

## Systematic Literature Review on Needs Analysis in ESP within Higher Education: Implications for Future Research

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### ABSTRACT

Needs analysis is a critical step in designing an English for Specific Purposes (ESP) course, as it can ensure language courses are aligned with students' specific requirements. This article conducted a systematic review to explore the current status of needs analysis in ESP within a higher education context. It aims to analyze the application of various needs analysis models in recent research and identify future research directions. The review employed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method, using keywords in Scopus and Web of Science (WoS) databases. Articles were selected based on strict criteria, including publication date within 3 years and content related to the needs analysis of ESP in higher education. A total of 21 articles were included for detailed analysis. The findings highlight significant gaps in the existing research, such as an imbalance in the geographic regions and disciplines examined and the use of single needs analysis models. Future research can address these gaps by expanding the disciplines and regions covered as well as combining different needs analysis models. Research can also employ multiple sources of information to better understand students' language needs within specific fields.

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**Contribution/Originality:** This study contributes to the existing literature by conducting a systematic review of ESP needs analysis in higher education, offering valuable implications and directions for future research to better address students' specific language needs in diverse academic disciplines.

## 1. Introduction

English for Specific Purposes (ESP) is a branch of language teaching that can equip learners with the skills to use English effectively in specific contexts, such as professional or workplace environments, as well as academic settings (Khadam, 2023). One of the main target groups of ESP courses is university or college students from various academic disciplines who need English for their studies or future careers (Chaovanapricha & Champakaew, 2023). Among the various aspects of ESP, needs analysis has emerged as a critical focus because it ensures that language instruction aligns with the specific language requirements of learners and can thus make ESP courses more relevant and effective (Al-Malki et al., 2022; Yang et al., 2021). Given the growing importance of needs analysis in ESP, systematic studies that comprehensively review needs analysis models, applications, and current status in higher education are lacking. By analyzing recent empirical studies, the present study seeks to identify the main models, methodological approaches, and emerging trends in the field. This study addresses the following questions:

- i. What is the current status of research on ESP needs analysis in higher education?
- ii. What needs analysis models are applied in ESP research across various disciplines in higher education?
- iii. What are the potential future research directions for needs analysis in ESP within higher education?

## 2. Literature review

### 2.1. English for Specific Purpose (ESP)

ESP emerged in the 1960s. At that time, the world had entered a peaceful development following World War II with rapid advancements in science, technology, and international trade. Due to the strong international influence of English-speaking countries, the role of English in global communication grew significantly. This led to a rapid increase in English learners, particularly among university students in non-English-speaking countries (Yang et al., 2021). Most non-native English-speaking students learn English with clear and specific objectives, such as reading academic literature, understanding English-taught courses, writing research papers, or engaging in international trade and business communication, which differ significantly from the broader goals of traditional elite education in Western countries. To address this shift, university English instructors worldwide began to design new syllabi, and develop English-teaching materials, and some of these efforts came to be categorized as ESP instruction (Swales, 2013).

Unlike general English courses, ESP focuses on equipping learners with language skills in specific fields like engineering, medicine, or business. In higher education, ESP is crucial in preparing students for academic and professional communication within their disciplines, equipping them for future careers in various fields (Mao & Zhou, 2024). Therefore, understanding the language needs of different academic disciplines is crucial.

### 2.2. Needs analysis development

Needs analysis is a fundamental tool in foreign language education, particularly in ESP (Farea & Singh, 2024), because it systematically investigates learners' needs and uses

the findings to design effective language courses (Ejigu et al., 2023). According to Brown (2005), it is a process that can establish specific learning using the integration of objective and subjective data. Over time, needs analysis has progressed from the early exploratory stage to a structured theoretical framework that involves refined methods and models. The following outlines its key classifications and stages of development.

Target Situation Analysis (TSA) was first introduced by Munby (1981). It identifies the language needs that learners must meet in their target environments. Chambers (1980) then enhanced this model by analyzing target contexts to define required language proficiency. Complementing TSA, Allwright (1982) proposed Present Situation Analysis (PSA), which assesses learners' starting points, such as educational background, English learning duration, and current proficiency (Dudley-Evans & St John, 1998). PSA enables a more accurate assessment of learners' needs.

