A Bibliometric Analysis of English for Specific Purposes from 2011 to 2023 Using Citespace: Visualizing Status, Themes, Evolution, and Emerging Trends

Sining Tan [1], **Madhubala Bava Harji** [2], **Xiaogang Hu** [3]

[1] Canvard College, Beijing Technology and Business University, Beijing, China
[2] SEGI University & Colleges, Kota Damansara, Selangor, Malaysia
[3] Xinyu College, Jiangxi, China

ABSTRACT

Introduction: Research on English for Specific Purposes (ESP) emerged in the 1960s. A few researchers conducted reviews on ESP literature. However, there is currently a lack of up-to-date and comprehensive bibliometric analysis covering the last decade from an international perspective, particularly covering the last decade's developments in ESP research.

Purpose: Combining bibliometric analysis and systematic review of the literature on English for Specific Purposes, this study serves to objectively maps the knowledge area, and aims to identify the current status, major research themes, evolution, and the emerging trends in this field.

Method: To maintain the objectivity and transparency, the review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses protocol. Based on literature retrieved from the Web of Science core collection, a total of 1657 bibliometric records published from 2011 to 2023 were visualized and analyzed via Citespace.

Results: The current research status through publication distribution and co-country network shows that the research is undergoing a steady increase and international authorship. Clusters and systematic review of citing articles indicate four themes, i.e., "linguistic inquires", "teaching pedagogy", "student learning", and "teacher development". Through the timezone view of keyword co-occurrence network, four features, such as the predominance of genre, corpus and pedagogy, varied pedagogies, varied research methodologies, and technology-assisted teaching, were identified. The keyword and citation burst detection, as well as systematic review of citing articles, were conducted to identify the research trends. It is found that EAP, teacher development, needs analysis in under-researched settings, as well as EMI and Corpus-based teaching pedagogies are the new frontiers in this field.

Conclusion: The field of English for Specific Purposes continues to experience exponential growth and development, indicating an ongoing expansion and advancement of research in this area. This paper provides references for researchers to understand the status, hidden structure, evolution, and emerging trends of research on English for Specific Purposes.

KEYWORDS

English for Specific Purposes, bibliometric analysis, trends, citation, visualization

INTRODUCTION

English for Specific Purposes (ESP) primarily caters to non-native English speakers in academic and professional contexts, with a particular emphasis on the learning, teaching, and researching specialized variations of the English language (Belcher, 2006). It is a language teaching approach in which all decisions as to the teaching content and methods are determined by the academic, professional, social and cultural needs of the learners (Hutchinson & Waters, 1987). The main aim of ESP is to facilitate the communication or the social and psycho-

logical integration of learners into "the target professional or academic community in which communication is fostered mainly in English" (Vesna, 2022, p.118). Due to its interdisciplinary nature and continuous evolution, ESP has emerged as a highly dynamic and vibrant field within foreign language education and research (Hu, 2019).

The 1960s marked the commencement of ESP research, spurred by significant advancements in science, technology, economics, and global trade. Johns (2012) conducted a historic overview of ESP development, and divided it into four stages of development. The foci of interest during the Early Years (1962-1981) were English for science and technology in academic settings, and rhetorical and discourse analysis. 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. This period saw a shift in research focus towards ESP practitioner training, vocational English, and interlanguage. Modern Era (1990-2011) witnessed a surge in ESP-related publications in international journals, and a prominent focus on genre analysis research, accompanied by thorough exploration of corpus studies. According to Johns (2012), the anticipated developments in the fourth stage, i.e., the Future (2011 plus), included international authorship, the different roles of ESP practitioners in teaching, curriculum design, material creation, collaboration, research, and assessment. Additionally, this stage was expected to feature diverse methodologies, multimedia course materials, a broad spectrum of ESP teaching contexts, and a teaching focus on genre awareness.

LITERATURE REVIEW

To understand the existing repository of knowledge of a specific field, literature review is a prerequisite (Jia & Harji, 2023). More recent reviews of ESP research (Basturkmen, 2021, 2022; Dou et al., 2023; Hu, 2019; Hyland & Jiang, 2021; Liu & Hu, 2021) have provided insights into the current development in this field. Basturkmen (2021) drew upon her twenty years of experience as an academic in ESP and English for Academic Purposes (EAP), and explored key research themes in ESP literature, including well-established topics and emerging areas of interest. Linguistic analysis has been a significant focus, driven by the need for linguistic descriptions to inform ESP pedagogy. The ESP literature also contains many case studies on teaching practices. The review highlights underexplored areas such as learning ESP, diverse teaching practices, and the educational needs of ESP practitioners, suggesting these as promising avenues for future research. In another study, Basturkmen (2022) randomly selected 23 articles from 2018 to 2020 issues of the field's flagship journal *English for Specific Purposes* for empirical studies in the Asia Pacific region to identify recent themes in ESP research. Four broad themes emerged from the sample, including teacher/student identity issues, teaching/learning applications, under-researched contexts,

and linguistic inquiries. This conclusion supported her findings in the previous study.

Dou et al. (2023) conducted a review on ESP literature from the 1960s to 2023, and summarized the distinctive characteristics of various stages in the development of ESP. They concluded that needs analysis remained central to ESP, but its conceptualization has evolved from purely target situation analysis to also considering learning processes and contexts. Technology was transforming ESP through data analysis, materials design, and online learning platforms. They predicted that the future would likely see more research on intercultural communication, continued technology impacts, and needs analysis that incorporates learner motivation and perspectives.

In general, these studies provide valuable insights into the research trends of ESP literature. However, these studies are conventional reviews that adopt a descriptive and impressionistic approach, relying on manual analysis or personal experiences. A few quantitative reviews (Hu, 2019; Hyland & Jiang, 2021; Liu & Hu, 2021) used a more objective and statistical method, i.e., Bibliometric Analysis (BA). BA is a robust approach to delve into extensive literature sets in a quantitative manner, aiming to unveil the intellectual framework and emerging patterns within a specific field (Diao et al., 2022). BA addresses the limitations of conventional or narrative reviews that depend on the experiential and intuitive viewpoints of their authors (Liu & Hu, 2021). It aids researchers in uncovering concealed trends and concepts within the literature that manual reviews may inadvertently miss (Diao et al., 2022; Zhong et al., 2019).

Hu (2019) conducted BA of ESP research in China from 2000 to 2017, mapping out the research hotspots and trends, including ESP teaching methodologies and models, needs analysis, and ESP curriculum development and design. They suggested that future exploration should focus on areas such as developing an ESP evaluation system, investigating ESP instructors, building ESP corpora, and enhancing ESP textbook development. Their BA primarily focused on the Chinese context rather than on a global scale. Hyland and Jiang (2021) also adopted the bibliometric analysis approach to examine the EAP literature from 1980 to 2020, to analyze shifts in research themes, influential publications, author contributions, and geographical sources. They found a sustained interest among researchers in teaching, learning, and classroom methodologies. From 2001, a significant portion of research has shifted its focus towards examining the contexts, discourses, identity, educational practices, and genre, and more involvement of Asian countries in the field. The focus of this study is on one branch of ESP, i.e., EAP, instead of ESP.

By looking into the ESP field from an international perspective, Liu and Hu (2021) used bibliometric and visual analysis techniques to systematically map and quantify the research
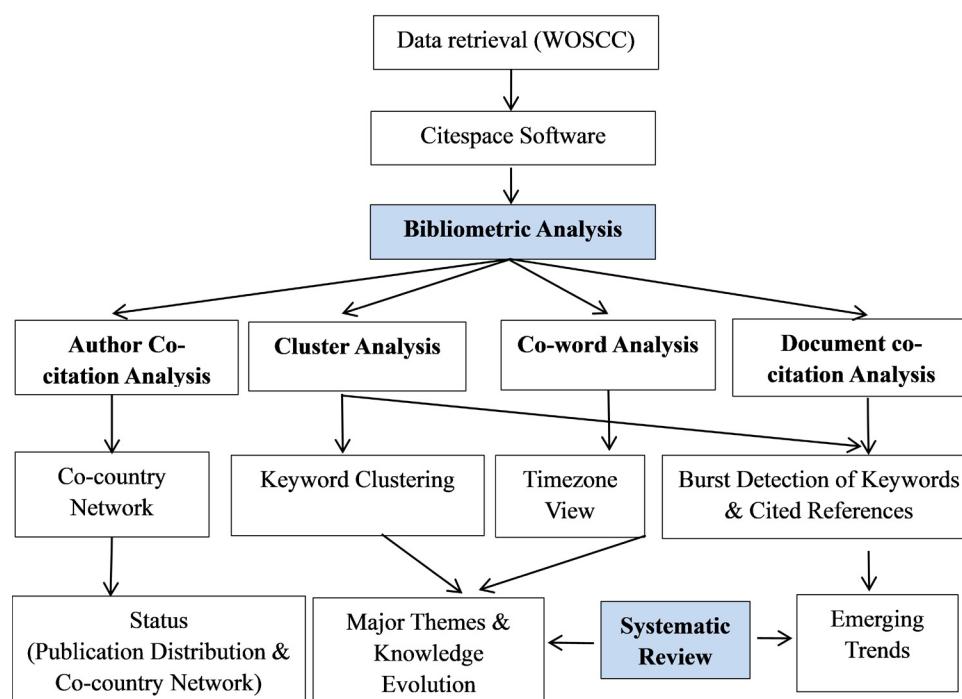
topics, influential publications, and historical trends of based on citation data. 1092 articles published from 1980 to 2018 in two flagship journals, *English for Specific Purposes* and *Journal of Journal of English for Academic Purposes*, were analyzed. They provided a theme-based three-staged characterization of ESP development, which corresponds mostly to that of ESP's historical phases in the study of Johns (2012), but presented a more comprehensive and objective evolution map of ESP literature. However, this review has certain limitations. It relied solely on articles from the two lead journals as its source data, utilized only the co-citation analysis technique, and did not include articles published from 2019 to 2023. Thus, there is a need for a more up-to-date and systematic review that includes the latest ESP research and its sub-branches with more analysis techniques.

