

Methodological Approaches and Triangulation in ESP Needs Analysis: A Systematic Review from Saudi Arabia

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Abstract

Conducting needs analysis is essential for designing effective English for Specific Purposes (ESP) programs, as it identifies learners' specific linguistic requirements. This systematic review examines the methodological approaches used in ESP needs analysis research, using the Kingdom of Saudi Arabia as a case study over the period 2014–2024. Following systematic review procedures, 57 studies were initially identified through comprehensive keyword searches across multiple databases, and 21 studies met the inclusion criteria for detailed analysis. A structured framework was applied to code and evaluate study designs, data-collection instruments, and analytic procedures. The findings show a growing reliance on mixed methods designs, with questionnaires and interviews as the most frequently used instruments, alongside a recent increase in document analysis and digitally mediated data collection. Across the reviewed studies, English for Academic Purposes (EAP) contexts were most common. The review synthesizes key methodological strengths and limitations and proposes recommendations to strengthen transparency and triangulation in international ESP needs analysis research.

1. Introduction

In needs analysis (NA), methodological choices matter because they shape what is treated as evidence of “need” and, therefore, how confidently findings can guide ESP course design. Rigorous, well-aligned methods strengthen the credibility of results and improve the precision with which NA captures the language demands of target contexts. As Basturkmen (2010) notes, NA outcomes are shaped by the methodologies employed, making methodological scrutiny central to producing trustworthy accounts of need.

The demand for English for Specific Purposes (ESP) continues to grow internationally, particularly in academic and professional settings where specialised communicative practices are required. Within ESP, NA is widely viewed as foundational to curriculum development because it clarifies what learners must do with English in specific target situations (Long, 2005; Anthony, 2018). Reliable NA therefore supports programme quality by informing decisions about objectives, content, and assessment, and by aligning provision with field-specific communicative demands (Serafini et al., 2015; Anthony, 2018). However, methodological

inconsistency across NA studies can weaken comparability and limit the extent to which findings can be generalised or transferred across contexts. This inconsistency extends beyond the selection of methods (e.g., surveys or interviews) to the way methods are implemented and reported, including sampling practices, instrument design, triangulation rationales, coding reliability, and analytic transparency. At the same time, few studies have comprehensively reviewed NA methodologies at an international level, and existing reviews remain relatively limited in scope and coverage (Serafini et al., 2015; Mohammed, 2022).

Responding to this methodological agenda, the present study conducts a systematic methodological review of ESP-related NA research published in Saudi Arabia between 2014 and 2024. Using Saudi Arabia as a representative case study, this research maps and evaluates broader methodological patterns and shifts that resonate across the field of applied linguistics. Saudi Arabia serves as a particularly informative case due to its rapid expansion of ESP provision, offering a unique “laboratory” to observe a wide diversity of NA settings and stakeholders.

Adopting a PRISMA-guided systematic review with transparent screening criteria, this study investigates how research is designed and executed—specifically regarding the configuration of mixed-methods approaches. Ultimately, the goal is to move beyond the local context to generate transferable guidance and best practices for the international community of NA researchers and ESP decision-makers (Long, 2005; Mohammed, 2022; Liu & Zhang, 2020).

Accordingly, the study addresses the following research questions:

What methodological approaches have characterized ESP-related needs analysis research over the last decade (2014–2024)?

How have research designs, data-collection instruments, analytic procedures, and triangulation practices changed in Saudi ESP needs analysis research from 2014 to 2024?

2. Literature Review

2.1. Needs Analysis

Needs analysis is widely recognized as the foundation of ESP course design. It serves as the key process for identifying and responding to learners’ requirements. Hutchinson and Waters (1987) argued that what distinguishes ESP from General English is not the mere presence of needs, but rather the conscious recognition and systematic consideration of those needs. In practice, this involves carefully identifying and analyzing what learners must be able to do in their academic, professional, or social contexts (Belcher, 2006; Benesch, 1996; Graves, 2008; Hadley, 2006; Harding, 2007; Johns & Dudley-Evans, 1991; McCarter & Jakes, 2009).

Dudley-Evans and St John (1998) stressed that needs analysis is not only a core element but also the defining feature of any ESP course. Nonetheless, the concept has long been debated. Richterich (1983), for example, pointed out that the notion of “needs” itself lacks a precise definition and often remains ambiguous. Similarly, Widdowson (1983) noted that these ambiguities may blur the boundaries between identifying needs and conducting analyses.

Over the years, scholars have offered different interpretations of needs analysis within language education. Brown (1995) described it as a systematic process of collecting and analyzing both subjective and objective information to justify curriculum goals that meet

learners' requirements in specific institutional settings. Hyland (2002) viewed it as a structured investigation into the skills, texts, linguistic features, and communicative practices that a given learner group must master. Basturkmen (2010) similarly defined it as the process of determining learners' target language and skills, taking into account their current knowledge, perceived needs, and the constraints of the teaching context. In a later update, Brown (2016) emphasized that needs analysis involves carefully gathering and examining relevant data to design a curriculum that is both well-supported and defensible. Within ESP, the importance of needs analysis is magnified by the cultural, linguistic, and academic diversity of learners, as well as their differing educational goals and levels of academic literacy (Chalikandy, 2013).

2.2. Methods Used in NA

Data collection methods are central to needs analysis (NA) in ESP, as they allow for accurate identification and alignment of learner requirements with educational goals. Brown (2016) notes that NA is particularly challenging because it often intrudes on the time of individuals who may not share the same interest as the researcher. Consequently, the reliability of findings depends heavily on the appropriateness of the chosen method (Basturkmen, 2010).

Commonly used approaches include questionnaires, interviews, observations, performance tests, simulations of real-life tasks, and meeting analyses (Brown, 2016). Interviews, observations, and questionnaires are most frequently employed (Basturkmen, 2010; Bocanegra-Valle, 2016; Hutchinson & Waters, 1987; Jordan, 1997; Long, 2005). However, their application in Saudi contexts raises concerns. For instance, low proficiency levels may limit learners' ability to articulate needs, while overreliance on structured tools like questionnaires risks overlooking qualitative insights. Hyland (2006) highlights that questionnaires often provide restricted reliability and a narrow view of needs.

Molle and Prior (2008) observe that questionnaires are generally prioritized, with interviews serving a secondary role. Their popularity lies in scalability and efficiency (Brown, 2016), yet such dependence can obscure authentic stakeholder perspectives. In Saudi Arabia, cultural norms may also influence responses, producing socially desirable rather than genuine answers (Huhta et al., 2013). Hence, methods must be adapted to local contexts.

Questionnaires vary by type: closed-ended for quantitative data, open-ended for qualitative insights, mixed forms, situational, diagnostic, and attitudinal (Brown, 2001; Dörnyei, 2003; Creswell, 2014). Interviews are categorized as unstructured, structured, or semi-structured, each offering different levels of flexibility and comparability (Brown, 2016). Observation, often termed a direct method (Basturkmen, 2010), is the third most common tool. It enables examination of language use in authentic contexts, such as job shadowing, and provides in-depth insights into learners' responses and attitudes (Brown, 2016; Long, 2005). Yet in Saudi Arabia, institutional access and gender-segregated systems may restrict its application.

Brown (2016) stresses that method selection must consider contextual appropriateness and learner needs. He adds that qualitative methods generate new ideas and hypotheses, whereas quantitative methods assess stakeholder consensus. Huhta et al. (2013) recommend mixed methods, integrating triangulated data and stakeholder perspectives. Nevertheless, many Saudi NA studies overemphasize quantitative tools, neglecting the richness of qualitative insights. A balanced, mixed-method approach is thus necessary to capture a comprehensive picture of ESP learners' needs.