Later, a deficiency analysis was introduced to further develop needs analysis. It aims to detect the gaps between learners' current skills and the competencies needed to achieve their goals. This concept is often referred to as identifying 'deficiencies' or 'lacks' (Al-Malki et al., 2022; Allwright, 1982). Hutchinson and Waters (1987) later developed this concept into a learning needs analysis model, and their framework intends to address knowledge and skill gaps in order to provide a clear approach to course development. Needs analysis has further evolved with more comprehensive approaches like means analysis. This analysis examines the course implementation environment (Korba et al., 2023). Discourse analysis and genre analysis are also used to identify students' language needs. They concentrate on language use in professional settings to make ESP courses more relevant and practical (Li, 2024).

In conclusion, needs analysis is a key step that plays an important role in many ESP course designs, as it helps identify students' language needs. The next section provides a brief introduction to past studies.

### 2.3. Summary

To re-confirm the importance of needs analysis and the measures taken by curriculum developers when providing ESP courses, the present study conducted a systematic review and meta-analysis using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method based on the following keywords "ESP," "higher education," and "needs analysis." The following discussions provide the necessary details that could be referred to by prospective researchers and curriculum developers in ESP. The systematic review and meta-analysis were done only on articles published in Scopus and Web of Science journals to ensure that only high-quality articles were included in the meta-analysis.

### 3. Research method

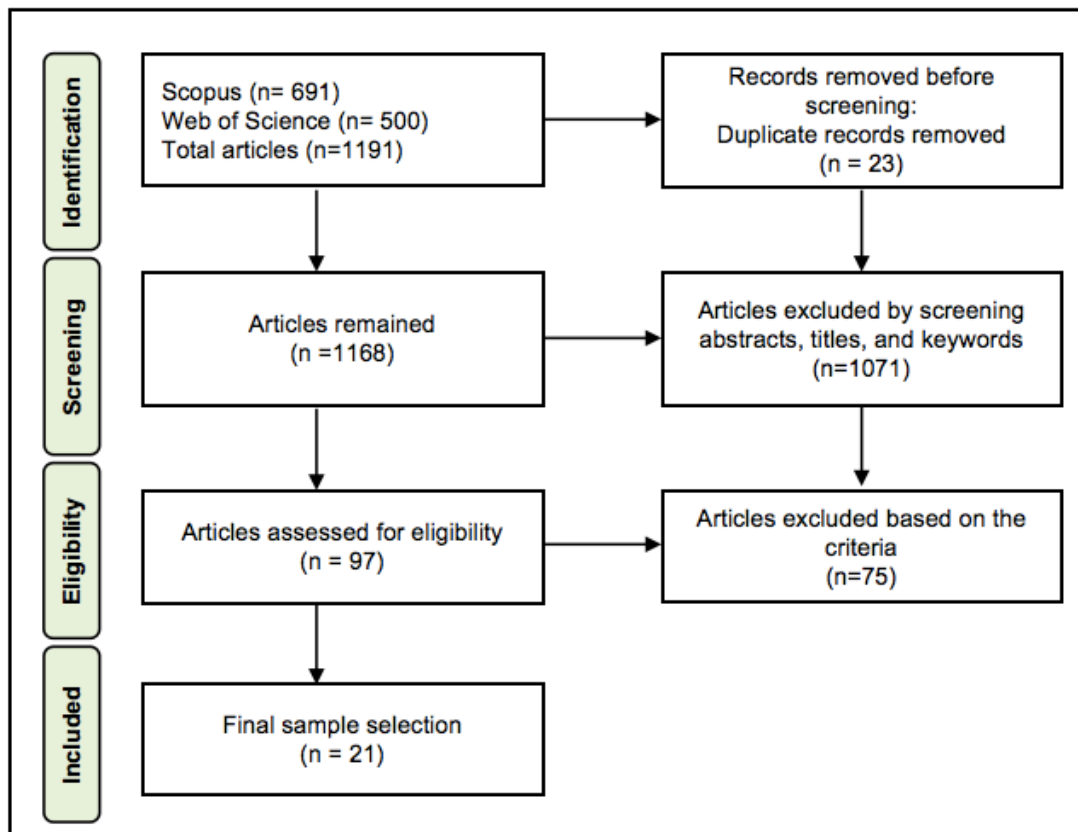
This study was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. According to the PRISMA methodology, the systematic literature review process includes the stages of identification, screening, and eligibility assessment. These steps have been carefully carried out and are described in detail below.