In view of the above, this study adopted Citespace, one of multiple tools for BA, to analyze the literature on ESP research from 2011 to 2023. Citespace is a now a widely used tool in BA and data visualization to unfold research patterns, hotspots and evolution trends in fields such as medicine, demography, sociology, geography, education, and related fields (Jiang et al., 2022; Sun & Asmawi, 2022; Tu et al., 2022). Through visualizing some knowledge networks in ESP literature, this study aims to address the following research questions:

(1) What is the current status of ESP research from 2011 to 2023?

(2) What are the major themes of ESP research from 2011 to 2023?

(3) How did ESP research evolve from 2011 to 2023?

(4) What are the emerging trends in ESP research from 2011 to 2023?

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

METHOD

Using BA, this study provides a quantitative, objective, and systematic overview of literature on ESP. The methodology of systematic review was also adopted. The research design is presented in Figure 1. Publication distribution and co-country network were analyzed to identify the research status, cluster analysis was conducted to examine the major themes, timezone view of keyword co-occurrence network and burst detection, along with systematic review, were carried out to explore major themes, knowledge evolution, and emerging trends.

Data Collection and Processing

The literature quantity with the time distribution figure can shed light on the research status and development of the discipline or the field, which works as a prediction for future research trends (Diao et al., 2022; Fu et al., 2021). This review

Figure 1
Research Design

adapted a modified diagram of Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA).

This review obtained data from the Web of Science Core Collection (WOSCC) on September 25, 2023, because the WOSCC included high-quality journal literature widely recognized and influential worldwide, and is suited for extensive and bibliometric analysis on a large scale (Jia &Harji, 2022). The ESP classification of Dudley-Evans and St. John (1998) was adopted in the process of the search queries. ESP can be classified into two categories: EAP and English for Professional Purposes (EOP). Both EAP and EOP can be further divided into several branches, as seen in Figure **2**.

Topic terms comprised all the sub-branches of ESP, including English for Science and Technology, English for Medical Purposes, English for Legal Purposes and English for Finance and Economics, etc., Therefore, publications that mention these ESP branches in titles, abstracts, and/or keywords were included in the data.

Inclusion and Exclusion Criteria

As suggested by Jia and Harji (2022), and Wang et al. (2023), some inclusion and exclusion criteria were adopted in data collection and screening. The literature database was obtained from the WOSCC. During this stage, the publication time, language, topic, and document types were set as inclusion and exclusion criteria.

Firstly, according to Hwang and Tsai (2011), reviewing literature published over the past decade serves as an effective

approach for identifying patterns and trends in the educational field. Building upon the study of Johns (2012), the time span for this research was set from 1st January, 2011 to 25th September, 2023, excluding publications in other years. Secondly, in terms of language, the publications in the English language were included, excluding papers in other languages. In addition, the filters of document types "Article" or "Review" were applied to refine the results (Chen, 2017; Jia & Harji, 2023). As for topic, all branches of ESP were used in the data retrieval.

Following the modified PRISMA diagram (Wang et al., 2023) and Chen's methodology (2017) in data retrieving for Citespace, the search query input the topic term "English for Specific Purpose*" in the WOSCC database. This query yielded 750 records as SET #1. Similarly, two more queries were conducted using the terms "English for Academic Purpose*" and "English for Occupational Purpose*", along with sub-branches of EAP and EOP, maintaining the same document type and language restrictions. These queries resulted in 997 and 415 records for SET #2 and SET #3, respectively. Subsequently, SET #1 to SET #3 were combined using "OR", and the amalgamation of these search results led to the retrieval of the final 2075 records (Figure 3).

In the first round of screening, only 1981 publications in the field of linguistics or education were included. All other publications beyond these two fields were excluded, because they were different to the subject of this review (Wang et al., 2023). All the 1981 records were downloaded and saved in "Abstract and full record (including cited references)", and input into Citespace for data analysis. In the second

Figure 2
ESP Classification
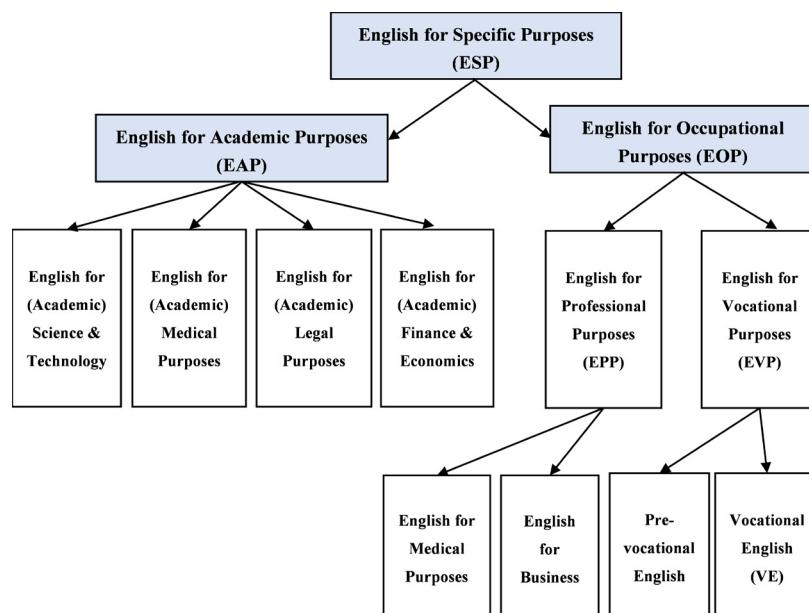
Note. From *"Developments in English for Specific Purposes: A Multi-Disciplinary Approach,"* by T. Dudley-Evans & M. J. St John, 1998, Cambridge University Press. Copyright 1998 by Cambridge University Press.

Figure 3
Topic Search Queries
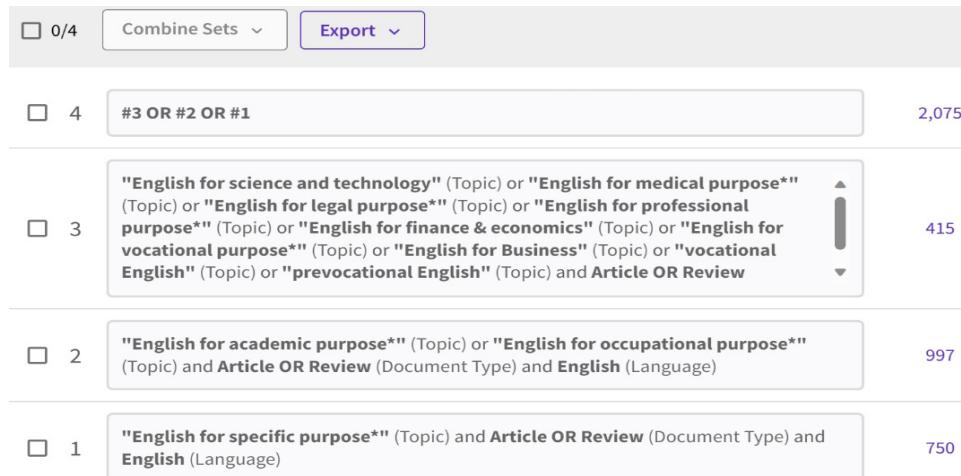
round of screening, the de-duplication function in Citespace screened and excluded again 324 conference proceedings, book chapter, editorial materials, meeting abstract, book review, and duplicate publications. Only articles (1608) and reviews (49) were retained after removing the above-mentioned document types and duplicated literature (Diao et al., 2022). The dataset of 1657 articles or reviews was retained for BA. The modified PRISMA flow diagram is shown in Figure **4**.

Data Analysis

Using Citespace 6.1. R6 for BA, this study used four techniques, including author and document co-citation analysis, co-word analysis, and cluster analysis (Chen, 2017).

First, the study examined the current state of ESP research by analyzing the distribution of publications, focusing on temporal patterns. Additionally, author co-citation analysis was employed to understand collaboration among researchers, specifically concentrating on co-country networks (Zhong et al., 2019). Second, the co-word analysis, specifically keyword clusters, was conducted to identify prominent thematic clusters. This was followed by an in-depth review of related articles to categorize the clusters and pinpoint major themes. Third, timezone view of keyword co-occurrence network (a visualization of co-word analysis) was generated to analyze the knowledge evolution of ESP research. Last, burst detection analysis was performed on keywords (co-word analysis) and cited references (document co-citation analysis) to identify emerging trends. A thorough review of articles citing burst keywords and references was undertaken to gain deeper insights into these trends.

RESULTS

This section presents the results of knowledge networks from the perspectives of current status, major themes, knowledge evolution, and emerging trends of ESP research.

Publication Distribution

The publication and geographic distribution of research in a specific field can facilitate understanding the research status of a specific field (Diao et al., 2022). Figure **5** shows the annual publications of ESP literature based on the dataset of 1657 records.

The solid line in Figure **5** shows the numbers of annual publications. Evidently, the ESP research is undergoing a steady growth trend in publications (Diao et al., 2022). The annual number of articles during this phase exceeded 60, and kept rising exponentially to 150 or so in the last three years (2020-2022). While 2023 saw a decline in the number of publications, research within this field remains ongoing.

Co-Country Network

To explore the geographic distribution of ESP research during the period from 2011 to 2023, co-country network was generated in Figure **6**.

As shown in Figure **6**, Citespace identified 95 countries and regions, indicating a growing global interest in ESP research among international scholars over the last decade. The most productive countries in ESP research include People's Republic of China (215 articles), USA (165 articles), England (127 articles), Spain (113 articles), Canada (100 articles), Australia (91), Iran (89), Ukraine (77), Taiwan (65), and Malaysia (64).