2.3. Prior Reviews of Needs Analysis Research

Several reviews have examined methodologies in needs analysis (NA). Serafini et al. (2015) analyzed 32 studies from 1984 to 2014 across EFL and occupational contexts. Studies from 1984–1999 employed qualitative, quantitative, and mixed methods, while mixed-methods became dominant after 2000. Although reporting improved with more detail on participants and materials, sampling procedures often remained vague. About half of the studies used triangulation, but interactions between data sources and methods were rarely effective. Developments included increased use of mixed methods and a shift from pre-service to in-service learners, though challenges such as limited pilot testing and inconsistent triangulation persisted. Building on this, Mohammed (2022) reviewed 48 NA studies in the Arab world (2000–2019). The findings showed a heavy focus on English for Academic Purposes (47.9%). Over half (52.1%) relied on a single method, mainly questionnaires, and 62.5% depended on a single data source, usually students or instructors. Only 14.6% demonstrated interaction between methods or sources, indicating a lack of triangulation and raising concerns about validity and reliability. These issues highlight the need for methodological improvement in Arab world NA research.

In 2020, Liu and Zhang conducted a review of methodologies employed in needs analysis (NA) data collection. They examined commonly used techniques, including questionnaires, interviews, observations, tests, and the analysis of authentic workplace discourse. Each method was found to have distinct strengths and limitations, as summarized in Table 2.1. Liu and Zhang (2020) further argued that triangulation—combining multiple approaches—can provide a more comprehensive and reliable needs assessment. Their review also served as the foundation for a proposed NA framework tailored to bank tellers in a Chinese banking context.

Table 1. Liu and Zhang (2020) - Summary of the Advantages and Disadvantages of Common Methods in Needs Analysis

Questionnaires	Interviews	Observations
Advantages: • Quick and cost-effective • Provides abundant, structured, and consistent data • Encourages truthful responses • Ensures anonymity • Minimizes interviewer influence Disadvantages: • Responses may be overly idealized • Low participation rate • Challenging to balance the number of questions • Bias from self-selection • Limited depth and variety of answers • No chance to clarify or probe further	Advantages: • Useful for gathering detailed, in-depth information • Allows clarification of unclear questions or responses • Cost-effective, familiar, encourages cooperation, requires less specialist training, and helps build rapport. Disadvantages: • Time-intensive • Risk of interviewer bias and inconsistency • Less standardized • Data quality depends heavily on the interviewer's expertise	Advantages: • Enables a direct, detailed, and contextual study • Captures participants' real behaviors and performances • Observes activities in their natural setting. Disadvantages: • In non-participant observation, the presence of an external observer may create an unnatural environment • Participants' behaviour can be influenced by being observed

3. Methodology

This study adopts a systematic review approach to investigate the methodologies used in needs analysis within the Saudi ESP context. A systematic review, as Gough et al. (2017) explain, follows a rigorous process to map the existing body of research in a given field and to integrate diverse findings, thereby offering a more complete picture than any single study could achieve. Unlike traditional literature reviews—which can be influenced by selective inclusion and personal bias—a systematic review applies a predefined protocol that ensures broader and more objective coverage of relevant studies, provided the design is carefully constructed (Boland et al., 2014). Within applied linguistics and second language acquisition (SLA), this approach has particular value given ongoing concerns about the reliability of evidence (Gough et al., 2012) and the large body of work examining adult L2 learning strategies and their instruction (Plonsky, 2011). Bringing these studies together not only highlights emerging patterns but also generates practical insights for stakeholders such as students, teachers, and educational policymakers (Macaro, 2019).

3.1. Databases and Search Strategy

To systematically review methodologies used in needs analysis for ESP in the Saudi context, a carefully structured search strategy was developed. Initial data were gathered through extensive searches in major databases, including PubMed, ERIC, Google Scholar, and the Saudi Digital Library. The search was limited to studies published in English only. The search was guided by specific parameters, with particular attention given to the choice of keywords and search terms (see Table 2). The Boolean operators AND and OR were used to combine search terms and refine the results. The main search string was: (“needs analysis” OR “needs assessment”) AND (“English for Specific Purposes” OR “ESP”) AND (“Saudi Arabia” OR “KSA”). The final database search was conducted on 18 October 2024. In addition, citation tracking was used by reviewing the reference lists of relevant studies to identify further studies that met the inclusion criteria.

Table 2. Databases and Key words Used in search

Database	Key words used in all databases
• PubMed • ERIC • Google Scholar • Saudi Digital Library • Semantic AI	• Needs analysis in Saudi Arabia • English for Specific Purposes in Saudi Arabia • ESP in Saudi Arabia • Needs assessment • Investigate the needs for ESP in KSA • Designing courses, analyzing the needs in Saudi

3.2. Studies Inclusion and Exclusion Criteria

The eligibility of studies was determined by well-defined criteria related to their relevance to the research questions, methodological quality, and geographical scope. As Macaro (2019) notes, establishing clear inclusion and exclusion parameters before conducting the literature search is essential to ensure transparency and rigor.

Table 3. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Time frame	Studies that were conducted and published between 2014 and 2024.	Excludes studies not conducted and published between 2014 and 2024.
Geographical Focus	Studies must specifically relate to needs analysis within the context of Saudi Arabia or for Saudi students.	Excludes studies that do not focus on needs analysis within the context of (ESP) in Saudi Arabia.
Methodological Detail	Each study must provide a detailed methodological description, which includes explicit details about research methodology, data collection, and analysis techniques.	Excludes studies with insufficient or unclear methodological reporting (e.g., missing participants/sampling, instruments, procedures, or analysis) that prevents reliable coding.
Type of Research	Studies must be based on primary empirical research.	Excludes theoretical papers, literature reviews, and opinion pieces that lack primary empirical research methods.
Publication Source	Studies must be published in peer-reviewed journals or credible academic sources (e.g., dissertations or theses in the Saudi Digital Library).	Excludes non-peer-reviewed/non-scholarly sources (e.g., blogs, magazines) and records without accessible full text.

3.3. Selected Studies

To ensure consistency in applying the eligibility criteria, the study selection process was carried out in two stages, following the PRISMA (2020) flow diagram for searching and screening (see Figure 1). An Excel spreadsheet was used to organize the identified needs analysis (NA) studies and to record decisions about inclusion and exclusion (see Appendix A). In the first stage, titles and abstracts were screened to allow for the efficient sorting of a large number of studies. In the second stage, a more detailed review of the full texts was undertaken to refine the dataset and ensure that only studies meeting the inclusion criteria were retained (Higgins et al., 2019). The study selection process was conducted in two stages. Following the initial database search, titles and abstracts were screened, resulting in 57 records being identified; 22 were excluded and 35 advanced to full-text screening. Full texts were then examined more closely, leading to the exclusion of 14 additional records for three main reasons: lack of specific focus on the ESP needs of Saudi students ($n = 6$), insufficient detail about the methodology used ($n = 4$), and lack of primary research or original data collection ($n = 4$). In total, 21 studies were included in the review (see Table 4).