### 3.1. Search strategy

To ensure comprehensive coverage, this article compiled all relevant studies on needs analysis models within research on English for Specific Purposes (ESP) across higher education disciplines. Therefore, the reviewer constructed the review pool through a structured process involving: 1) database selection, 2) keyword-driven search, and 3) report inclusion/exclusion.

The primary review method involved online database searches, focusing on journal articles indexed in Scopus and Web of Science for their comprehensive coverage of high-quality ESP-related research (Hiver et al., 2024). Structured searches using title-abstract-keyword fields (TITLE-ABS-KEY) were conducted with terms such as “needs analysis,” “ESP,” “language needs,” and “higher education,” covering publications from 01-01-2022 to 09-31-2024. Keywords were restricted to titles, abstracts, and keywords to ensure relevance and minimize false positives from unrelated contexts. The initial search identified 1,190 records, and after removing duplicates, 1,168 articles were retained for further screening. The search strategy is illustrated in Figure 1.

Figure1: RISMA flow chart illustrating journal search and research-creation process



### 3.2. Coding

A total of 1168 articles were then coded by the authors according to the inclusion and exclusion criteria. Only studies that met these criteria were retained for the review. This systematic approach helped maintain the review's focus and ensured that the selected studies were directly aligned with the research objectives. Table 1 presents the inclusion and exclusion criteria for the review pool. As outlined in Table 1, the review included

full-text empirical studies conducted at the tertiary level, specifically on students' needs for ESP courses.

Table 1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Conducted in a tertiary context	Conducted in other contexts
Written in English	Written in other languages
Available as full-text	Not available as full-text
Empirical study	Non-empirical study
Focused on ESP	Focused on general English
Published from 2022-2024	Published before 2022
Specified a needs analysis model	Did not specify a needs analysis model

Additionally, the studies were restricted to those published within the past three years, ensuring that the focus is on the most recent developments in ESP needs analysis in higher education. The characteristics related to the collected data were then coded to include different needs analysis models. During the data analysis process, the articles that did not explain the application of needs analysis models in ESP contexts were excluded.

At the end of the data coding procedure, 21 articles that met the inclusion criteria and used at least one needs analysis model were included, as shown in Table 2.

#### 4. Results

This section aims to systematically present the review's findings, offering insights into the current status, applications of models, and limitations. Table 2 lists the studies included in the review.

Table 2: Summary of studies included

	Author	Title of Study	Field of Study	Needs Analysis Model Applied
1	Rimkeeratikul (2022)	Needs Analysis on an English Textbook Entitled English for International Business	Business	Dudley-Evans & St John's (1998) Model
2	Zheng et al. (2023)	A Study on Medical English Education of China	Medical	Hutchinson & Waters' (1987) Model, Dudley-Evans & St John's (1998) Model
3	Farea and Singh (2024)	A Target English Needs Analysis on ESP Course: Exploring Medical Students' Perceptions of Necessities at a Yemeni University	Medical	Hutchinson & Waters' (1987) Model
4	Jitpanich et al. (2022)	Assessing the English Writing Needs of Undergraduate Business Administration Students for ESP Writing Course	Business	Hutchinson & Waters' (1987) Model, Graves' and Xu (2000) Model