Figure 4
Modified PRISMA Flow Diagram
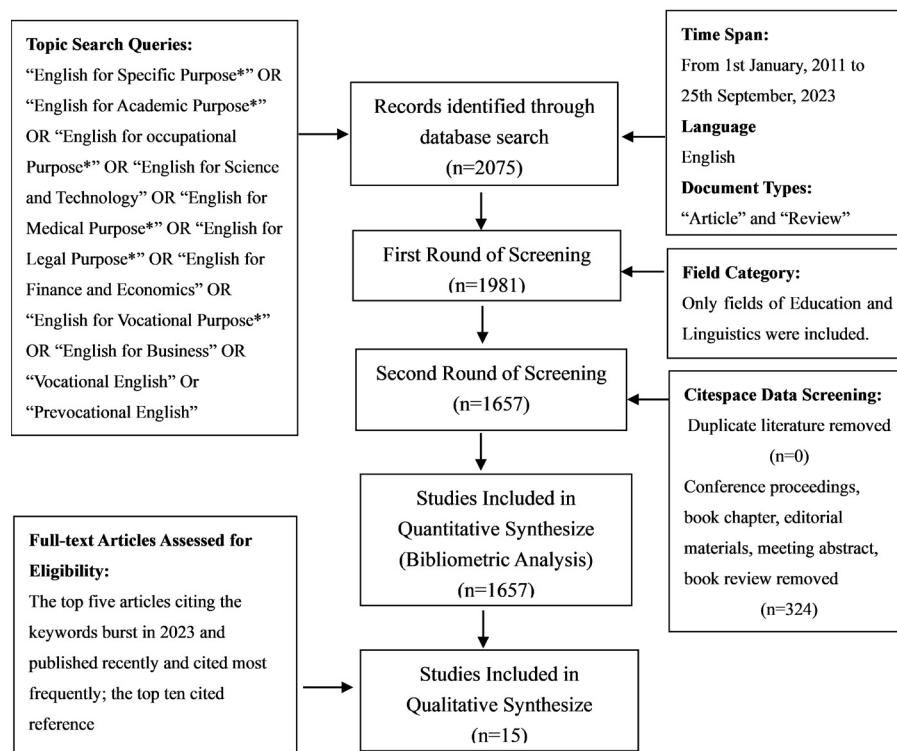
Figure 5
Annual Publications on ESP (2011-2023)
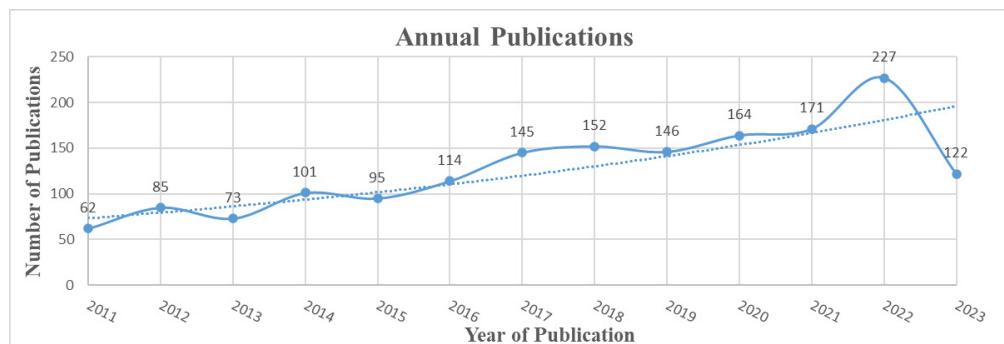

Keyword Clustering

Keywords represent research content, and those appearing frequently in literature pervasive topics within a specific field during a particular period (Wang et al., 2020). Chen (2017) highlighted that keywords analysis in pinpointing research trends and hotspots. To gain a better understanding of the research focus of ESP, keywords with frequency higher than 20 are presented in Table 1. Frequency refers to the number of times of citation in literature. Keywords with high frequency in the literature reflect the research hotspots in a specific field (Jia & Feng, 2022; Wang et al., 2020). High-frequency keywords of ESP research include "English for aca-demic purposes", "students", "higher education", "academic writing", "needs analysis", "genre analysis", etc.

To understand the hidden structure of these keywords, cluster analysis and systematic review were conducted. The keyword-based clusters classify significant terms and contexts within a research field, uncover patterns and connections in the vast literature, and help identify underlying rules governing research themes (Diao et al., 2022). The clustering function generated 18 clusters. The cluster network displayed high modularity (0.7734) and a mean silhouette score of 0.9084, indicating significant homogeneity among cluster members and a highly rational clustering arrangement (Guo et al., 2022). By examining keywords in clusters

Figure 6

Co-Country Network of ESP Research (2011-2023)
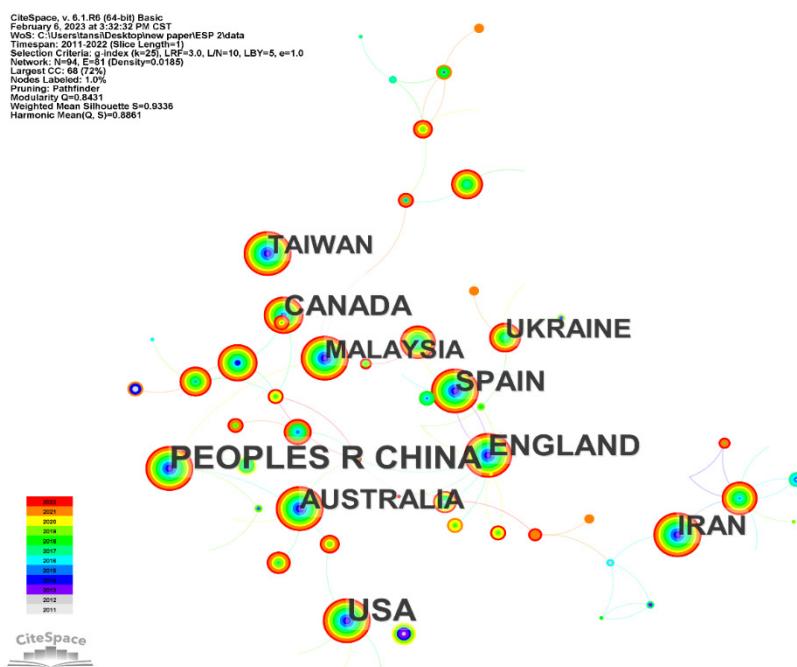
Table 1

High-Frequency Keywords of ESP Research (2011-2023)

No.	Keywords	Frequency	No.	Keywords	Frequency
1	English for specific purposes	248	16	applied linguistics	38
2	English for academic purposes	237	17	instruction	37
3	English	229	18	lexical bundles	35
4	language	201	19	corpus linguistics	34
5	students	131	20	teachers	33
6	higher education	109	21	performance	31
7	education	76	22	research articles	31
8	academic writing	75	23	needs	27
9	needs analysis	60	24	corpus	26
10	learners	59	25	proficiency	24
11	genre analysis	48	26	attitudes	24
12	knowledge	44	27	motivation	24
13	literacy	37	28	strategy	22
14	perceptions	35	29	genre	22
15	discourse	35	30	blended learning	21

and labeling them with the most indicative keyword, Figure 7 illustrates 13 clusters, each containing over 20 papers.

However, the cluster analysis in ESP research revealed overlapping cluster labels. Therefore, systematic review of keywords and abstracts in the "Node Details" were conducted, which provided citation information, and offered more in-sights into articles using the same keywords and those within the clusters (Jia & Harji, 2023). For instance, Cluster #0 "professional development" and Cluster #3 "teacher education" were combined due to their overlapping content. The same combination was applied to Cluster #1 "genre analysis" and Cluster #9 "discourse analysis". Cluster #5 "EAP"

was removed because it is a branch of ESP, which is the topic of this paper and does not represent the research themes.

Ultimately, four major themes emerged, including "linguistic inquiries", "teaching pedagogy", "student learning", and "teacher development". These four themes, along with their respective representative keywords, are presented in Figure 8.

Timezone View

The development of a research field can be identified through the changes of highly cited keywords over time (Diao et al., 2022). Timezone view of keyword co-occurrence network displays the evolution and development of keywords, and visualizes the research frontiers and the research trends of a certain field in different periods (Jiang et al., 2022). It is through the timezone view that we can see
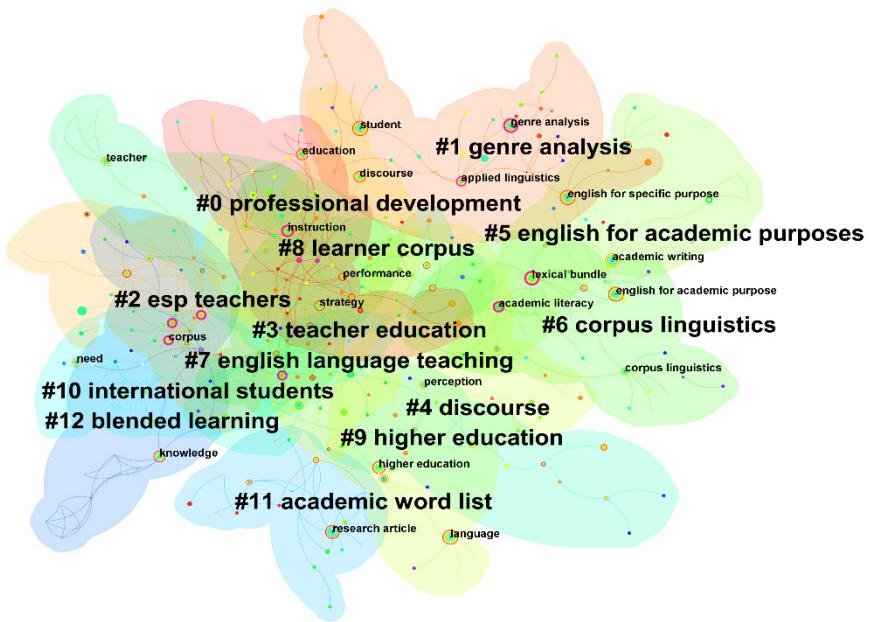
the time span and knowledge evolution of ESP research, as presented in Figure 9.

