began in the 1960s when the unprecedented development in science, technology, economics, and international trade gave rise to the inception of ESP. Based on its interdisciplinary and constantly developing nature, ESP has become one of the most dynamic and active subjects in foreign language teaching and research (Hu, 2019). With the ongoing development of ESP research, a few researchers (Basturkmen, 2021; Johns, 2012; Liu & Hu, 2021; Xu et al., 2022) conducted reviews of ESP literature. However, a systematic, objective, and scientometric analysis (SA) of ESP literature from 2011 to 2022 from an international perspective is lacking. Scientometric analysis (SA) is a quantitative method that analyzes large-scale literature and maps a specific field's overall knowledge structures, hotspots, evolutions, and emerging trends (Zhou et al., 2019). Through processing massive amounts of bibliometric data, SA addresses the limitations of conventional reviews in their subjective and impressionistic description and helps researchers find the hidden paths and concepts in the literature that may be overlooked by manual reviews (Zhong et al., 2019). Citespace is a bibliometric software that analyzes massive literature, generates visualized networks, and facilitates identifying and understanding research hotspots, knowledge evolution, and current trends in a particular domain (Chen, 2017; Zhong et al., 2019).

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Given the above, this paper aims to provide an objective and scientific overview of the literature on ESP research from 2011 to 2022 through the combination of SA using the latest version of Citespace 6.1. R6 and critical review of cited literature manually. The research objectives are to examine the research status quo, themes, and current trends of ESP research during this period. The research questions are as follows:

1. What is the status quo of ESP research from 2011 to 2022?
2. What are the themes that emerged in ESP research from 2011 to 2022?
3. What are the current trends in ESP research?

2.0 Literature review

Johns (2012) reviewed the history of ESP research and divided it into four sections based on their respective features. During the Early Years (1962-1981), research focused on English for science and technology in academic contexts. The second stage is the Recent Past (1981-1990) when the research scope broadened and some central concepts, including genre and rhetorical moves, were introduced. During this period, the main research focus was the training of teachers and other teaching practitioners, Vocational English, interlanguage, etc. The Modern Era (1990-2011) featured increasing articles on ESP in international journals and the dominant roles of genre and corpus studies. Johns (2012) predicted that the trends of the fourth stage, i.e., the Future (2011 plus), were international authorship, different roles of researchers, varied methodologies, multimodal coursebooks, varied locales of ESP teaching, such as business, law, and other professions, and genre-awareness teaching approach. However, his study is a descriptive and manual analysis focusing on the period from 1962 to 2011, and the years after 2011 were not included. Basturkmen (2021) delved into key research themes within ESP. The review maintained that teaching practice and linguistic analysis have been deep-seated entrenchment in this field, and underscored new areas, including varied teaching methodologies and the educational requirements of ESP teachers. These areas were identified as promising avenues for future research endeavors. These previous reviews provide insights into historical developments and research topics in this field, but they are conventional and narrative reviews based on researchers' subjective perspectives.

To complement the conventional reviews, a few researchers adopted systematic and scientometric techniques. Xu et al. (2022) visualized the research focus and frontiers of English for Academic Purposes (EAP) internationally in the past three decades (1985-2021). Their study emphasized critical areas such as genre analysis, academic vocabulary, and academic research. Furthermore, the paper recommends future EAP research to concentrate on academic English literacy, corpus-oriented research, EAP teaching practice, and EAP instruction in the digital era. The focus is on EAP, whereas the holistic review of ESP research was not included. Liu and Hu (2021) adopted SA and conducted a detailed overview of ESP research from 1980 to 2018. Utilizing co-citation analysis, it identified 11 major research clusters, representing the evolution of the field across different stages. The study mapped out the field's development, highlighting key areas of research interest. However, their study only adopted the co-citation method and focused on articles from two leading journals in this field. In addition, articles published after 2018 were not included. The present study aims to fill the gap.