5	Dewi et al. (2023)	Development: A Case Study in Thailand English Materials Development for an Undergraduate Communication Study Program: A Needs Analysis in Indonesian Context	Communication	Hutchinson & Waters' (1987) Model
6	Changpueng and Pattanapichet (2023)	A Needs Analysis of English for Meeting Lessons for Thai Undergraduate Engineering Students	Engineering	Hutchinson & Waters' (1987) Model, Target Situation Analysis Model
7	Lasekan et al. (2022)	Needs Analysis of Chilean Students of Dentistry for Dental English Course Development	Dentistry	Hutchinson & Waters' (1987) Model, Target Situation Analysis Model
8	Suraprajit et al. (2024)	Needs Analysis of English Skills for Logistics Business Among Thai University Students	Logistics Business	Hutchinson & Waters' (1987) Model
9	Zakaria and Aziz (2023)	Police's Voice: A Needs Analysis of ESP for Police Trainees in Malaysia Academic English Language Needs	Law Enforcement	Target Situation Analysis Model
10	Ejigu et al. (2023)	Assessment: The Case of Undergraduate Engineering Students at Hawassa	Engineering	Task-Based Language Needs Analysis Model
11	Alibakhshi et al. (2022)	Assessing the Task Based Language Needs for Students of Marine Engineering	Marine Engineering	Task-Based Language Needs Analysis Model, Hutchinson & Waters' (1987) Model,
12	Arias-Contreras and Moore (2022)	The Role of English Language in the Field of Agriculture: A Needs Analysis	Agriculture	Task-Based Language Needs Analysis Model
13	Thavabalan et al. (2022)	English for Business Purposes in the Context of Printing Institute Students Proficiency Preparedness	Business	Target Situation Analysis Model
14	Rahman et al. (2023)	in Defence Workforce: A Survey of Cadet Officers' English Language Needs English Language and Communicative	Military	Present Situation Analysis Model, Target Situation Analysis Model
15	Abdullah Al-Malki (2023)	Proficiency of Saudi Tourism and Hospitality Students: A Present Situation Analysis	Tourism & Hospitality	Present Situation Analysis Model
16	Mao and Zhou (2024)	A Needs Analysis of ESP Courses in Colleges of Art	Art & Design	Present Situation Analysis Model,

		and Design: Consensus and Divergence		Target Situation Analysis Model, Learner Factor Analysis, Teaching Context Analysis
17	Jing and Wang (2022)	The Study on the Needs of English Skills in Economics and Management Industries Based on Mobile Big Data Management and Innovative Applications English Language Skills Required by International Relations Officers: A Target Situation Analysis and Its Implications for English for International Relations Officers Course Design	Economics & Management	Target Situation Analysis Model, Social Needs Analysis Model
18	Padermprach and Yaemtui (2023)	English Needs Assessment Survey for International Students of Technology at the Budapest University of Technology and Economics in Hungary	International Relations	Target Situation Analysis Model
19	Furka (2024)	Improving Chinese Nursing Undergraduates' Nurse-Patient Clinical Communication Competence in English: A Study Based on a Target Situation Needs Analysis	Technology & Education	Target Situation Analysis Model
20	Liu et al. (2023)	Needs Analysis of Aircraft Mechanics' English Language Skills	Medical	Target Situation Analysis Model
21	Korba et al. (2023)		Aviation & Mechanics	Target Situation Analysis Model

The following discussions provide an analysis of the findings according to each research question.

#### 4.1. Research Question 1: Current development trends on needs analysis of ESP in higher education

First, in terms of geographical distribution, all the studies were conducted in non-English-speaking countries and regions. As shown in Table 3, most ESP needs analysis research in higher education is centered in Asia, particularly in Thailand and China, which account for 42.8% of the studies. By contrast, studies from Africa and Europe are far less common, with only two studies from Europe (Hungary and Slovakia) and one from Africa (Ethiopia). Research from the Middle East and South America is also limited, with only one study conducted in Saudi Arabia and one in Chile.

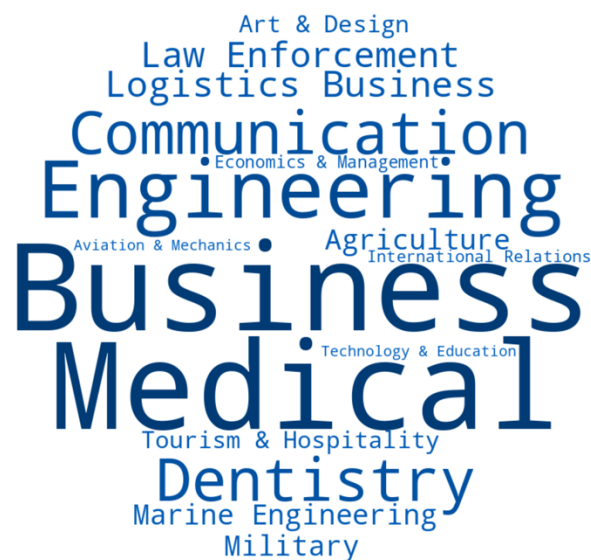
As shown in the word cloud in Figure 2, from a disciplinary perspective, the majority of studies focus on the business and medical fields, with each having 3 studies. Engineering follows with 2 studies. Other disciplines, including, law, military, communication, dentistry, tourism and hospitality, art and design, economics and management,

international relations, technology, agriculture, logistics, and etc. are each represented by 1 study.