The figure shows the keywords that have appeared most frequently each year. In 2011, ESP scholars conducted research from a wide variety of research perspectives, such as academic writing, NA, genre analysis, lexical bundle, corpus linguistics, academic literacy, BE, etc. These perspectives represent all the above-mentioned themes except the theme "teacher". In 2012 and 2013, in addition to the conventional topics of academic English, academic vocabulary, discourse, need, new topics of blended learning and teacher began to gain wider attention.

The years 2014 and 2015 witnessed some new research interest in identity, students' English proficiency, ME, and case study. The conventional topics of word list, discourse, language need continued to remain the research focus. From 2016 to 2017, more focus had been on the themes of "stu-
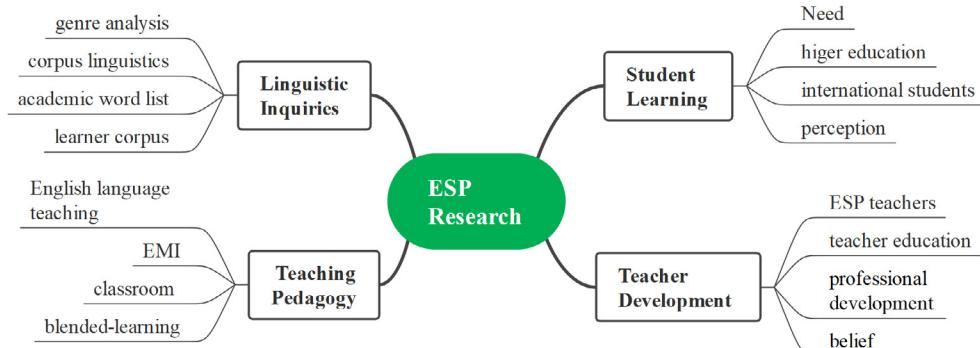
Figure 7

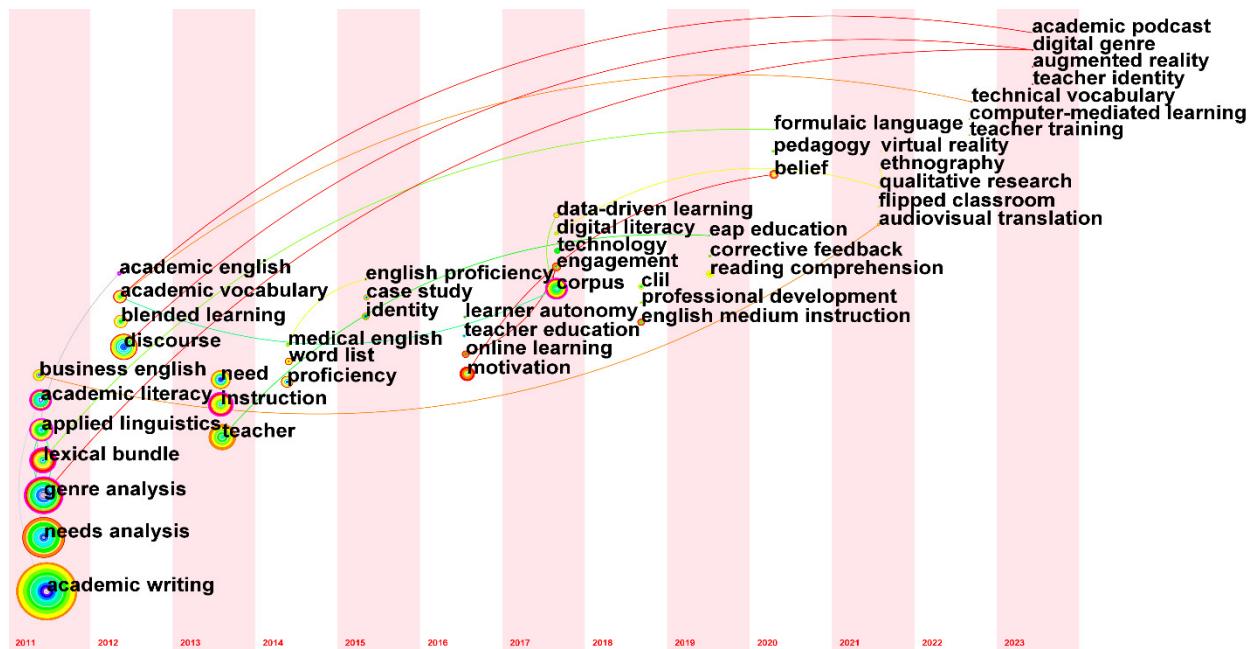*Keyword Clusters of ESP Research (2011-2023)*

Figure 8

Major Themes of ESP Research (2011-2023)

Figure 9

Knowledge Evolution of ESP Research (2011-2023)

dent" and "teacher", including keywords of "learner autonomy", "teacher education", "motivation", "engagement", etc. Some new trends related to technology, such as "online learning", "technology", "digital literacy", and "data-driven learning", emerged as well. Between 2018 and 2020, research topics centred around the themes "pedagogy" and "genre", which can be seen from keywords "content and language integrated learning (CLIL)", "English medium instruction (EMI)", "genre knowledge", "formulaic language", etc.

Finally, 2021 and 2023 saw the emergence of more technological terms including "virtual reality (VR)", "flipped classroom", "academic podcast", "digital genre", and "computer-mediated learning". "Teacher identity" and "teacher training" also received some attention.

Burst Detection

Analyzing research trends in a specific discipline provides valuable insights into future research directions. Burst detection in Citespace detects sudden increases in keywords or citations and unveils the research trends (Diao et al., 2022; Wang et al., 2020). Both the burst keywords and cited articles serve as crucial indicators of emerging trends in research (Zhou et al., 2019). Figure **10** displays the top 10 burst keywords. "Year" denotes the first occurrence of keywords, while "Strength" represents the burst strength value. "Begin" and "End" indicate the start and end points of the burst period. The bar visualizes the duration of burst.

As presented, the keywords with highest burst strengths were "research articles", "EAP", and "corpus linguistics", indicating a heated academic attention on EAP, especially research articles, and corpus analysis. However, current emerging patterns can be identified through the burst emergence and duration of keywords "teachers", "belief", and "curriculum", which started to burst in 2019, and continue to be influential till 2023. To facilitate the understanding of the trends, the major articles citing these three keywords that were published most recently and cited extensively, were critically examined (Chen, 2017). The major articles are presented in Table 2.

The keywords "teachers" and "belief" pertain to teachers' teaching methods and perceptions regarding their roles, competence, and challenges in ESP or EAP teaching. Bahrami et al. (2019) explored the current status of Iranian EAP teachers' involvement in both reading and conducting research, their EAP teaching careers, research engagement, and personal and institutional barriers in their academic commitment. Afshar and Ranjbar (2021) explored the level of assessment literacy among EAP teachers, including their beliefs towards assessment, their assessment methods in classrooms, and the underlying reasons for any discrepancies between their beliefs and practices. Tai and Tang (2021) explored teachers' teaching methods in mitigating students' adverse reactions to English-Medium Instruction (EMI) course, and examined whether students could alleviate their anxiety in by employing diverse learning strategies and minimizing their avoidance of English-Medium Instruction (EMI)

Figure 10
Keyword Burst of ESP Research (2011-2023)

Keywords	Year	Strength	Begin	End	2011 - 2023
research articles	2011	4.95	**2011**	2016	
corpus linguistics	2011	4	**2011**	2013	
english for academic purposes	2011	6.44	**2012**	2013	
business english	2013	3.41	**2013**	2014	
corpus	2017	3.19	**2017**	2020	
rhetorical structure	2017	3.16	**2017**	2018	
teachers	2018	3.35	**2018**	2023	
student	2019	3.52	**2019**	2020	
beliefs	2020	3.13	**2020**	2023	
curriculum	2021	3.4	**2021**	2023	

Table 2
Major Citing Articles of Detected Keywords

Article	Authors
Exploring research-informed practice in English for academic purposes: A narrative study	Bahrami et al. (2019)
EAP teachers' assessment literacy: From theory to practice	Afshar and Ranjbar (2021)
The role of graduate students' learning strategies in reducing their English medium instruction avoidance: The mediation effect of language anxiety	Tai and Tang (2021)
Challenges and constraints in the design of an ESP course in Cambodia: implications for higher education institutions	Petraki and Khat (2022)
Needs analysis-based design principles for constructing a context-aware English learning system	Chiu et al. (2023)

course. These studies focused on ESP teacher development or EMI.

The keyword "curriculum" is related to ESP course development. Petraki and Khat (2022) examined the perspectives of academic and industry stakeholders regarding challenges and necessary measures for developing an ESP course in the Science, Technology, Engineering, and Mathematics (STEM) field at a Cambodian tertiary institution. Chiu et al. (2023) conducted a needs analysis for developing a system, materials, and activities for context-aware ubiquitous language learning and English for Fitness Purposes (EFP) in a fitness center as part of a design-based research project. Their foci of interest were on using needs analysis to develop ESP courses in different disciplines or social context.

To attain a profound comprehension of emerging trends, the burst detection of citations was conducted subsequently. Table 3 show the top ten cited reference.

As shown in Table 3, the books of Lillis and Curry (2010), and Nesi and Garders (2012), have the highest strengths. Lillis and Curry (2010) targeted at postgraduates and professionals in English language teaching, applied linguistics, etc.,

discusses how the dominance of English affects the practices of multilingual researchers in their academic writing and evaluation for publication. Nesi and Garders (2012) introduced the concepts of genre and genre family in the context of tertiary education, and the norms and conventions of the academic writing across different disciplines. Both works focus on academic writing. Research from 2012 to 2019 witnessed special academic attention paid to genre knowledge (Tardy, 2009), vocabulary learning (Nation, 2013), academic vocabulary (Gardner & Davies, 2014), and academic literacy (Wingate, 2015).