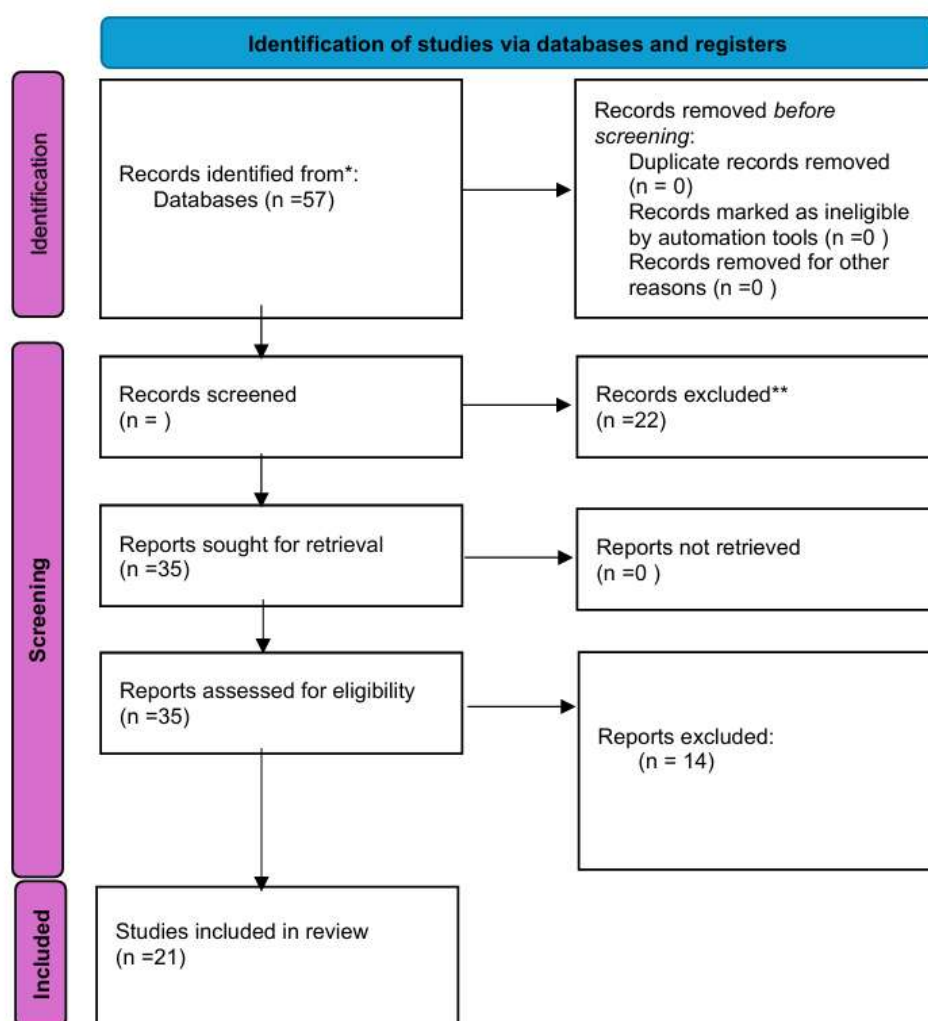
Table 4. The 21 NAs selected studies

Type of study	Author(s) and year
PhD theses	Showail, 2018- Ghobain, 2014- Sa'ad, 2019
Master Dissertation	Hausawi, 2024-Al Mukailed, 2019
Research Articles	Alfaifi, Bahudhailah, & Saleem, 2022 – Alghamdi, 2019 – Alhadih, 2021 – Alharthi, 2020 – Alhumaidan & Alghamdi, 2023 – Al-Malki, Javid, Farooq, Algethami, & Al-Harthi, 2022 – Alqunayeer & Zamir, 2016 – Alqurashi, 2016 – Alsamadani, 2017 – Alshabeb, Alsubaie, & Albasheer, 2017 – Alshayban, 2022 – Fadel & Elyas, 2015 – Fadel & Rajab, 2017 – Habbash & Albakrawi, 2014 – Mohamed & Ahmed, 2020 – Muhammad & Abdul Raof, 2019

3.4. Reporting-Sufficiency Quality Control

To strengthen the credibility of the evidence base, I applied a reporting-sufficiency quality control during screening and full-text review. I restricted eligibility to peer-reviewed journal articles and formally examined postgraduate theses/dissertations retrieved from credible academic sources (e.g., dissertations or theses in the Saudi Digital Library). At the full-text stage, I retained studies only when they reported sufficient methodological information to support reliable coding—specifically, clear details on the participant group and sampling, data sources and instruments, data-collection procedures, and the analytic approach. Records from non-scholarly outlets, and studies with unclear or minimally reported methods that could not be coded consistently, were excluded.

Figure 1. PRISMA (2020) Flow Diagram for Searching and Screening



3.5. Data Extraction Procedure

Before conducting the search, a data extraction framework was designed to ensure consistency and systematic analysis. Framework analysis, as noted by Goldsmith (2021), involves creating an analytic structure and applying it during analysis. Using this approach, data from selected studies were recorded to enable a reliable comparison of Needs Analysis (NA) methodologies. (see appendix B for the framework).

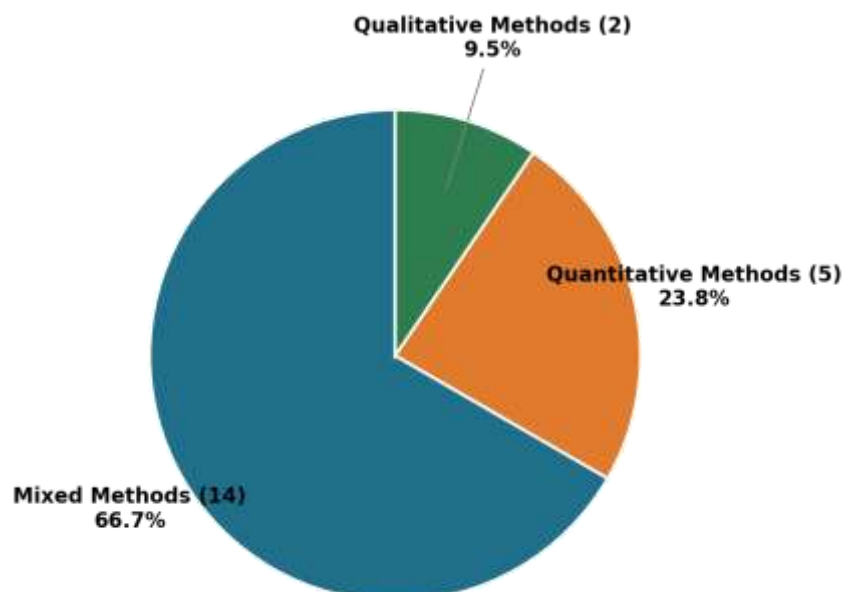
The framework categorized essential elements of NA studies to identify patterns, trends, and methodological challenges. An Excel sheet was developed with categories as column headers, supported by a coding system to ensure uniform data entry. This coding scheme, refined through multiple iterations, captured both qualitative and quantitative aspects across dimensions such as context, data sources, data types, and methods of data generation (see Appendix B for a summary of the general characteristics of the 21 NAs studies). This process facilitated systematic organization and efficient retrieval of information for analysis.