Table 3: Research location

Country/Area	n
Thailand	5
China	5
Malaysia	2
Chile	1
Yemen	1
Indonesia	1
Ethiopia	1
Iran	1
India	1
Saudi Arabia	1
Hungary	1
Slovakia	1

Figure 2: Word cloud of disciplines



Next, the authors looked at the general study design as well as the methods adopted in the reviewed studies. As is shown in [Figure 3](#), the review reveals that over the past three years, mixed-method research has been the most frequently employed methodology in ESP needs analysis studies, reaching its highest usage in 2023. Quantitative and qualitative approaches have been used less often, with qualitative studies notably absent in 2024.

Additionally, 4 studies had sample sizes of fewer than 50 participants, while 17 studies had over 50 participants; notably, 14 of these fell within the range of 100 to 500 participants ([Table 4](#)). Remarkably, as shown in [Figure 4](#), a majority of studies (57%) chose to include diverse types of participants, such as students, employees, teachers, and professionals.

Figure 3: Research design

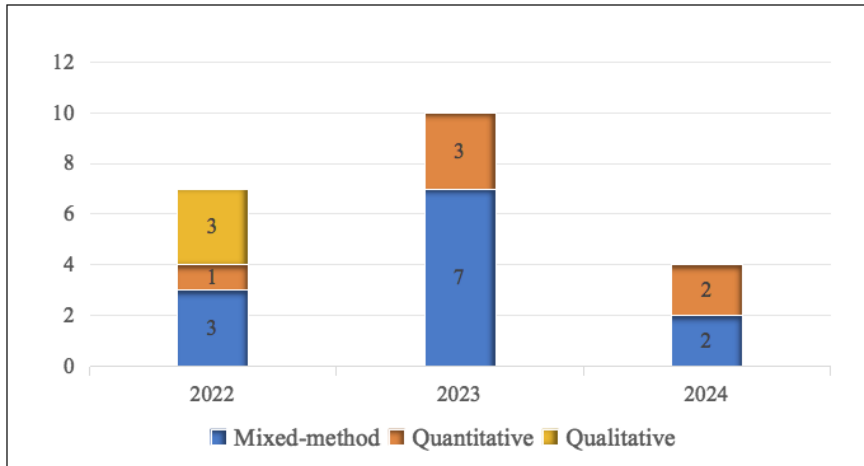
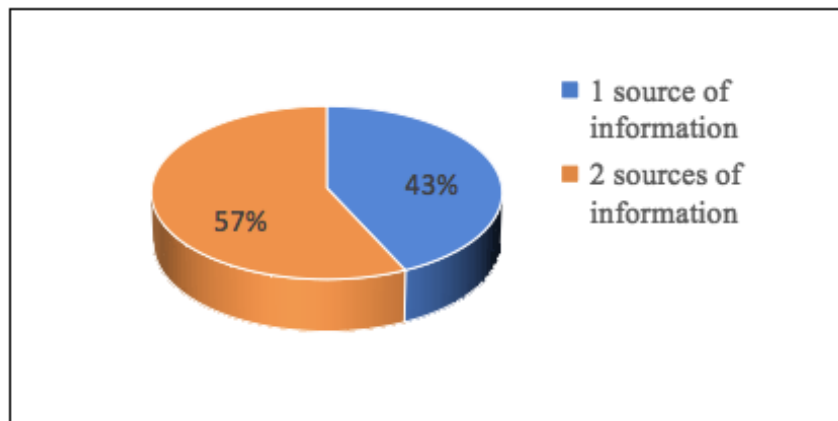


Table 4: Sample size

Sample size(p)	n	Percentage
p<5	1	4.76
5≤p<50	3	14.29
50≤p<100	1	4.76
100≤p<500	14	66.67
p≥500	2	9.52