The recent emerging trends can be seen from the studies by Campion (2016), Macaro et al. (2018), Coxhead and Demecheleer (2018), and Ding and Bruce (2017), whose citation bursts last till 2022 or 2023. Campion (2016) explored teachers' views on their transition from General English to EAP. Macaro et al. (2018) conducted a systematic review of EMI in Higher Education. Based on corpus studies and methodology, Coxhead and Demecheleer (2018) investigated the technical vocabulary in the pluming field. In their book, Ding and Bruce (2017) explore previously overlooked aspects in EAP teachers' development, including the socio-economic, academic, and employment environments in which EAP prac-

Table 3

Citation Burst Detection of ESP Research (2011-2023)

References	Authors	Strength	Burst Duration
Academic writing in global context	Lillis and Curry (2010)	5.15	2011-2014
Building genre knowledge	Tardy (2009)	4.59	2012-2013
Genres across the disciplines: Student writing in higher education	Nesi and Garders (2012)	5.13	2014-2017
Learning vocabulary in another language	Nation (2013)	4.35	2015-2016
A new academic vocabulary list	Gardener and Davies (2014)	4.56	2016-2019
Academic literacy and student diversity: the case for inclusive practice	Wingate (2015)	3.99	2017-2019
"The learning never ends": Exploring teachers views on the transition from General English to EAP	Campion (2016)	4.77	2017-2022
A Systematic Review of English Medium Instruction in Higher Education	Macaro et al. (2018)	4.53	2020-2022
The English for academic purposes practitioner	Ding and Bruce (2017)	5.26	2019-2023
Investigating the technical vocabulary of plumbing	Coxhead and Demecheleer (2018)	4.87	2021-2023

titioners operate. By examining these contexts, they gain insights into the roles, expectations, and limitations faced by practitioners. Their research implies that ESP teacher development, EMI, and academic vocabulary, corpus-base teaching will be increasingly explored in the future.

DISCUSSION

The quantitative and objective review demonstrate the liveliness and diversity of ESP research from 2011 to 2023.

Current Research Status

As seen in Figures **5** and **6**, the field of ESP is continuously evolving and far from reaching saturation. As Johns predicted (2012), the period spanning from 2011 to 2013 witnessed a significant surge in international authorship, implying the global academic interest in ESP research during this timeframe.

Major Themes

As presented in Figure **8**, four major themes were found from the clustering analysis and systematic review. The first theme "linguistic inquiries" refers to linguistic research to describe how English is utilized in academic, study, and professional environments within the local community. It mainly includes genre analysis and corpus analysis. Ren and Lu (2021) compared narratives in corporate annual reports from American and Chinese companies, and suggested to incorporate the language variations in the genre into Business English teaching in China. Chan (2021) identified the challenges faced by English major graduates in Hong Kong

to workplace communication in their unfamiliar fields, and their strategies to overcome these challenges. Otto (2021) employed a corpus-based strategy to pinpoint 18 frequently used terms in civil engineering writing.

The second theme, "teaching pedagogy", encompasses the practical aspects of teaching, such as teaching approach, innovations, and the evaluation of teaching and materials. Classroom-based research has gained more prominence during this period. Belmekki and Sekkal (2018) integrated process-genre approach into BE writing. They investigated how process-genre approach affected ESP students' writing achievement in terms of request letters as well as their attitude towards this approach, and found that process-genre approach had a significantly positive effect on students' writing achievement, including organization, vocabulary, grammar, and mechanics. Numerous studies have explored other teaching approaches, including CLIL (Wozniak, 2019; Yang, 2018), task-based and project-based learning (Hafner et al., 2017), and corpus-based teaching (Otto, 2021).

The third theme "student learning", concentrates on different learning variables and NA. ESP research mainly focuses on ESP learning of students in higher education (Liontou, 2021; Rose et al., 2020). Rose et al. (2020) examined the relationship between course performance, English proficiency, motivation, and academic language skills of students of a business program at a Japanese university. Liontou (2021) investigated Finnish and Chinese students' perceptions of language assessment for an ESP course in some university programs offered in Finland and China. NA is a core characteristic of ESP and EAP courses and an integral part of curriculum development (Chan, 2018). Since NA is a prerequisite for any ESP course, students' needs have been looked into

from different perspectives, such as learning motivation (Thepseenu, 2020), teaching approach (Jafari & Alemi, 2020), and teaching materials or textbooks (Guo & He, 2020).

The fourth theme, "teacher development", specifically pertains to the professional training and growth of ESP teachers. Ding and Bruce (2017) examined the role and development of EAP practitioners, and evaluated their professional and academic identities. Bahrami et al. (2019) highlighted the challenges faced by EAP teachers from diverse disciplinary backgrounds in conducting research practice due to personal and institutional barriers in Irian. Afshar and Ranjbar (2021) examined the assessment literacy of EAP teachers. However, research on EAP instructors still remains limited (Du et al., 2022), which was further discussed in emerging trends.

Knowledge Evolution

As presented in Figure 9, there are four features to the research evolution of ESP from 2011 to 2023. First, the linguistic inquiries, such as "genre", "corpus", and "discourse", is still an enduring research focus during this period. These topics, as the central concepts in ESP research ever since 1960s (Johns, 2012), are overlapping with each other, and have yet to be fully explored. As one persuasive topic of ESP research, linguistic inquiry could provide insights in linguistic practices in academic, professional or workplace contexts (Basturkmen, 2021). Le and Miller (2023) concentrated on the vocabulary required by medical students, while Bi (2020) focused on the vocabulary necessary for Chinese undergraduate students majoring in computer science to comprehend their specialized textbooks.

Second, varied pedagogies have been attempted, such as CLIL (Wozniak, 2019; Yang, 2018), task-based and project-based learning (Hafner et al., 2017), corpus-based teaching (Otto, 2021), etc. As a relatively new topic compared with genre and corpus, CLIL approach, which integrates language skills and content knowledge, has been widely adopted and researched internationally, Yang (2018) examined the satisfaction of students in a polytechnic university for their CLIL teaching materials, and the factors affecting their satisfaction. Wozniak (2019) analyzed the feedback of pre-service content teachers in French secondary schools after a period of training of teaching in the way of CLIL. Several difficulties were identified and suggestion were offered for improvement. Like all language education, classroom-based research will continue to gain prominence in ESP research.

Third, varied research methodologies have been adopted, which can be seen from the emergence of keywords including "case study", "qualitative case study", etc. Combining both qualitative and quantitative approaches, more case and ethnographic studies of learners in different learning and cultural contexts have been conducted to enhance ESP

teaching and learning (Liu et al., 2021; Mortenson, 2022; Šelmić, 2021). Liu et al. (2021) focused on two groups of students in an EAP reading course at a Chinese university, and identified their reading strategies for academic texts. Mortenson (2022) integrated social justice-oriented content into an EAP writing course at a university on the East coast of America, and identified the barriers to the emergent bilingual students learning this course.

Fourth, technology has been implemented more frequently in ESP teaching and research recently, which can be implied from keywords such as "online learning" (Mihai et al., 2022), "blended learning" (Simonova, 2019), "flipped classroom" (Hsiao et al., 2021), "Virtual reality" (Chen et al., 2021; Hsu et al., 2022), etc. Technology has long played an important role in ESP instruction, and can be applied in different types of ESP courses. Chen et al. (2021) integrated VR technology into an ESP course which enabled students with multimodal information, and pointed out the importance of engaging students in immersive environments. Hsu et al. (2022) developed a VR platform for an ESP course and examined the relationship between self-efficacy and behavioural intention, and recommended that ESP teachers promote students' self-efficacy when integrating VR technology in their courses. With the inception of each new technology, new challenges and opportunities will be posed for both ESP learners and practitioners in their learning and teaching process, indicating the continuing predominance of technology in ESP research.

Emerging Trends

Keywords burst and citation burst results show that EAP, ESP teacher development, NA in under-researched settings, as well as EMI and Corpus-based teaching pedagogies, are new ESP research frontiers.

Firstly, the prevalence of EAP is revealed by a significant increase in published EAP research, especially in Asian countries (Hyland & Jiang, 2021). There is a notable academic emphasis on vocabulary learning (Nation, 2013), academic vocabulary (Gardner & Davies, 2014), academic literacy (Wingate, 2015), and lexical bundle (Liu & Chen, 2020).

As another prevalent topic, ESP teacher development is continuously drawing enormous academic attention. Tao and Gao (2018), and Mahendra (2020), both examined the challenges faced by ESP teachers in different social context when constructing their professional identity. Even more research was conducted to explore the EAP teachers' teaching beliefs, literacy, development of (Afshar & Ranjbar, 2021; Bahrami et al., 2019; Du et al., 2022). This corroborates Basturkmens' findings (2022), who emphasized that ESP teachers need to acquire new knowledge and redefine their professional identities. However, they face limited access to adequate support for their professional development and are often

marginalized in their roles. Therefore, the research into their development is still in need.

Furthermore, NA has been a prominent focus in ESP literature to date. The recent research demonstrates a robust representation of this research trend. This finding was consistent with the conclusions made by Basturkmen (2022) and Dou et al. (2023), that NA remains a core and enduring characteristic in this field. The recent studies apper to focus on the language needs of stakeholders coming from various cultural and linguistic backgrounds in under-research setting, such as STEM course (Petraki & Khat, 2022), EFP course (Chiu et al., 2023), and plumbing industry (Coxhead & Demecheleer, 2018).

Lastly, as discussed by Johns (2012), and Hyland and Jiang (2021), teaching practices were a focal point of the academic interest. Studies in recent years highlight the interest in implementing EMI or corpus-based teaching (Basturkmen, 2022). Macaro et al. (2018) conducted a systematic review of EMI in Higher Education. Some researchers explored the practices of EMI course and its impact on teaching in universities in different countries such as Indonesia (Simbolon, 2021), and Taiwan (Tai & Tang; 2021). Other researchers have utilized corpus analysis to create linguistic descriptions or word lists, incorporating them into their teaching methods. They drew on corpus-based methods and aimed to facilitate both ESP teaching and learning (Coxhead & Demecheleer, 2018; Liu & Chen, 2020; Otto, 2021).