3.6. Data Analysis Method

The data set was analyzed using descriptive analysis, with a particular focus on the methodologies reported in needs analyses (NAs), including the use of mixed methods, quantitative or qualitative approaches, and changes in methodologies over time. The first stage of analysis was conducted descriptively. Using my coded framework, I performed a descriptive analysis of the methodologies reported in the NAs. According to Phakiti (2015), descriptive statistics are used to summarize the characteristics of individual variables, such as mean scores. I examined the methodologies employed across the selected studies by reviewing the coded data, identifying each methodology used, and calculating its frequency and percentage of occurrence. This process enabled me to analyze the frequency of each methodology by year. Subsequently, I analyzed and reported the changes in methodologies between 2014 and 2024 by organizing the NAs according to their year of publication. Finally, I used time-series visualizations to depict trends in methodology use across two periods: 2014–2018 and 2019–2024.

4. Findings

The analysis indicated that, of the 21 studies reviewed, 14 (66.7%) employed mixed-methods designs that integrated qualitative and quantitative techniques, commonly through semi-structured interviews, questionnaires, and surveys. Five studies (23.8%) relied solely on quantitative methods, mainly using surveys or questionnaires, while two studies (9.5%) utilized qualitative approaches such as interviews and document analysis. Detailed information for each study is presented in Table 4.1.

Figure 2. Distribution of Methodologies in (N=21) NAs Studies**Table 5. Studies used Mixed Methods, Quantitative Methods, and Qualitative Methods**

Type	Author(s) and Year
Mix-Methods	(Alfaifi, Bahudhailah, & Saleem, 2022 – Alghamdi, 2019 – Alhadiah, 2021 – Alhumaidan & Alghamdi, 2023 – Al-Malki, Javid, Farooq, Algethami, & Al-Harthi, 2022 – Alsamadani, 2017 – Alshabeb, Alsubaie, & Albasheer, 2017 – Alshayban, 2022 – – Habbash & Albakrawi, 2014 – Mohamed & Ahmed, 2020 – Muhammad & Abdul Raof, 2019, Al Mukailed, 2019, Ghobain 2014, Sa’ad, 2019)
Quantitative	(Fadel & Elyas, 2015, Al-Malki et al., 2022, Alqunayeer & Zamir, 2016 – Alqurashi, 2016 Fadel & Elyas, 2015, Fadel & Rajab, 2017)
Qualitative	(Hausawi, 2024, Alharthi, 2020)

Quantitative approaches were predominant, with 19 of the 21 studies (90.48%) employing quantitative techniques. Among these, questionnaires—both written and online—were the most frequently utilized instruments, appearing in 18 studies (85.71%). For instance, Alqurashi (2016) used written questionnaires to investigate the English language needs of Saudi medical professionals, whereas Al-Malki (2022) administered an online survey to examine the English language needs of employees in the Saudi tourism sector.

Qualitative methods were also extensively applied, appearing in 16 of the 21 studies (76.19%). The most commonly used qualitative tool was the semi-structured interview, reported in 14 studies (66.67%). For example, Ghobain (2014) conducted face-to-face interviews with medical professionals and students, while Alshayban (2022) used online interviews with banking professionals. Document analysis appeared less frequently, being employed in only three studies (14.29%), such as Sa’ad’s (2019) investigation of English course development in Saudi technical colleges.

Within the 14 mixed-methods studies, there was an even division between those that began with qualitative procedures and those that started with quantitative ones—seven studies

followed each sequence. This balanced (50–50) distribution illustrates the methodological symmetry observed in needs analysis research conducted within Saudi educational contexts. For instance, among the studies beginning with qualitative methods, Ghobain (2014) initiated data collection through in-person semi-structured interviews before administering online questionnaires. In contrast, Habbash and Albakrawi (2014) commenced their investigation with written questionnaires followed by open-ended qualitative questions. Despite the differing sequences, all 14 studies combined interviews and questionnaires to obtain comprehensive data. Similarly, Alghamdi (2019) and Alhadiah (2021) both incorporated written or online questionnaires alongside in-person semi-structured interviews, albeit in differing orders.

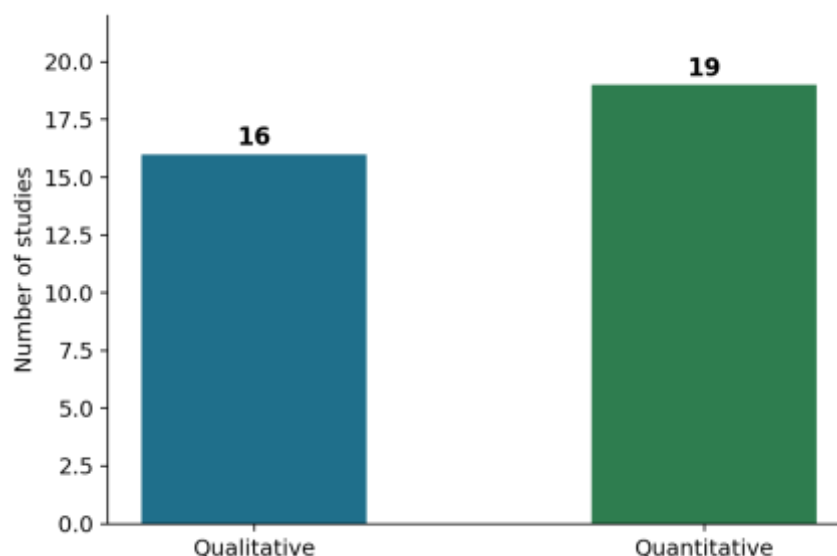
The analysis also revealed that students represented the most frequently targeted population, cited in 19 out of the 21 studies (90.5%). Subject teachers were the next most common group (10 studies, 47.6%), followed by ESP teachers (5 studies, 23.8%). Additional data sources included employees (4 studies, 19%), medical practitioners (3 studies, 14.3%), and managers (2 studies, 9.5%), indicating a comprehensive and multi-stakeholder approach to data collection across various professional domains. Furthermore, document analysis was employed in three studies (14.3%). Details on data sources are provided in Table 6.

Table 6. Sources of Data in Needs Analysis Studies (N=21)

Data sources	Number of studies
Students	19
Subject teachers	10
ESP teachers	5
Employees	4
Medical practitioner	3
Documents	3
Manager	2

4.1. Methods Used for Data Generation

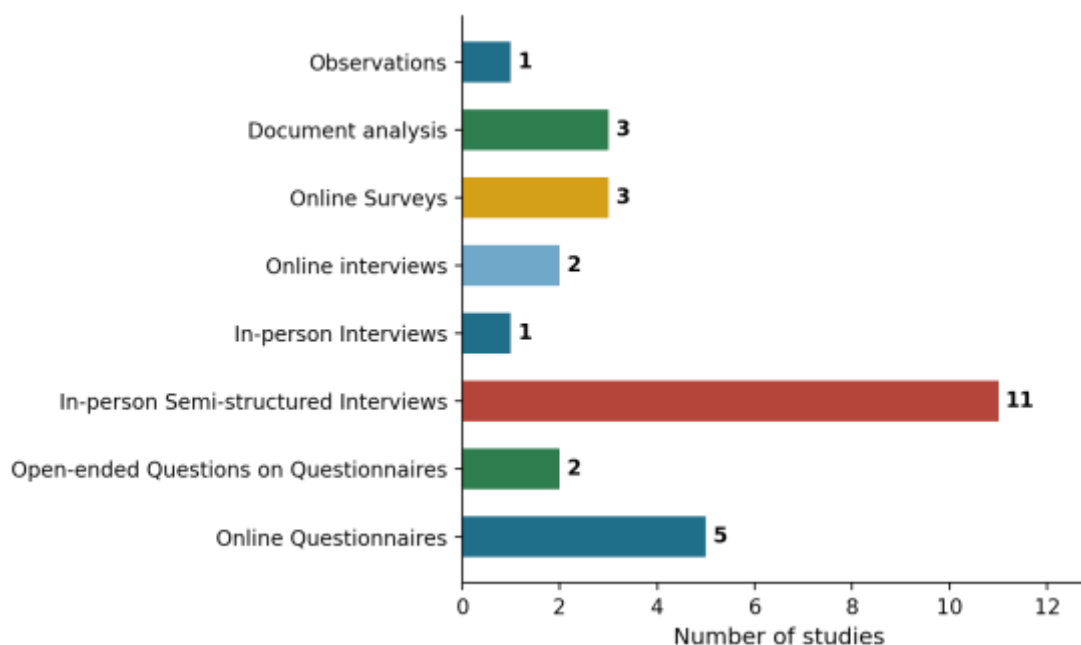
A range of methods was employed for data generation, as shown in Figure 5. Questionnaires were the most frequently used tool, applied in 18 of the 21 studies (85.71%). Interviews followed, used in 14 studies (66.67%). Surveys and document analysis were each used in three studies (14.29%), while observation appeared only once (4.76%).