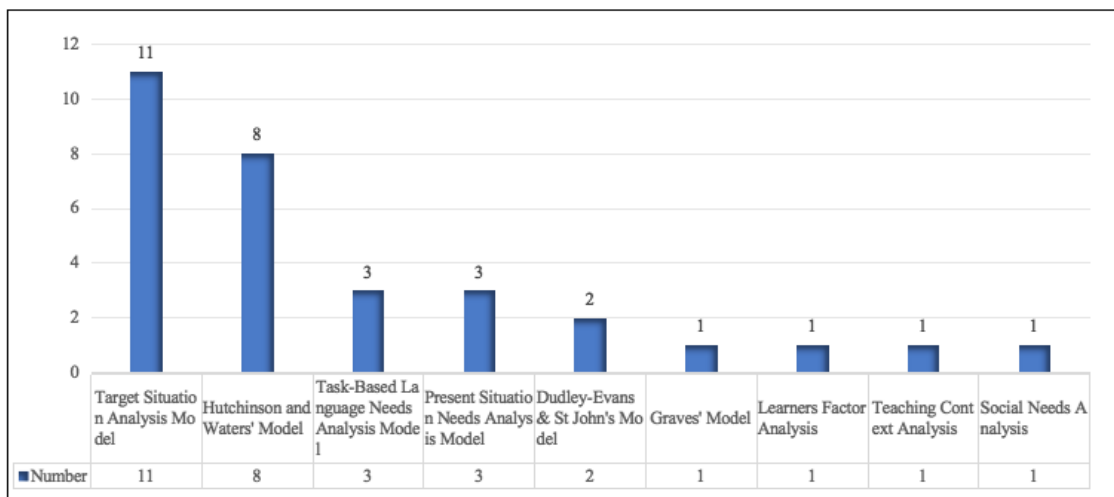
Figure 4: Information sources percentage



#### 4.2 Research Question 2: Needs analysis models application

Table 2 highlights the primary models applied in ESP needs analysis research within higher education over the past three years. These include TSA (Allwright, 1982; Chambers, 1980), Hutchinson and Waters' (1987) model, Dudley-Evans and St. John's (1998) model, and Task-Based Needs Analysis (Long, 2005). As illustrated in Figure 5, TSA emerges as the most frequently applied model, followed by Hutchinson and Waters' (1987) model, Dudley-Evans and St. John's (1998) model, and task-based needs analysis model (Long, 2005). Another noteworthy point is that 13 employed a single research model among these studies, while the remaining 8 used two or more research models.

Figure 5: Need analysis models used in selected studies



### 4.3. Research Question 3: Limitations of current research

In reviewing needs analysis in ESP research within higher education, several limitations in the existing literature were identified. These limitations expose areas that require further exploration and refinement.

To begin with, some studies reveal insufficient sample sizes. While most studies have sample sizes of over 50 participants, some studies contain smaller samples, with fewer than 50 participants. For example, a study in Thailand that examined the ESP writing needs of business administration students involved a total of 28 participants (Jitpanich et al., 2022), and another study in Iran collected data from only 20 participants (Alibakhshi et al., 2022). These studies with smaller sample sizes may not adequately reflect the characteristics of a broader student population.

Furthermore, some studies uncover the limitations of research methods. While most adopted mixed-method approaches, eight studies still relied on a single-method approach. Quantitative research primarily relies on questionnaires, such as detecting logistics business students' language needs (Suraprajit et al., 2024) and investigating nursing students from China (Liu et al., 2023) primarily relied on the use of questionnaires. Qualitative research such as Alibakhshi's et al. (2022), Arias-Contreras and Moore's (2022) used interviews or open-ended questions. These single-method studies may be constrained in comprehensively capturing the full scope of students' language needs.

Lastly, some research on the needs analysis process employed only a single model. For instance, research on undergraduate communication (Dewi et al., 2023) and a Chilean study on investigating dental students' language needs (Lasekan et al., 2022) were based on Hutchinson and Waters' (1987) model without combining other relevant models. Most studies focused on a single model, which may be restricted to the comprehensiveness of the needs analysis.

Considering the current state of research, there are still some limitations in the existing studies that could be addressed in future research.