CONCLUSION

This study employed bibliometric analysis via Citespace to provide a systematic, quantitative and objective overview of international ESP research during the period from 2011 to 2023. A dataset of 1657 bibliographic records within this timespan were analyzed. The analysis involved generating and examining various graphs and networks.

The publication distribution and co-country network were analyzed to understand the current research status. Evidently, ESP research has been experiencing steady growth in the past decade and is not yet saturated. Moreover, this research exhibits extensive international authorship and collaboration.

To identify the major themes of ESP research, keywords were used to generate clusters. The clustering results and systematic review suggested that researchers in ESP have focused on the four themes, including linguistic inquiries, teaching pedagogy, student learning, and teacher development.

Through the timezone view of keyword co-occurrence network, the knowledge evolution shows the research hot topics are highly dynamic and overlapping within the years from 2011 to 2023. Four features were identified, including the predominance of pedagogy, genre and corpus analysis, varied pedagogies, varied research methodologies, and more technology-assisted teaching.

Lastly, the results of keyword and citation burst detection, as well as systematic review of citing articles of burst keywords were examined to explore the emerging trends in ESP. The recent studies exhibit growing research interests in EAP, ESP teacher development, different learning needs in under-researched settings, as well as EMI and Corpus-based teaching pedagogies.

Admittedly, this study has several limitations. Firstly, this study used Citespace as the analysis tool, but different tools might yield divergent outcomes. Future research endeavors could explore alternative tools such as BibExcel, VOSviewer, or the Science of Science Tool to present the findings. Secondly, the most productive authors, institutions, and journals were not examined. Furthermore, only English-language articles sourced from the WOSCC database were analyzed, excluding regional journals in different languages. Researchers in ESP could explore localized contexts, or contrast local and international trends in the future.

DECLARATION OF COMPETING INTEREST

None declared.

AUTHORS CONTRIBUTIONS

Sining Tan: Conceptualization, software validation, visualization, and writing-original draft, writing- reviewing and editing.

Madhubala Bava Harji: Conceptualization, writing- reviewing and editing.

Xiaogang Hu: Software validation, visualization, and writing- reviewing and editing.

REFERENCES

Afshar, H. S., & Ranjbar, N. (2021). EAP teachers' assessment literacy: From theory to practice. *Studies in Educational Evaluation*, *70*, 101042. https://doi.org/10.1016/j.stueduc.20 21.101042

Bahrami, V., Hosseini, M., & Atai, M. R. (2019). Exploring research-informed practice in English for academic purposes: A narrative study. *English for Specific Purposes*, *54*, 152-165. https://doi.org/ 10.1016/j.esp.2019.02.003

Basturkmen, H. (2021). ESP research directions: Enduring and emerging lines of inquiry. *Language Teaching Research Quarterly*, *23*, 5-11. https://doi.org/10.32038/ltrq.2021.23.02

Basturkmen, H. (2022). Current trends in ESP research in the Asia Pacific region. *World Englishes*, *41*(4), 512-522. https://doi.org/10.1111/weng.12601

Belcher, D. D. (2006). English for specific purposes: Teaching to perceived needs and imagined futures in worlds of work, study, and everyday life. *TESOL Quarterly*, *40*(1), 133-156. https://doi.org/ 10.2307/40264514

Belmekki, A., & Sekkal, F. (2018). The effect of process-genre approach on ESL students' achievement in writing business letters. *European Journal of Research and Reflection in Educational Sciences*, *6*(2), 10-14. http://dx.doi.org/10.21070/jees.v4i2.2598

Bi, J. (2020). How large a vocabulary do Chinese computer science undergraduates need to read English-medium specialist textbooks? *English for Specific Purposes*, *58*, 77-89. https://doi.org/10.1016/j.esp.2020.01.001

Campion, G. C. (2016). 'The learning never ends': Exploring teachers' views on the transition from General English to EAP. *Journal of English for Academic Purposes*, *23*, 59-70. http://dx. doi.org/10.1016/j.jeap.2016.06.003

Chan, C. S. (2018). Proposing and illustrating a research-informed approach to curriculum development for specific topics in business English. *English for Specific Purposes*, *52*, 27-46. https://doi.org/10.1016/j.esp.2018.07.001

Chan, C. S. (2021). University graduates' transition into the workplace: How they learn to use English for work and cope with language-related challenges. *System*, *100*, 102530. https://doi.org/10.1016/j.system.2021.102530

Chen, C. (2006). "CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature." *Journal of the American Society of Information Science and Technology*, *57*(3), 359–377. https://doi.org/10.1002/asi.20317

Chen, C. (2013). *Mapping scientific frontiers: The quest for knowledge visualization*. Springer Science & Business Media.

Chen, C. (2017). Science mapping: a systematic review of the literature. *Journal of Data and Information Science*, *2*(2), 1-40. https://doi.org/10.1002/asi.20317

Chen, C. H., Hung, H. T., & Yeh, H. C. (2021). Virtual reality in problem-based learning contexts: Effects on the problem-solving performance, vocabulary acquisition and motivation of English language learners. *Journal of Computer Assisted Learning*, *37*(3), 851-860. http://dx.doi.org/ 10.1111/jcal.12 528

Chen, X., & Liu, Y. (2020). Visualization analysis of high-speed railway research based on CiteSpace. *Transport Policy*, *85*, 1-17. https://doi.org/10.1016/j.tranpol.2019.10.004

Cheng, A. (2011). ESP classroom research: Basic consideration and future research questions. In D. Belcher, A. M. Johns, & B. Paltridge (Eds.), *New directions in English for specific purposes* (pp. 44–72). University of Michigan Press.

Chiu, W. Y., Liu, G. Z., Barrett, N. E., Liaw, M. L., Hwang, G. J., & Lin, C. C. (2023). Needs analysis-based design principles for constructing a context-aware English learning system. *Computer Assisted Language Learning*, *36*(1-2), 176-204. https://doi.org/10.1080/ 09588221.2021.1905666

Coxhead, A., & Demecheleer, M. (2018). Investigating the technical vocabulary of plumbing. *English for Specific Purposes, 51, 84-97.*

Diao, B. C., Adnan, N., Harji, M. B., & Ravindran, L. (2022). Evolution and hotspots of peer instruction: a visualized analysis using CiteSpace. *Education and Information Technologies*, *28*(2),1-18. https://doi.org/10.1007/s10639-022-11218-x

Ding, A., & Bruce, I. (2017). *The English for academic purposes practitioner*. Palgrave Macmillan.

Dou, A. Q., Chan, S. H., & Win, M. T. (2023). Changing visions in ESP development and teaching: Past, present, and future vistas. *Frontiers in Psychology*, *14*, 1140659. https://doi.org/10.3389/fpsyg.2023.1140659

Du, J., Li, W., & Li, Q. (2022). Who Are We, What Can We Do, and What Do We Think? Review on EAP Teacher Development. *Chinese Journal of Applied Linguistics*, *45*(4), 532-550. http://dx. doi.org/10.1515/CJAL-2022-0403

Dudley-Evans, T. & St John, M. J. (1998). *Developments in English for Specific Purposes: A Multi - Disciplinary Approach*. Cambridge University Press.

Fu, R. D., Yang, D. G., Jin, C. F., Cai, T. Y., Wu, S. Q., and Wang T. (2021). Research progress and review on spatial differentiation of urban housing price: a bibliometric analysis using CiteSpace. *Journal of University of Chinese Academy of Sciences*, *38*(6), 782-790. http://dx.doi. org/10.7523/j.issn.209 5-6134.2021.06.008

Gardner, D., & Davies, M. (2014). A new academic vocabulary list. *Applied Linguistics*, *35*(3), 305-327. https://doi.org/10.1093/applin/amt015

Guo, Y., Xu, Z. Y. R., Cai, M. T., Gong, W. X., & Shen, C. H. (2022). Epilepsy with suicide: A bibliometrics study and visualization analysis via CiteSpace. *Frontiers in Neurology*, *12*, 823474. https://doi.org/10.3389/fneur.2021.823474

Guo, G., & He, B. (2020). Evaluation of business English writing course-book based on the needs analysis model. *International Linguistics Research*, *3*(3), 11-21. https://doi.org/10.30560 /ilr.v3n3p11

Hafner, C. A., Miller, L., & Ng, C. K. F. (2017). Creativity and digital literacies in English for specific purposes. *Essential Competencies for English-medium University Teaching*, 111-123. http://dx.doi. org/10.1007/978-3-319-40956-6_8

Hsiao, I. C. V., Hung, S. T. A., & Huang, H. T. D. (2021). The flipped classroom approach in an English for specific purposes (ESP) course: A quasi-experimental study on learners' self-efficacy, study process, and learning performances. *Journal of Research on Technology in Education*, *55*(3), 1-20. http://dx.doi.org/10.1080/15391523.2021.1976329

Hsu, C. C., Chen, Y. L., Lin, C. Y., & Lien, W. C. (2022). Cognitive development, self-efficacy, and wearable technology use in a virtual reality language learning environment: A structural equation modeling analysis. *Current Psychology*, *41*(3), 1-15. http://dx.doi.org/10.1007/s12144-021-02252-y

Hu, F. (2019). Visualization analysis of research of English for specific purposes in China based on citespace (2000-2017). *Theory and Practice in Language Studies*, *9*(9), 1183-1190. http://dx.doi.org/10.17507/tpls.0909.15

Huebner, T. (2015). Academic writing for graduate students: Essential Tasks and skills. J. M. Swales & Ch. B. Feak. 2012. Ann Arbor, MI: University of Michigan Press (418 pages). *Journal of Humanities*, *18*(2), 113-115. http://dx.doi.org/10.1163/26659077-01802006

Hutchinson, T., & Waters, A. (1987). *English for Specific Purposes*. Cambridge University Press.