3.0 Methodology

As mentioned, this paper is an objective and scientific review of ESP research through the combination of SA and critical review. Fig. 1 presents the research design. SA of literature on ESP objectively maps the knowledge area, and a critical review of related articles aims to identify the research status quo, key research themes, and current trends.

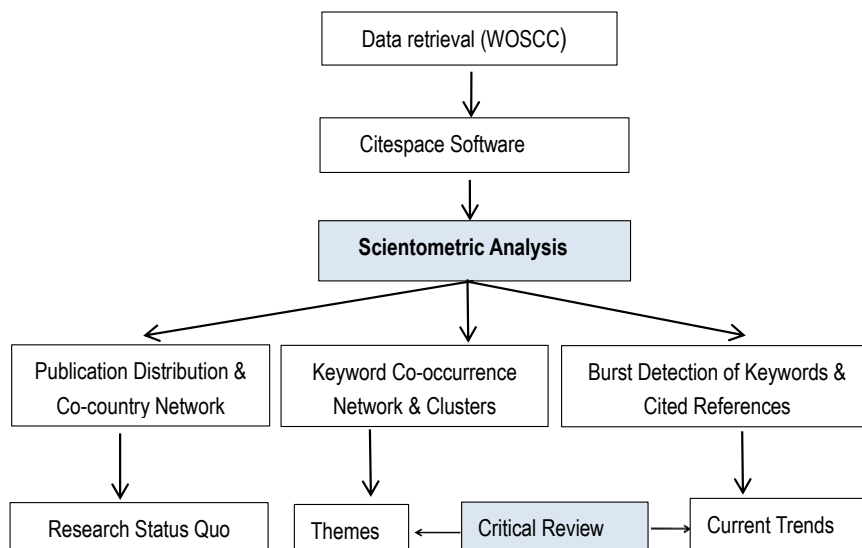


Fig 1: Outline of research design
(Source: Authors, 2023)

3.1 Data collection and processing

The dataset for this review was obtained from the Web of Science Core Collection (WOSCC) on 20 January, 2023. In the search queries to the WOSCC database, Chen’s data collection method (Chen, 2017) was adopted. First, the queries input the topic terms “English for Specific Purpose*”, “English for Academic Purpose*”, “English for Occupational Purpose*”, and the subbranches of EAP and EOP, including “English for Science and Technology”, “English for Medical Purposes”, “English for Legal Purposes” and “English for Finance and Economics”, etc. based on the ESP classification of Dudley-Evans and St. John (1998). Therefore, publications that mention these ESP branches in titles, abstracts, and/or keywords were all included in the dataset. The document types of “Article” or “Review”, and the language of “English” were selected to refine the results of records (Chen, 2017; Jia & Harji, 2023). Only articles and reviews were retained after removing editorial, meeting abstract, letter, book review, and duplicated literature (Diao et al., 2022). The publication date was set from 1 January, 2011 to 31 December, 2022. The final dataset of 1528 records was obtained for further data analysis.

3.2 Data analysis

This study used Citespace 6.1. R6 for SA of ESP research to visualize and analyze knowledge networks. First, to understand the research status quo of ESP research, publication distribution was analyzed to reveal the temporal characteristics, and for the spatial characteristics, the author co-citation analysis was conducted to identify the collaboration relations among researchers (Zhong et al., 2019). There are many forms of research collaboration networks, such as co-author network, co-institute network, and co-country network. This paper focused on the co-country network. Second, the co-word analysis, including keyword co-occurrence network and keyword clusters, was carried out to detect the salient keywords and the main clusters. A critical review of related articles was then conducted to classify the clusters further and identify the key themes. Last, burst detection of keywords (co-word analysis) and cited reference (document co-citation analysis) was carried out to detect the current trends, and a critical review of citing articles of the burst keywords and references was conducted to understand the trends further.