Figure 3. Methods Dominance in the Review**Figure 4. Methods Sequence in Mixed-Methods Studies**

4.1.1. Questionnaires

Questionnaires were used in 18 studies overall, comprising 11 written, 5 online, and 2 mixed-format questionnaires with open-ended questions. For instance, Ghobain (2014) employed an online questionnaire adapted from previous instruments (e.g., Guerra, 2005; Yang, 2010) and Gardner's (1985) Motivation Test Battery, adding new items derived from preliminary interview data. Similarly, Habbash and Albakrawi (2014) administered written questionnaires to 154 engineering students and 12 instructors at the University of Tabuk, carefully validating and piloting the instrument. Alqunayeer and Zamir (2016) distributed written questionnaires to 150 English Language and Translation students at Qassim University, while Alqurashi (2016) targeted 156 Saudi medical students and fellows in Australian institutions.

Figure 5. General Data Generation Methods



Alshabeb et al. (2017) combined questionnaires with interviews among 70 technical students at Prince Sultan Air Base. More recently, Alhumaidan and Alghamdi (2023) used an online questionnaire distributed via Google Forms to investigate the English language needs of Hospitality and Hotel Management (HHM) students at King Abdulaziz University. The instrument addressed three key areas: essential language skills, future job expectations, and satisfaction with the current program.

4.1.2. Interviews

Interviews represented the second most frequently employed method, with 11 studies using in-person semi-structured interviews, one using structured in-person interviews, and two employing online interviews. For example, Ghobain (2014) conducted semi-structured interviews with Saudi medical professionals and students, while Alsamadani (2016) used in-person semi-structured interviews with 200 engineering students and 25 instructors at Umm Al-Qura University. Showail (2018) interviewed nursing students and teachers, and Alghamdi (2019) gathered data from 254 business students, 20 English instructors, and 3 business lecturers. Online interviews were conducted by Alshayban (2022) with banking professionals and by Alhumaidan and Alghamdi (2023) with HHM faculty and students.

4.1.3. Online Surveys, Document Analysis, and Observations

Online surveys were implemented in three studies. Alfaifi, Alghamdi, and Ahmad (2020) used an open-ended online survey with 111 business students at King Abdulaziz University, while Al-Malki (2022) targeted employees from various sectors in the Saudi tourism industry. Document analysis appeared in three studies. Sa'ad (2019) triangulated documents, interviews, and questionnaires involving technical college students, graduates, and industry stakeholders, analyzing ESP syllabi, tests, meeting reports, and correspondence. Alharthi (2020) examined exam results from the English for Business Administration program at Taif University to identify recurring challenges. Alhumaidan and Alghamdi (2023) evaluated ESP textbooks used in the HHM program through document analysis. Observation was the least utilized method,

reported only by Alsamadani (2016), who employed a structured classroom observation protocol to record student–teacher interaction patterns and time allocation across the four language skills.

4.1.4. Methods Used for Data Analysis

Quantitative and qualitative analytical approaches were almost equally represented. Quantitative methods accounted for 51.35% of cases, primarily employing statistical descriptive analysis (11 cases) and SPSS software (8 cases). For example, Habbash and Albakrawi (2014) and Fadel and Elyas (2015) used descriptive statistics to analyze engineering and foundation-year students' needs, while Alqurashi (2016) and Alqunayeer and Zamir (2016) used SPSS for medical and language student data. Qualitative analysis was used in 47.37% of studies, with thematic analysis applied in 13 cases, mostly for interview data. Ghobain (2014) and Showail (2018) integrated thematic analysis with SPSS to provide complementary quantitative insights. Document analysis (3 cases) was used by Sa'ad (2019), Alharthi (2020), and Alhumaidan and Alghamdi (2023) to examine curricula and assessments. Content analysis and NVivo software were each used once—by Alfaifi et al. (2020) and Muhammad and Abdul Raof (2019), respectively.

4.2. Triangulation

The application of triangulation varied notably across the reviewed studies. Out of the total 21 cases, 12 studies (57.14%) adopted triangulation of both sources and methods, whereas three studies (14.29%) applied triangulation of sources only and another three (14.29%) used triangulation of methods only. In contrast, three studies (14.29%) did not employ triangulation at all, relying on a single data-collection technique without cross-verification.

Table 7. Distribution of Triangulation in (N=21)

Triangulation Type	N	%
Triangulation of Methods and Sources	12	57.14%
Triangulation of Methods	3	14.29%
Triangulation of Sources	3	14.29%
No Triangulation	3	14.29%

4.2.1. Triangulation of Methods and Sources

Triangulation of both methods and sources was the most prevalent approach, employed in 12 needs analysis studies across educational and professional contexts in Saudi Arabia. This practice substantially strengthened the validity and reliability of the findings. For example, Ghobain (2014) implemented triangulation by combining semi-structured interviews and online questionnaires administered to medical professionals and students, analyzed through both thematic and statistical techniques.

Similarly, Sa'ad (2019) integrated document analysis, semi-structured interviews, and questionnaires, drawing data from multiple sources including students, graduates, teachers, administrators, and company representatives, alongside the researcher's own observations. Showail (2018) also triangulated data through in-person interviews and written questionnaires with nursing students and instructors to evaluate the need for an English for Nursing Purposes course. Alhumaidan and Alghamdi (2023) adopted a comprehensive mixed-methods design

combining a student questionnaire, faculty and industry interviews, and a textbook evaluation checklist. This approach enabled a multidimensional understanding of English language needs in the Hospitality and Hotel Management (HHM) program at King Abdulaziz University.

4.2.2. Triangulation of Methods and/or Sources

Methodological triangulation was observed in three studies. Alshabeb et al. (2017) examined the English needs of 70 Saudi Air Force technicians using both semi-structured interviews and questionnaires, analyzed via descriptive statistics and thematic coding. Alfaifi et al. (2020) combined online surveys with content analysis to explore perceived and actual business-communication needs among 111 undergraduate students. Likewise, Alshayban (2022) assessed English language requirements among Saudi banking professionals using online surveys and interviews, analyzed through both quantitative and qualitative procedures.