## 5. Discussions

### 5.1. Current development trends and future research

#### 5.1.1. Geographic distribution

Research on the needs analysis of ESP in higher education shows a clear imbalance in regional distribution. The data indicate that most ESP studies have been primarily located in Asian countries, including Thailand, China, Malaysia, Indonesia, Iran, India, and Saudi Arabia. This finding aligns with the observation of [Baştürkmen \(2022\)](#) that most ESP research comes from Asia, which reflects the region's emphasis on preparing learners for specific fields. This may be attributed to the significant economic and social growth of the Asia-Pacific region in recent years and its increasingly mobile and international population. These developments have driven the increased use of English as a lingua franca for business and trade and as a key academic language for education and research ([Baştürkmen, 2022](#)).

In contrast, only Hungary and Slovakia are represented in this field of study in Europe, which is comparatively inadequate. Similarly, Africa, with only a single study from Ethiopia, and South America, with a single study from Chile, are underrepresented in needs analysis research. To address this imbalance, future research can emphasize expanding ESP needs analysis research in higher education across these underrepresented regions. This would provide a more comprehensive understanding of diverse educational contexts and contribute to a more globally balanced perspective in ESP research.

#### 5.1.2. Disciplinary diversity

The results reveal that ESP needs analysis in higher education has progressively spread beyond traditional domains like business and medicine to a broader range of academic and professional disciplines. Increasingly, research has explored ESP needs in diverse fields such as tourism, art and design, aviation, and agriculture. For example, reading comprehension has been found to be the most important skill in the field of aircraft mechanics since students must understand aircraft-related technical documentation ([Korba et al., 2023](#)). Similarly, research reports that reading is the most crucial skill in the agricultural industry because it is essential to understanding the relevant manuals ([Arias-Contreras & Moore, 2022](#)). By contrast, the speaking ability is highlighted as most crucial in ESP studies related to tourism, which shows the significance of oral communication in this industry ([Abdullah Al-Malki, 2023](#)). These findings highlight the distinct linguistic needs of various professions, emphasizing the trend of ESP being increasingly tailored to the specific requirements of diverse disciplines. This increasing diversity shows that researchers are attempting to create ESP courses that cater to the specific needs of every professional field ([Wang & Yang, 2023](#)).

However, despite growth in some disciplines with specific language needs, the range of professional fields remains narrow. Existing research has not given enough attention to a number of rapidly emerging industries, such as digital services, green energy, and artificial intelligence. Future research should focus more on these new areas to fully address the demands of industry and society today.

## 5.2. Needs analysis models

From the above results, it can be concluded that the main models used in ESP needs analysis research in the context of higher education over the last three years were Target situation analysis model (Allwright, 1982), Hutchinson and Waters' (1987) model, Dudley-Evans and St. John's (1998) model, and task-based needs analysis model (Long, 2005). Target situation analysis model focuses on analyzing students' language requirements in their future academic or professional contexts (Nunan & Carter, 2001). The analysis model proposed by Hutchinson and Waters (1987) adopts a learner-centered approach and consists of two parts: the TSA and the LSA. The former focuses on the use of language in target situations, while the latter emphasizes language learning. In addition, the model by Dudley-Evans and St. John (1998) examines students from seven aspects of language and skill learning among specific student groups and provides relevant information about the target situation and learning environment (Chen, 2010). Task-based needs analysis (Long, 2005) is divided into three steps. First, it identifies the target situation tasks that individuals perform in everyday life. Second, it classifies these target tasks into more abstract categories to provide a basis for course design. Finally, it codes these tasks as pedagogical tasks that learners can practice in the classroom (Alibakhshi et al., 2022).