4.0 Findings & Discussions

4.1 Research status quo

ESP research publications and spatial distributions are good ways to understand the research status quo (Diao et al., 2022; Wang et al., 2020). The publication distribution of the 1528 records on ESP research retrieved from the WOSCC database can be seen in Fig. 2.

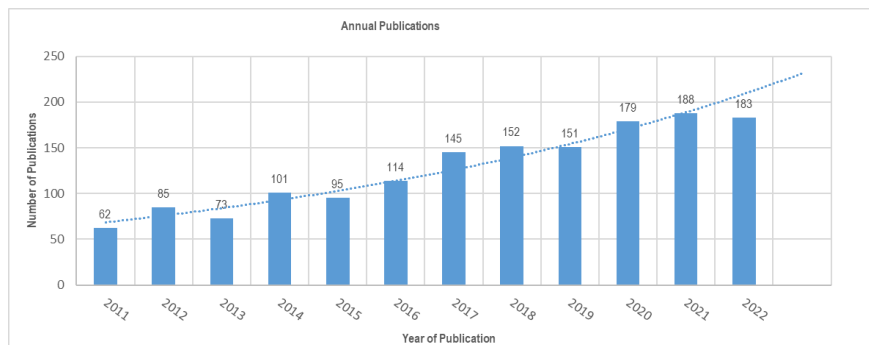


Fig 2: Annual publications on ESP (2011-2022)
(Source: Authors, 2023)

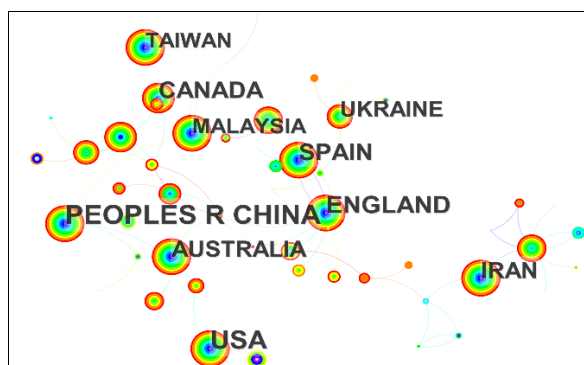


Fig 3: Co-country network of ESP research (2011-2022)
(Source: Authors, 2023)

extracted from titles, keywords, and abstracts of the literature within the cluster (Chen, 2017). Through the clustering function in Citespace, a total number of 18 clusters were generated in ESP research. The modularity of the cluster network is 0.7735, and the mean silhouette score is 0.9075, implying that the cluster members have high homogeneity and that the clustering is highly reasonable (Guo & He, 2020). After viewing the keywords within each cluster respectively and selecting the most representative keywords as labels, the major 12 clusters are presented in Fig. 5. Major clusters include “pedagogy”, “corpus”, “higher education”, “discourse”, “genre analysis”, “needs analysis”, “research article”, “teacher”, etc.

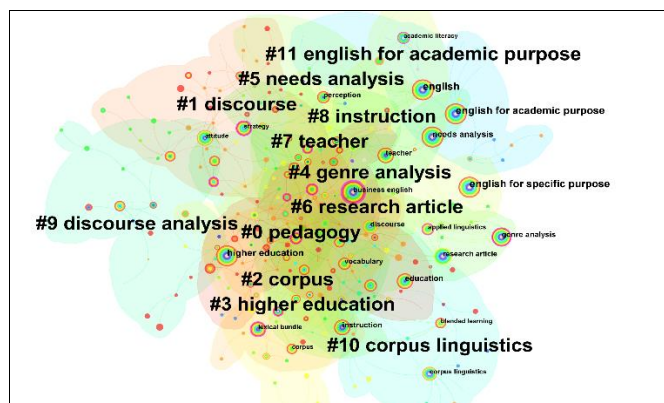


Fig 5: Major clusters of ESP research (2011-2021)
(Source: Authors, 2023)

However, the cluster results show that some cluster labels overlap, and some cannot represent the articles within the clusters. Therefore, a critical review was needed to remove or combine clusters by reviewing the keywords and abstracts of articles (Zhong et al., 2019). "Node Details" of keywords show the citation details of the corresponding keywords in the literature. Through viewing the "Node Details", more information about the articles can be obtained. Based on the keyword co-occurrence network, major clusters, and the critical review of "Node Details" of keywords, seven themes can be summarized, i.e., "pedagogy", "genre", "corpus", "needs analysis", "learning behaviours", "teacher", and "ESP branches".