Triangulation of sources was reported in three studies. Alqurashi (2016) investigated Saudi medical professionals and students in Australia using written questionnaires analyzed through SPSS, thereby obtaining perspectives from two distinct populations. Al-Malki et al. (2022) collected data from tourism-sector employees via online surveys and statistical analysis to capture diverse occupational insights. Most recently, Hausawi (2024) conducted semi-structured interviews with faculty and students in Applied Medical Sciences, employing thematic analysis to identify English writing needs across academic levels.

4.2.3. Non-Triangulated Studies

Three studies did not implement triangulation of either methods or sources. Fadel and Elyas (2015) explored ESP requirements at King Abdulaziz University's English Language Institute using only an online questionnaire administered to 85 female foundation-year students. Alqunayeer and Zamir (2016) similarly relied on a single written questionnaire with 150 female English majors at Qassim University, analyzed quantitatively with SPSS. Fadel and Rajab (2017) investigated the needs of 130 female students from the Faculty of Computing and Information Technology at King Abdulaziz University through an online questionnaire and descriptive statistical analysis, also without methodological or source triangulation.

4.3. Changes in Data Collection, Analysis, and Reporting Practices (2014–2024)

ESP needs analysis research in Saudi Arabia demonstrated distinct methodological evolution across the two examined timeframes. The 2014-2018 period showed inconsistent application of mixed methods approaches. While the initial studies in 2014 (Ghobain, 2014; Habbash & Albakrawi, 2014) incorporated mixed methods, researchers in the following years (Fadel & Elyas, 2015; Alqunayeer & Zamir, 2016) reverted to single-method designs before mixed methods reappeared with Alshabeb et al. (2017). Mixed methods accounted for 55.56% of studies during this earlier period. The later period (2019-2024) revealed a marked increase, with 83.33% of studies (10 of 12) employing combined qualitative and quantitative methodologies. Sa'ad (2019) exemplified this trend by pairing questionnaires with semi-structured interviews to capture multiple stakeholder perspectives, while Muhammad and Abdul Raof (2019) utilized NVivo and SPSS for their respective qualitative and quantitative analyses.

Questionnaires served as the predominant data collection instrument throughout both periods. All nine studies (100%) from 2014-2018 incorporated questionnaires, with digital

administration emerging in later years, as demonstrated by Fadel and Rajab (2017). This digitalization intensified during 2019-2024, with 91.67% of studies utilizing questionnaires, primarily through online platforms following 2020. Studies by Alfaifi et al. (2020) and Al-Malki et al. (2022) fully adopted digital infrastructure, implementing platforms such as Google Forms and SurveyMonkey. The COVID-19 pandemic accelerated this digital transformation, prompting researchers like Alshayban (2022) and Alhumaidan and Alghamdi (2023) to conduct interviews through video conferencing platforms.

Semi-structured interviews maintained consistent usage across both timeframes. In the 2014-2018 period, 44.44% of studies conducted face-to-face interviews as the primary mode. During 2019-2024, semi-structured interviews featured in 83.33% of studies, though pandemic-related constraints drove a transition to virtual formats, as evidenced by Alhumaidan and Alghamdi's (2023) use of video conferencing technology.

Document analysis emerged as a new methodological component in the later period. Absent from 2014-2018 studies, this approach appeared in 25% of investigations between 2019 and 2024. Researchers such as Sa'ad (2019) and Alharthi (2020) integrated document analysis with other methods to strengthen their examination of ESP requirements.

Digital tool integration showed substantial growth from 2019 to 2024, with five studies explicitly documenting the use of online surveys and video conferencing for interviews—a considerable departure from the limited technology adoption in the earlier period. Data analysis approaches remained largely stable, with SPSS commonly employed for quantitative analysis and thematic analysis for qualitative interpretation. However, the later period introduced additional techniques, including content analysis as utilized by Alfaifi et al. (2020), indicating expanding methodological diversity.

Triangulation usage increased between the two periods. From 2014 to 2018, six of nine studies reported triangulation to strengthen validity; for example, Alsamadani (2016) combined observations, questionnaires, and interviews to gather complementary evidence. In 2019–2024, triangulation remained common but was not universal: most studies reported triangulating methods and/or sources, while a small minority relied on a single method without cross-verification. Alhadiah (2021), for instance, illustrates this later trend through method and source triangulation by integrating interviews, questionnaires, and document analysis.

5. Discussion and Methodological Implications

5.1. Research Designs and Data-Generation Tools in ESP Needs Analysis

Across the reviewed studies, mixed-methods designs predominated, combining qualitative and quantitative evidence to develop a more comprehensive account of learners' needs (Creswell & Plano Clark, 2018). This pattern is consistent with ESP needs analysis practice, where qualitative evidence can contextualise quantitative trends and help interpret stakeholder responses. In related regional work, Mohammed (2022) reported that nearly half of Arab-world needs analyses published between 2000 and 2019 used mixed methods, suggesting increasing uptake across Arab contexts. In the present corpus, commonly reported data-generation tools included semi-structured interviews and questionnaire surveys administered in paper and/or online formats, often used to represent multiple stakeholder perspectives (e.g., students, teachers, and administrators) (Anthony, 2018; Ghobain, 2014; Alsamadani, 2016; Alshabeb et al., 2017). Importantly, mixed-method designs can support

triangulation when studies make explicit how datasets are integrated and how convergence/divergence across sources informs claims, rather than treating the use of multiple tools as sufficient in itself. Mixed methods may be particularly attractive in ESP because they allow researchers to capture both broad patterns (e.g., frequency-based needs) and context-sensitive explanations of those patterns, aligning with the “what” and “why” of learners’ requirements. The apparent shift away from single-method designs in some Arab contexts may also reflect growing awareness of the limitations of relying on one instrument and, in some cases, greater feasibility of multi-tool data collection (Mohammed, 2022). As King and Mackey (2016) and Park (2021) argue, combining paradigms can provide a more holistic perspective on language learning needs. Serafini et al. (2015) likewise note increased adoption of mixed designs after 2000, highlighting their utility for curriculum development and instructional planning. Nevertheless, quantitative-only approaches persisted in some studies (e.g., Fadel & Elyas, 2015; Al-Malki et al., 2022), typically leveraging statistical analyses with larger samples to identify broad ESP trends. While efficient for large-scale data collection, such designs may under-represent the complexity and situated nature of language needs (Bocanegra-Valle, 2016). Conversely, qualitative-only studies (e.g., Alharthi, 2020; Hausawi, 2024) offered richer accounts through interviews and document analysis but may be constrained in scope and transferability when sampling and evidentiary coverage are narrow (Serafini et al., 2015; Bhatia et al., 2011). Within Saudi ESP needs analysis research, questionnaires and interviews were the most frequently reported tools, with variation in sequencing—some studies began with interviews (Ghobain, 2014), whereas others began with surveys (Habbash & Albakrawi, 2014). Students were the most common participant group, reflecting a learner-centred orientation; however, Serafini et al. (2015) caution that learners may not always accurately anticipate future target-situation needs. Including teachers, practitioners, and employers (e.g., Sa’ad, 2019) can therefore broaden evidentiary coverage and strengthen contextual relevance (Long, 2005). At the same time, several studies relied on limited data sources, which can constrain triangulation (Mohammed, 2022). Questionnaires were frequently used because of their practicality and reach (Brown, 2016; Basturkmen, 2010; Liu & Zhang, 2020), yet they may reduce depth and invite misunderstanding without careful instrument design and administration (Dörnyei, 2007). Interviews can provide clarification and richer explanation but require greater time and resources. Document analysis, as used by Sa’ad (2019) and Alharthi (2020), can complement perception-based data by providing access to authentic institutional or communicative practices (Bowen, 2009). Observation, although rare (e.g., Alsamadani, 2016), may offer distinctive insights into real-world language use but is often limited by access, time, and expertise demands (Liu & Zhang, 2020). Overall, the frequent use of multiple methods and sources indicates a field-level commitment to building more defensible needs claims; however, the strength of this warrant depends on transparent reporting of integration procedures and how cross-evidence comparison supports the resulting interpretations (Serafini et al., 2015).