Even though each needs analysis model has a unique focus, they all have limitations. For example, as an initial and localized tool for needs analysis, Target situation analysis model focuses on identifying tasks and activities related to target needs. However, it may overlook students' present needs. The needs analysis model developed by Hutchinson and Waters (1987) expands on the Communicative Needs Processor (CNP) (Munby, 1981) concept and addresses some of its limitations. Although it considers the target needs and the learning process, which includes language use and acquisition, it does not identify learners' deficiencies. Task-based needs analysis model (Long, 2005), on the other hand, focuses on the specific tasks that learners need to accomplish in real-world or professional contexts. However, its strong emphasis on specific tasks may overlook broader language needs, such as general communication skills or long-term language development. Present needs analysis model emphasizes the gap between students' current abilities and their target needs but overlooks the role of students' individual initiative in the learning process. The needs analysis model proposed by Dudley-Evans and St. John (1998), however, takes a more comprehensive approach. It examines students from multiple perspectives to conduct an in-depth analysis of language and skill learning for specific student groups. This model dramatically reduces random course design and implementation by offering insights into target situations and learning environments. It stands out among the other models as relatively well-rounded and refined. From the above, it can be seen that each model has its strengths and weaknesses.

Hyland (2019) highlighted that the continuous evolution of needs analysis models enables researchers to capture a broader range of information. Similarly, Korba et al. (2023) emphasized that integrating multiple needs analysis models effectively provides the information needed to design specialized language courses that meet learners' needs. The majority of recent research, however, has relied on single models in the past three years, which restricts the ability to fully comprehend the needs of learners. To improve the breadth and depth of needs analysis, future research might look into the integration of multiple models in more detail. This would provide more prosperous and

more reliable theoretical support for designing language courses that better align with learners' actual requirements.

### 5.3. Other methodological limitations

Methodologically, some of the included studies used a single research method, such as examining students' language needs only through quantitative approaches like surveys. Although quantitative research provides measurable and objective data, it has significant limitations. For example, it often fails to reveal deeper causes and complicated sociocultural settings. Harper and Kuh (2007) pointed out that focusing too much on generalization and statistical significance can compromise the accuracy of specific details. Relying solely on quantitative methods can make it challenging to understand individuals' or groups' attitudes and underlying psychological tendencies (Crespi, 1961). Quantitative research often fails to uncover deeper psychological factors by focusing only on measurable behaviors and responses.

A smaller percentage of studies only used qualitative approaches, like document analysis or interviews, to determine students' language needs. While qualitative research can provide deeper insights into the complexities of specific contexts, its findings are often difficult to generalize to other settings. They may suffer from subjectivity and issues of representativeness (Buchanan, 1992). Moreover, qualitative research is sometimes perceived as lacking methodological rigor and defensibility. Considering the advantages and disadvantages of both quantitative and qualitative approaches, the combination of both approaches would better validate the findings.

In terms of research samples, as Long (2005) suggested, ESP needs analysis research should include multiple sources of information to achieve comprehensive and reliable findings. However, in current studies, some research still primarily relies on single information sources, such as student surveys, without further exploring students' specific needs, teachers' insights, or employers' expectations. Limited sources may result in ESP course development that lacks both specificity and practicality. Additionally, one trend noted in the literature is that some ESP courses have become standardized and inflexible, failing to adapt to changes in the target professions, which could limit their effectiveness in addressing learners' evolving needs (Godina et al., 2018). Therefore, employing more than one source of information, such as information from learners, instructors, and stakeholders, when conducting needs analysis for ESP course design could help ensure that the courses are more closely aligned with specific and dynamic needs (Orr, 2001).

The sample size is also worth mentioning. While most studies have sample sizes exceeding 50, a small portion still rely on relatively small samples. Small-sample studies often fail to capture the complexities of the overall context adequately. Therefore, future research should consider employing a reasonable sample size to ensure the rigor and generalizability of study findings (Bacchetti, 2010).

## 6. Conclusions

This systematic review highlights the current development trends, applications, and limitations of needs analysis in ESP research within higher education. Although notable progress has been achieved, the geographic and disciplinary foci remain unbalanced, with much of the research concentrated on specific regions and fields, such as business

engineering and medicine. Established models such as Target needs analysis model dominate but may have limited efficacy in addressing evolving academic and professional language needs. Future research should prioritize expanding studies' geographic and disciplinary representation, developing dynamic and hybrid needs analysis models, and incorporating advanced methodologies such as corpus analysis and longitudinal approaches. These efforts will ensure that ESP courses better align with the specific and evolving language demands of diverse academic and professional contexts. By addressing these gaps, the field of needs analysis can continue to advance, providing a stronger foundation for effective ESP course design in higher education.

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Not applicable.

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### **Conflict of Interest**

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest concerning the research, authorship, or publication of this article.

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