The first theme, "pedagogy," covers the keywords of "instruction", "strategy", "classroom", "blended learning", etc. Many researchers have attempted various teaching approaches, such as the genre-based approach (Selvaraj & Aziz, 2019), corpus-based approach (Green & Lambert, 2018; Otto, 2021), and blended learning (Dovhanets, 2020) in their ESP courses. Classroom-based research, especially different pedagogies, continues to be a predominant topic from 2011 to 2022 and thereafter.

The second theme, "genre," is a highly salient term in ESP research (Johns, 2012), and includes keywords such as "genre analysis", "discourse", "genre knowledge", "research articles", etc. Yu and Bondi (2017) adopted the genre analysis approach for ESP to examine the generic structures of corporate social responsibility reports. Based on a genre-based analytical framework. Lim (2017) looked into linguistic strategies and language choices in research reports published in language education journals. The topic of genre, especially research on academic genres, will continue to predominate in this field (Xu et al., 2022).

The third theme is "corpus", including keywords of "corpus linguistics", "vocabulary", "lexical bundle", etc. This trend is also glaringly obvious during the period from 2011 to 2022. Green and Lambert (2018) provided secondary school education with vocabulary lists to promote disciplinary literacy for specific disciplines, including Biology, Chemistry, Economics, Mathematics, Physics, etc. Otto (2021) adopted a corpus-based approach to identify 18 words prevalent in civil engineering writing and well suited to data-driven learning.

The fourth theme is "needs analysis", including keywords of "needs", "learning needs", "motivation", etc. NA is essential to ESP and EAP courses and an integral part of curriculum development. NA was a dynamic process to collect and analyze learners' learning needs, constructing a teaching form with a common goal, and finally enabling learners to master relevant knowledge. It provides validity and relevancy for the course content and activity design (Sönmez, 2019).

The fifth theme, "learning behaviours", covers a wide range of keywords, such as "higher education", "performance", "perception", "literacy", "attitude", "proficiency", etc. ESP research mainly focuses on ESP learning and students' learning behaviours in higher education (Rose et al., 2020). The sixth theme "teacher" mainly refers to the professional training or development of ESP teachers. Bahrami et al. (2019) presented the personal and institutional barriers for Irian EAP teachers with different disciplinary backgrounds to conduct research practice. Research by and about EAP instructors is still underdeveloped (Du et al., 2022). The seventh theme, "ESP branches", mainly focuses on BE, Medical English (ME), Engineering English, etc.

4.3 Current trends

The Burst detection function in Citespace can find the keywords or cited articles that receive special attention from researchers during a period, therefore identifying emerging research trends (Jia & Harji, 2023). Both the burst keywords and cited articles are important indicators of current trends and future directions of a research field (Zhou et al., 2019). To reveal the current trends in ESP research, the relevant literature on ESP from 2011 to 2022 was analyzed for burst detection, including keyword citation burst and reference citation burst. Table 2 presents the top ten keywords that have the strongest citation bursts, as well as their burst strengths and burst duration.