Hwang, G. J., & Tsai, C. C. (2011). Research trends in mobile and ubiquitous learning: A review of publications in selected journals from 2001 to 2010. *British Journal of Educational Technology*, *42*(4), E65–E70. https://doi.org/10.1111/j.1467-8535.2011.01183.x

Hyland, K. (2012). ESP and writing. *The handbook of English for specific purposes* (pp. 95-113). https://doi.org/10.1002/9781118339855.ch5

Hyland, K., & Jiang, F. K. (2021). A bibliometric study of EAP research: Who is doing what, where and when? *Journal of English for Academic Purposes*, *49*, 100929. https://doi.org/10.1016/j.jeap.2020.100929

Jafari, P. S., & Alemi, M. (2020). Engineering students' motivation to learn technical English in ESP courses: Investigating Iranian teachers' and students' perceptions. *RELC Journal*, *51*(2), 212-226. https://doi.org/10.1177/0033688218811371

Jia, S., & Harji, M. B. (2022). Systematic *review of mobile-assisted task-based learning based* on WoS (2013-2022). *Journal of Information Technology Education: Research*, *21*, 571-595. https://doi.org/10.28945/5034

Jia, S. J., & Harji, M. B. (2023). Themes, knowledge evolution, and emerging trends in task-based teaching and learning: A scientometric analysis in CiteSpace. *Education and Information Technologies*, *28*, 1-20. http://dx.doi.org/10.1007/s10639-023-11586-y

Jia, X. L., & Feng, Y. (2022). A knowledge graph analysis of cultural heritage research in China in past 30 years. *Journal of North-West Minority University of Philosophy, Society and Science, 6*, 124–135.

Jiang, W., Aishan, T., Halik, Ü., Wei, Z., & Wumaier, M. (2022). A Bibliometric and visualized analysis of research progress and trends on decay and cavity trees in forest ecosystem over 20 Years: An application of the CiteSpace Software. *Forests*, *13*(9), 1437. https://doi.org/ 10.3390/f13091437

Johns, A. M. (2012). The history of English for specific purposes research. *The handbook of English for specific purposes*, *107*, 5-30. https://doi.org/10.1002/9781118339855.ch1

Karimnia, A., & Khodashenas, M. R. (2018). Medical students' English language learning needs and perceptions. *Sustainable Multilingualism*, *13*, 168-195. https://doi.org/10.2478/sm-2018-0016

Le, C. N. N., & Miller, J. (2023). A core meaning-based analysis of English semi-technical vocabulary in the medical field. *English for Specific Purposes*, *70*, 252-266. https://doi.org/10.1016/j.esp.2023.01.006

Lei, L., & Liu, D. (2016). A new medical academic word list: A corpus-based study with enhanced methodology. *Journal of English for academic purposes*, *22*, 42-53. http://dx.doi.org/10.1016/ j.jeap.2016.01.008

Lillis, T. M., & Curry, M. J. (2010). *Academic writing in global context*. Routledge.

Liontou, M. (2021). Conceptions of assessment as an integral part of language learning: A case study of Finnish and Chinese university students. *Languages*, *6*(4), 202. https://doi.org/10.3390/lang uages6040202

Liu, C. Y., & Chen, H. J. H. (2020). Analyzing the functions of lexical bundles in undergraduate academic lectures for pedagogical use. *English for Specific Purposes*, *58*, 122-137. https://doi.org/10.1016/j.esp.2019.12.003

Liu, X., Gu, M. M., & Jin, T. (2021). Strategy use in collaborative academic reading: Understanding how undergraduate students co-construct comprehension of academic texts. *Language Teaching Research*, *0*(0). https://doi.org/10.1177/13621688211025688

Liu, Y., & Hu, G. (2021). Mapping the field of English for specific purposes (1980–2018): A co-citation analysis. *English for Specific Purposes*, *61*, 97-116. https://doi.org/10.1016/j.esp. 2020.10.003

Macaro, E., Curle, S., & Pun, J. Jiangshan An, and Julie Dearden. 2018. *A Systematic Review of English Medium Instruction in Higher Education. Language Teaching*, *51*(1), 36-76. http://dx.doi.org/10.1017/S0261444817000350

Mahendra, A. W. (2020). Constructing identity: Experiences of Indonesian ESP teachers in a language institute. *English Language Teaching Educational Journal*, *3*(3), 229-240. https://doi.org/10.12928/eltej.v3i3.2560

Mihai, M., Albert, C. N., Mihai, V. C., & Dumitras, D. E. (2022). Emotional and social engagement in the English language classroom for higher education students in the COVID-19 online context. *Sustainability*, *14*(8), 4527. http://dx.doi.org/10.3390/su14084527

Miller, C. R. (1984). Genre as social action. *Quarterly Journal of Speech*, *70*(2), 151-167. https://doi.org/10.1080/00335638409383686

Morrow, P. R. (1989). Conjunct use in business news stories and academic journal articles: A comparative study. *English for Specific Purposes*, *8*(3), 239-254. https://doi.org/10.1016/0889-4906(89)90015-X

Mortenson, L. (2022). Integrating social justice-oriented content into English for Academic Purposes (EAP) instruction: A case study. *English for Specific Purposes*, *65*, 1-14. https://doio.or/10. 1016/j.esp.2021.08.002

Nation. I. S. P. (2013). *Learning vocabulary in another language* (2nd ed.). Cambridge University.

Nesi, H., & Gardner, S. (2012). *Genres across the disciplines: Student writing in higher education.* Cambridge University Press.

Otto, P. (2021). Choosing specialized vocabulary to teach with data-driven learning: An example from civil engineering. *English for Specific Purposes*, *61*, 32-46. https://doi.org/10.1016/j.esp.2020.08. 003

Pan, J. F., Li, Z. F., & Xu, D. X. (2022). Constructing a diversified curriculum for college English in medical schools based on student needs analysis. *Journal of Higher Education*, *1*, 83-86+91. https://doi.org/10.19980/j.CN23-1593/G4.2022.01.020

Petraki, E., & Khat, K. (2022). Challenges and constraints in the design of an ESP course in Cambodia: implications for higher education institutions. *Asia Pacific Journal of Education*, *42*(2), 260-275. https://doi.org/10.1080/02188791.2020.1798738

Pratiwi, Y. E., Rukmini, W., & Faridi, A. (2017). The linguistic problems of students' competence in writing Business English letter. *Language Circle, 11*(2), 117-126. https://doi.org/10.15294/lc. v11i2.9584

Ren, C., & Lu, X. (2021). A multi-dimensional analysis of the management's discussion and analysis narratives in Chinese and American corporate annual reports. *English for Specific Purposes*, *62*, 84-99. https://doi.org/10.1016/j.esp.2020.12.004

Rose, H., Curle, S., Aizawa, I., & Thompson, G. (2020). What drives success in English medium taught courses? The interplay between language proficiency, academic skills, and motivation. *Studies in Higher Education*, *45*(11), 2149-2161. https://doi.org/10.1080/03075079.2019.1590690

Sabe, M., Chen, C., Perez, N., Solmi, M., Mucci, A., Galderisi, S., ... & Kaiser, S. (2022). Thirty years of research on negative symptoms of schizophrenia: A scientometric analysis of hotspots, bursts, and research trends. *Neuroscience & Biobehavioral Reviews*, *144*, 104979. https://doi.org/10.1016/j. neubiorev.2022.104979

Šelmić, N. (2021). Case Study Approach to Teaching and Learning English for Medical Purposes. *Journal of Teaching English for Specific and Academic Purposes*, *9*(3), 333-337. https://doi.org/10.22190/JTESAP2103333S

Si, J. (2020). An analysis of business English coursebooks from an ELF perspective. *ELT Journal*, *74*(2), 156-165. https://doi.org/10.1093/elt/ccz049

Simonova, I. (2019). Blended approach to learning and practicing English grammar with technical and foreign language university students: comparative study. *Journal of Computing in Higher Education*, *31*(2), 249-272. http://dx.doi.org/10.1007/s12528-019-09219-w

Simbolon, N. E. (2021). English Medium Instruction (EMI) practice: Higher education internationalization in Indonesia. *Journal of Language, Education, and Humanities*, *8*(2), 72-83. https://doi.org/10.22373/ej.v8i2.8961

Stubbs, M., & Halbe, D. (2012). *Corpus linguistics: Overview*. In C. A. Chapelle (Ed.), *The Encyclopedia of Applied Linguistics* (pp. 1377–1379). Blackwell.

Sun, L., & Asmawi, A. (2022). Research Progress and Trend of Business English Writing Instruction in China (2002-2021): A Bibliometric Analysis. *World Journal of English Language, 12*(6), 240-254. https://doi.org/10.5430/wjel.v12n6p241

Swales, J. M., & Feak, C. B. (2012). *Academic writing for graduate students: Essential Tasks and Skills* (3rd ed.)*. University of Michigan Press.

Tai, T. E., & Tang, C. W. (2021). The role of graduate students' learning strategies in reducing their English medium instruction avoidance: The mediation effect of language anxiety. *Asia Pacific Journal of Education*, *41*(2), 368-384. https://doi.org/10.1080/02188791.2020.177793 7

Tao, J. T., & Gao, X. A. (2018). Identity constructions of ESP teachers in a Chinese university. *English for specific Purposes*, *49*, 1-13. https://doi.org/10.1016/j.esp.2017.09.003

Tardy, C. M. (2009). *Building genre knowledge*. Parlor Press.