5.1.1. Comparison with Previous Reviews

Taken together, the findings indicate that Saudi ESP needs analysis research broadly follows the regional and international methodological movement toward mixed methods designs. The predominance of mixed methods in the present review is consistent with Mohammed’s (2022) observation of their substantial use across Arab-world needs analysis research and with Serafini et al.’s (2015) identification of increasing mixed-methods adoption

internationally. This pattern also resonates with recent bibliometric analyses in applied linguistics and translation studies, where Zakarneh et al. (2026) documented a comparable 66.7% of studies employing mixed-methods designs in post-editing research. A similar pattern is evident in the use of multiple sources and triangulation. Although some Saudi studies continued to rely on a single data source, the overall prevalence of triangulation suggests greater methodological diversification, consistent with Serafini et al.'s (2015) emphasis on combining multiple sources and methods and addressing the limitation identified by Mohammed (2022) regarding single-source needs analysis. The stakeholder concentration observed in Saudi ESP research—with students as the predominant group (90.5%)—also mirrors patterns documented in broader bibliometric studies of Arab-world applied linguistics (Alrefaee & Aljabr, 2025; Mohammed, 2022).

A more notable difference concerns the context in which needs analyses were conducted. Saudi research predominantly focused on EAP, resembling the broader Arab-world pattern reported by Mohammed (2022). In contrast, Serafini et al. (2015) identified a stronger international emphasis on occupational and professional ESP contexts, particularly EOP. Thus, while Saudi needs analysis research broadly reflects regional and international methodological trends, its stronger academic orientation places it closer to the Arab-world pattern than to the occupational orientation reported in the international review.

5.2. Methodological Strengths, Gaps, and Transferable Implications

Building on the patterns reported, this section synthesises the principal methodological strengths and recurring gaps across the reviewed studies and frames their implications in relation to wider ESP needs analysis debates on rigour, validity, triangulation, and stakeholder roles (Jasso-Aguilar, 1999; Serafini et al., 2015). Importantly, while the dataset is situated in Saudi Arabia, the synthesis targets transferable methodological issues—namely, how evidence is generated, how perspectives are represented, and how claims are warranted—so that readers working across regions and domains can evaluate comparable validity risks and reporting practices in their own ESP contexts.

Overall, the evidence base reflects a strong preference for mixed-methods designs: 14 of the 21 studies (66.7%) adopted mixed methods, while 5 studies (23.8%) were quantitative-only and 2 (9.5%) were qualitative-only. Within the mixed-methods subset, sequencing was evenly distributed, with seven studies beginning with qualitative procedures and seven beginning with quantitative procedures. Across the full dataset, quantitative techniques were widely used (19/21; 90.5%), and qualitative components were also prominent (16/21; 76.2%), most notably semi-structured interviews (14/21; 66.7%). Triangulation was commonly reported (18/21; 85.7%), including triangulation of both methods and sources in 12 studies (57.1%), with smaller proportions employing methods-only triangulation or sources-only triangulation (3 studies each; 14.3%). Percentages are based on a coding framework that allowed studies to be coded for multiple tools and analytic components where applicable. Collectively, these patterns suggest methodological pluralism consistent with long-standing calls in ESP needs analysis to reduce single-instrument bias and strengthen the defensibility of interpretations through complementary evidence streams (Jasso-Aguilar, 1999; Serafini et al., 2015).

At the same time, several recurrent gaps constrain inferential strength and transferability. First, questionnaire surveys (paper/online) were heavily relied upon as a data-generation tool (18/21; 85.7%), whereas observation was rare (1/21; 4.8%) and document analysis appeared in

relatively few studies (3/21; 14.3%). This imbalance matters because perception-based data alone can under-represent situated language use, interactional demands, and discourse routines; without more direct evidence (e.g., observed practices, institutional artefacts, or naturally occurring texts), needs claims risk remaining largely “reported needs” rather than being corroborated against “enacted needs” (Jasso-Aguilar, 1999). Second, stakeholder coverage was uneven: students were included in 19 studies (90.5%), while managers appeared in only 2 studies (9.5%), and six studies relied on a single data source. This distribution indicates that many studies privilege learner perspectives while under-sampling workplace or institutional perspectives that often shape target tasks, performance standards, and constraints—an imbalance that stronger ESP needs analyses address through wider stakeholder sampling and explicit evidence integration (Cowling, 2007; Kaewpet, 2009). Third, despite the overall prevalence of triangulation, three studies (14.3%) reported no triangulation, and several others reported triangulation without clarifying how it was operationalised analytically (i.e., how convergence and divergence across sources/methods informed claims). This reporting pattern suggests a field-wide distinction that is methodologically consequential: triangulation-as-collection (multiple tools administered) versus triangulation-as-inference (systematic cross-evidence comparison that tests, qualifies, and sometimes revises claims). In ESP needs analysis, triangulation strengthens rigour primarily in the latter sense—when it is explicitly used as a warranting procedure rather than a descriptive checklist (Jasso-Aguilar, 1999; Serafini et al., 2015). Finally, digital modes of data collection were present but concentrated in a smaller subset of studies (e.g., online questionnaires in 5 studies, online interviews in 2 studies, and online surveys in 3 studies), indicating uneven integration of technology and uneven reporting of procedures needed for replication (e.g., platform, administration conditions, sampling frame, and integration steps).

Taken together, these findings yield transferable implications that extend beyond the Saudi context by clarifying how future ESP needs analyses can strengthen validity arguments and methodological transparency (Serafini et al., 2015). First, future studies can strengthen their evidence base by complementing questionnaire data with more direct forms of evidence—particularly observation and/or document- and text-based evidence—given their limited use in the reviewed studies. Where access to workplaces is constrained, document analysis of institutional artefacts (e.g., job descriptions, assessment rubrics, course documents, sample texts, communication templates) can provide an evidentiary counterweight to survey perceptions and can be paired with interviews to triangulate target tasks and language demands. In addition, systematic collection of naturally occurring written and spoken texts (where ethically and practically feasible) can support discourse- and genre-sensitive accounts of what participants must do with language, not only what they report needing. Second, broader stakeholder inclusion is advisable, particularly through incorporating underrepresented groups (e.g., managers, workplace supervisors, subject specialists, alumni, and other gatekeepers) to balance the strong emphasis on student perspectives and reduce single-stakeholder blind spots (Cowling, 2007; Kaewpet, 2009). Third, where triangulation is used, clearer reporting is needed of (a) what is being triangulated (sources, methods, or both), (b) how datasets are integrated (e.g., staged integration, cross-evidence matrices), and crucially (c) how convergence or divergence is handled analytically. Finally, continued—but more consistently reported—use of digital tools may improve feasibility and access, yet digital data collection should be accompanied by explicit reporting of instruments, administration conditions, sampling, and

integration procedures to maintain comparability and replicability across contexts and over time (Serafini et al., 2015).