Table 2: Keyword burst detection of ESP research (2011-2022)

Keywords	Strength	Burst Duration	Keywords	Strength	Burst Duration
research article	6.36	2011-2016	proficiency	4.62	2014-2015
academic literacy	4.09	2011-2012	technology	3.25	2017-2019
corpus linguistics	3.69	2011-2013	English-medium instruction	3.57	2018
business English	3.84	2011-2016	belief	3.4	2020-2022
EAP	5.75	2012-2013	reading comprehension	3.67	2021-2022

It can be seen that "research articles" and "EAP" have the highest burst strengths. It indicates that compared with EOP, EAP is the area where researchers have concentrated, and research articles in the field of EAP have gained the most academic attention. In addition to its highest burst strength, "research article" has the longest duration of burst, which, as a major academic written genre, has long been the research focus (Johns, 2012). Another keyword with the longest duration of burst is "Business English", which is an important branch of EOP and received considerable academic attention from 2011 to 2016. "Technology" and "English-medium instruction" are highly dynamic keywords from 2017 to 2019. Recent current trends can also be identified by the burst of "belief" and "reading comprehension", which remain active till 2022. Citing articles that contain additional information facilitates the understanding of the current trends (Chen, 2017). The major citing articles of "belief" and "reading comprehension" that were published most recently and have been cited most frequently are presented in Table 3.

Table 4: Major citing articles of detected keywords

Article	Authors
Understanding novice teachers' perceived challenges and needs as a prerequisite for English curriculum innovation	Jiang et al. (2020)
EAP in the expanding circle: Exploring the knowledge base, practices, and challenges of Iranian EAP practitioners	Kaivanpanah et al. (2021)
Predicting integrated writing task performance: Source comprehension, prewriting planning, and individual differences	Payant et al. (2019)
Corpus Linguistics Methods for Building ESP Word Lists, Glossaries and Dictionaries on the Example of a Marine Engineering Word List	Durovic (2021)
Developing critical thinking in reading comprehension of texts for specific purposes at all levels of Bloom's taxonomy	Horváthová and Nađová (2021)

As seen in Table 4, "belief" refers to teachers' beliefs and perceptions about their roles, competence, and challenges in ESP or EAP teaching (Jiang et al., 2020; Kaivanpanah, et al., 2021). Jiang et al. (2020) and Kaivanpanah et al. (2021) both examined ESP instructors' challenges and needs through NA to provide support and suggestions for their teaching practice. In terms of "reading comprehension", Payant et al. (2019) found that students' academic reading ability is an important predictor of students' academic writing. Durovic (2021) and Horváthová and Nađová (2021) suggested a practical vocabulary tool or an e-learning platform to enhance students' reading comprehension of academic texts. It can be indicated that ESP teacher development, technology-assisted corpus teaching, and cultivation of students' academic literacy that encompasses both reading and writing, are new research frontiers.

5.0 Conclusion & Recommendations

This study conducted a scientometric-assisted review of ESP research using Citespace. 1528 bibliographic records published between 2011 and 2022 were collected from the WOSCC database. Various graphs and networks were generated and analyzed to examine the research status quo, key themes, and current trends of ESP research.

First, the research status quo, i.e., the temporal and spatial characteristics of ESP research, was identified. It is evident that ESP research has undergone exponential growth in the last decade, and shows highly international authorship and cooperation. Second, the co-occurrence network and clusters were generated to identify the key themes of ESP research, including "pedagogy", "genre", "corpus", "needs analysis", "learning behaviours", "teacher", and "ESP branches". Last, the results of keyword and citation burst detection, as well as a critical review of citing articles of burst keywords, were examined to explore the current trends in ESP. ESP teacher development, technology-assisted corpus teaching, and academic literacy, are the new research focus.

Several limitations of this study are acknowledged. First, this study used only Citespace, but SA can be conducted using other tools, such as BibExcel, VOSviewer, Science of Science (Sci2) Tool, CiteSpace, etc. Different tools may lead to different results. Second, this study focused on articles retrieved from the WOSCC database in the language of English, which represented the international level and excluded regional journals in other languages. Future studies on ESP are recommended to focus on a more localized context or compare the local trends with the international ones.

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Paper Contribution to Related Field of Study

The findings presented in this paper provide ESP researchers and practitioners with several research networks and insights to facilitate the understanding of ESP and promote further research in this field.

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