Thepseenu, B. (2020). Needs analysis for ESP course development: Thai civil engineering students' perspectives. *Asian Journal of Education and Training, 6*(3), 433-442. https://doi.org/ 10.20448/journal. 522.2020.63.433.442

Tu, S. J., Jin, C., Chen, B. T., Xu, A. Y., Luo, C., & Wang, X. (2022). Study on the fusion of sports and medicine in China from 2012 to 2021: A bibliometric analysis via CiteSpace. *Frontiers in Public Health*, *10*, 3322. https://doi.org/10.3389/fpubh.2022.939557

Vesna, P. P. (2022). Classification of English for Specific Purposes and overview of the language skills in ESP context. *Beder Journal of Educational Sciences*, *26*, 117-132. http://eprints.uklo.edu.mk/ id/eprint/7143

Wang, G., Li, S., Zhang, Z., Hou, Y., & Shin, C. (2023). A visual knowledge map analysis of cross-border agri-food supply chain research based on CiteSpace. *Sustainability*, *15*(14), 10763. https://doi.org/10.3390/su151410763

Wang, Z., Ma, D., Pang, R., Xie, F., Zhang, J., & Sun, D. (2020). Research progress and development trend of social media big data (smbd): Knowledge mapping analysis based on Citespace. *ISPRS International Journal of Geo-Information*, *9*(11), 632. http://dx.doi.org/10.3390/ijgi9110632

Wingate, U. (2015). *Academic literacy and student diversity: the case for inclusive practice.* Multilingual Matters.

Wozniak, S. (2019). English for Academic Purposes and the enhancement of French trainee content teachers' professional skills. *Journal of Teaching English for Specific and Academic Purposes*, *6*(3), 341-352. http://dx.doi.org/10.22190/JTESAP18033 41W

Yang, W. (2018). Evaluating contextualized content and language integrated learning materials at tertiary level. *Latin American Journal of Content & Language Integrated Learning, 11*(2), 236-274. https://doi.org/10.5294/laclil.2018.11.2.4

Zhong, B., Wu, H., Li, H., Sepasgozar, S., Luo, H., & He, L. (2019). A scientometric analysis and critical review of construction related ontology research. *Automation in Construction*, *101*, 17-31. https://doi.org/10.1016/j.autcon.2018.12.013

Zhou, W., Chen, J., & Huang, Y. (2019). Co-Citation analysis and burst detection on financial bubbles with scientometrics approach. *Economic research-Ekonomska istraživanja*, *32*(1), 2310-2328. https://doi.org/10.1080/1331677X.2019.1645716

The Effectiveness Data-Driven Vocabulary Learning: Hands-on Concordancing through a Pedagogical Corpus

Sibel Tosun [1] ⓘ**, Hatice Sofu** [2]ⓘ

[1] Firat University, Elazig, Turkey
[2] Cukurova University, Adana, Turkey

ABSTRACT

Introduction: Although extensive studies have been carried out on the effectiveness of corpora on teaching vocabulary, the exploration of whether learners can benefit from a pedagogical corpus, particularly regarding hands-on engagement by lower-level learners, has received little attention.

Purpose: To address this gap in the literature, this study sets out to explore the effectiveness of Data-Driven Learning (DDL) in enhancing the vocabulary acquisition of EFL students at a state university in Turkey through a pedagogical corpus.

Method: The quasi-experimental study employed a mixed-method research design, in which both quantitative and qualitative data were gathered through vocabulary tests, student questionnaires, and semi-structured interviews. Fifty-eight low-level students with an average age of 19 served as participants. The experimental group made use of hands-on concordancing while the control group received conventional course book-based instruction to learn the target words.

Results: The results indicate that pedagogical corpora have significant potential in facilitating vocabulary learning of low-level learners. The vocabulary tests revealed that the students who practiced with DDL outperformed the students who received traditional vocabulary instruction in both the post-test and the delayed post-test. The findings from student questionnaires, and semi-structured interviews also denoted that the participants held positive attitudes towards using concordancing to expand their vocabulary and grow aware of some aspects of words such as part of speech information, different meanings and usages, lexico-grammatical structures, and collocations.

Conclusion: The present study provides useful implications for collection and use of a pedagogical corpus for classroom use.

KEYWORDS

corpus-based instruction, data-driven learning (DDL), concordance lines, vocabulary learning, pedagogical corpus

INTRODUCTION

Considering the impact corpora have had on language pedagogy, they are acknowledged to have "revolutionized" language teaching in various areas (Conrad, 2000, p. 549) both directly and indirectly (Römer, 2008). Dictionary making (e.g., Gouws, 2021; Hunston, 2002; O'Keefe et al., 2007), textbook and material development (e.g., Boulton, 2012; Friginal & Roberts, 2022; McEnery & Xiao, 2011), design of syllabi and testing materials (e.g., Boulton 2009; Hunston, 2002) including their validation and standardization (McEnery & Xiao, 2011) are some areas where corpora have indirectly contributed to language teaching. A resurgence of interest has also been witnessed in incorporating corpora into language teaching directly (Römer, 2008) through DDL, an approach to language learning introduced by Johns (1991).

A myriad of studies focused on the impact of the DDL and corpus use in L2 learning. In particular, recent meta-analyses (Boulton & Cobb 2017; Cobb & Boulton, 2015; Lee et al., 2019), have put forward the positive outcomes reported by corpus studies. With regard to teaching language skills, some investigated the role of corpora and concordancing in writing (Gilmore, 2009; Huang, 2014), and some in grammar (Boulton, 2009; Girgin, 2011; Vannestal and Lindquist, 2007). Although a considerable number of studies exist in literature to date, the studies on the effectiveness of corpus use in vocabulary learning based on students' performance (Boulton, 2008, 2012; Chan & Liou, 2005; El-Esery, 2015; Gilmore, 2009; Golabi, 2022; Kazaz, 2015; Koosha & Jafarpour, 2006; Lee & Lin, 2019) have focused on the learning of intermediate/advanced level students. Since existing corpora mostly appeal to high-level learners (Flowerdew, 2012, Meunier, 2011), the research on lower-level students' vocabulary learning remained relatively few. It is possible that researchers have tended to work with higher level students because native corpora have a high vocabulary load (Balunda, 2009, Sinha, 2021), and are not considered learner-centered, and culturally and contextually appropriate for all (Meunier, 2011). This could be one of the reasons as to why corpora use has not been normalized in language teaching and learning, and research-practice gap still exists (Chambers, 2019). To bridge this gap, the creation of a contextually relevant pedagogical corpus (as suggested by Braun, 2005) emerges as a potential solution, particularly in addressing challenges associated with the application of general corpora, especially in terms of learner-corpus interaction complexities (Kavanagh, 2021). Especially promising for learners at lower proficiency levels, who primarily engage with classroom language and struggle to comprehend less common vocabulary within native corpora, a pedagogical corpus offers the potential to amplify benefits.

Central to this study is the exploration of whether learners can benefit from a pedagogical corpus, a research that has received limited attention, particularly regarding hands-on engagement by lower-level learners with such a resource. Therefore, the novelty of this research lies in its attempt to employ a pedagogical corpus that comprises textbooks and teaching materials for vocabulary instruction. With this objective, the study seeks to investigate the efficacy of Data-Driven Learning (DDL) in enhancing students' vocabulary acquisition through the utilization of a pedagogical corpus.

LITERATURE REVIEW

Data-Driven Learning

Tim Johns's concept of DDL (1991) is a method of language learning that involves the exploration of regularities and patterns in language samples. Johns's earlier attempts to incorporate corpora into language teaching, as well as his seminal publications (1986, 1988, and 1991), and his website has become the backbone of subsequent pedagogical applications of corpora and DDL. One reason for the attention DDL received at the time was that it brought a new perspective to language teaching and learning. For example, it differs from traditional teaching methods in terms of the nature of instruction and the roles of students and teachers. It provides learners with the opportunity to examine corpora and recognize language patterns (Boulton, 2012; Hunston, 2002; O'Keeffe et al., 2007; Friginal & Roberts, 2022) enhances their ability to make generalizations (Gilquin, 2021; Johns, 1991), and thereby fostering inductive learning (O'Keeffe et al., 2007). In this regard, it also has the potential to enhance autonomous learning (Barabadi & Khajavi, 2017; Binkai, 2012).

As a prominent "computing tool for the data-driven approach" (Johns, 1991, p. 2), concordancers can analyze and organize massive amounts of texts in a very short time and present "potential patterns" by reducing all language data to a simple list in alphabetical order (Scott & Tribble, 2006, p. 5). Concordance lines and the keyword-in-context (KWIC) format facilitate the process of identifying patterns such as "lexical features" and "phraseology" of words (Sripicharn, 2003, p. 204) not only quantitatively but "beyond the frequency of the words" (O'Keeffe et al., 2007, p. 2).

Vocabulary Teaching Through DDL

While teaching English in schools, irrespective of whether it is presented under integrated skills courses or separately, traditional methods are commonly used to teach vocabulary such as providing synonyms, antonyms, L1 translations and definitions (Balcı & Çakır, 2011). Traditional vocabulary learning is usually characterized as an inactive process for learners as they usually obtain word lists and try to memorize them (Chen, 2004). However, memorizing does not necessarily mean that acquisition takes place (Nation, 2001). Understanding the form, meaning and usage of words (Nation, 2001) and knowledge of surrounding vocabulary are also crucial for acquisition (Harmer, 1993). In this respect, DDL is a potent alternative to traditional methods as it guides learners to observe and analyse data, look for patterns implicitly, and become autonomous researchers.

DDL is considered a viable approach to vocabulary learning on various grounds. First, it serves as an opportunity to get exposed to words in different contexts and forms (Barabadi & Khajavi, 2017; Wu et al, 2010), which in turn facilitates vocabulary expansion (Nation, 2001). Moreover, it increases both vocabulary breadth and depth as vocabulary items are presented in their collocative environment (Chen, 2004), and in their most common forms and patterns, which provides a means of studying collocates (McEnery & Xiao, 2011; Varley, 2009). On top of that, the above-specified vocabulary gains are not temporary as research (El-Esery, 2015, Karras, 2015) suggests that DDL yields long-term benefits and better vocabulary retention compared to traditional vocabulary