5.3. Changes in Data Collection and Analysis Practices (2014–2024)

From 2014 through 2024, ESP needs analysis research in Saudi Arabia shows a clear shift in methodological choices across the reviewed studies. During the initial period, researchers showed moderate interest in mixed-methods approaches. Early investigations, including Ghobain (2014) and Habbash & Albakrawi (2014), incorporated combined qualitative and quantitative procedures. Nevertheless, a subsequent tendency toward single-method designs is also evident, as illustrated by Fadel and Elyas (2015) and Alqunayeer and Zamir (2016). Rather than attributing this pattern to a single factor, the reviewed studies suggest that methodological choice varied across projects, likely reflecting differences in feasibility, scope, and study aims. Around 2017, mixed-methods approaches reappeared (e.g., Alshabeb et al., 2017), consistent with an increased emphasis on methodological diversity when investigating ESP learners' needs.

Between 2019 and 2024, mixed-methods designs became more common in the reviewed corpus, with many studies integrating qualitative and quantitative components. This pattern is consistent with a growing emphasis on triangulation and multi-source evidence. For example, Sa'ad (2019) combined questionnaires with semi-structured interviews to capture stakeholder perspectives, while Muhammad and Abdul Raof (2019) used NVivo for qualitative analysis and SPSS for quantitative analysis, illustrating software-supported mixed-methods workflows.

Questionnaires remained a core data-collection instrument across both timeframes, although their mode of administration shifted over time. Between 2014 and 2018, studies more often reported paper-based questionnaires. Fadel and Rajab (2017) noted an emerging move toward digital formats, which intensified after 2020 due to COVID-19-related constraints. During 2019–2024, many studies reported using online questionnaires, with platforms such as Google Forms and SurveyMonkey becoming increasingly common. Semi-structured interviews also remained consistently valuable: while earlier studies primarily reported face-to-face interviews, virtual options gained prominence later. Alhumaidan and Alghamdi (2023), for example, employed video conferencing to address pandemic-related limitations.

A further development in the 2019–2024 period was the increased use of document analysis as a complementary technique. Although less visible in earlier work, document analysis appeared in several later studies. Sa'ad (2019) and Alharthi (2020), for instance, integrated document analysis with interviews and questionnaires to produce more comprehensive ESP needs assessments, strengthening the evidentiary base by incorporating institutional artefacts and authentic materials.

From 2019 onward, technological adoption became more evident, with researchers increasingly using online data collection and video conferencing. This shift also coincided with a broader range of qualitative analytic approaches being reported alongside statistical procedures; Alfaifi et al. (2020), for example, used content analysis, indicating diversification beyond conventional thematic analysis. These tools can support feasibility and broaden access to participants, particularly where they are geographically dispersed (Irani, 2019).

Overall, the reviewed studies suggest a growing emphasis on triangulation and methodological pluralism over time. While triangulation was reported in many studies across

2014–2018, it was more frequently reported in later work, although it was not universal. King and Mackey (2016) note that robust triangulation strengthens rigour through explicit verification across sources, settings, and viewpoints. Alhadiah (2021) illustrates this by combining interviews, questionnaires, and document analysis for a more comprehensive ESP needs analysis.

6. Conclusion

This systematic review examined needs analysis (NA) methodologies reported in ESP studies conducted in Saudi Arabia between 2014 and 2024. The synthesis mapped dominant research designs, data-generation tools, and reported analytic practices, and traced how these methodological choices evolved over time. Although the included studies are situated in Saudi Arabia, the synthesis targets transferable methodological and reporting issues in ESP needs analysis that are relevant across contexts.

The findings offer guidance for strengthening methodological rigour in future NA research, particularly through clearer warranting and reporting practices. Future studies may benefit from mixed-methods designs that explicitly report how datasets are integrated (i.e., when and how evidence is connected, merged, or compared) and how triangulation is used to qualify claims rather than merely as a data-collection checklist (Creswell & Plano Clark, 2018). Given the continued reliance on survey evidence, complementing questionnaire data with more direct or artefact-based sources—such as document and text analysis and, where feasible, observation—can strengthen warrants for target-situation language demands (Long, 2005). As digital data collection becomes more common, improved transparency in reporting administration conditions, sampling procedures, and data-management decisions is also needed; digital tools may support analysis and workflow efficiency when their use and limitations are clearly documented (Whang et al., 2023). Finally, extending cross-context comparisons beyond Saudi Arabia can help evaluate the robustness of NA procedures across settings and generate more widely transferable guidance for ESP programme development (Park, 2021).

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Appendices

Appendix A: Screenshot of Excel Sheet Used to Manage the NA Studies

	Title	Author	Year	Journal	Abstract	Reviewed	Full Text Download
1	Needs Analysis in ESP for Saudi Engineers	Alotaibi et al.	2022	Journal of ESP	Yes	Yes	Yes
2	A Study of General English Needs	Alotaibi et al.	2022	Language Research	Yes	Yes	Yes
3	Needs Analysis in ESP: A Saudi Arabian Perspective	Alotaibi et al.	2021	TESOL Journal	Yes	Yes	Yes
4	English Needs in the Two-Year Bachelor in Saudi Arabia	Alotaibi et al.	2022	International Journal	Yes	Yes	Yes
5	General Students' Perceptions of ESP Material and Its Impact on Their Language Proficiency: A Case Study of a Saudi Arabian University	Sama Al, Hadeen, Hassan Hadeen, Nasser Hadeen	2022	Arab World English Journal (AWEL), Volume 10, Number 4, December 2018, pp. 5-17	Yes	No	Yes
6	A STUDY OF SAUDI TEACHERS' AND STUDENTS' ATTITUDES TOWARD THE USE OF ESP AT A SAUDI UNIVERSITY	Sahar Alotaibi, Hadeen	2022	Open Access, The University of Manchester	Yes	No	Yes
7	ANALYSIS OF ESP CURRICULUM FOR STUDENTS OF HEALTH SCIENCES THROUGH NEEDS ANALYSIS AND COURSE EVALUATION IN SAUDI	Alotaibi, Hadeen T. Alotaibi	2021	PhD Thesis, University of Leicester	Yes	Yes	Yes
8	English for Event Management: A Mixed Methods Study for Needs Analysis and Course Design	Sama Alotaibi	2021	THESEUS JOURNAL, 10(2)	Yes	No	Yes
9	AN ENGLISH LANGUAGE NEEDS ASSESSMENT OF SAUDI COLLEGE OF TECHNOLOGY STUDENTS WITH RESPECT TO A NUMBER OF BUSINESS DEPARTMENTS	Alotaibi, Hadeen T. Alotaibi	2021	Open Access, The University of Manchester	Yes	No	Yes
10	General Students' Perceptions of ESP Material and Its Impact on Their Language Proficiency: A Case Study of a Saudi Arabian University	Sama Al, Hadeen, Hassan Hadeen, Nasser Hadeen	2022	Arab World English Journal (AWEL), Volume 10, Number 4, December 2018, pp. 5-17	Yes	No	Yes
11	A STUDY OF SAUDI TEACHERS' AND STUDENTS' ATTITUDES TOWARD THE USE OF ESP AT A SAUDI UNIVERSITY	Sahar Alotaibi, Hadeen	2022	Open Access, The University of Manchester	Yes	No	Yes
12	DEVELOPING AN ESP CURRICULUM FOR STUDENTS OF HEALTH SCIENCES THROUGH NEEDS ANALYSIS AND COURSE EVALUATION IN SAUDI	Alotaibi, Hadeen T. Alotaibi	2021	PhD Thesis, University of Leicester	Yes	Yes	Yes
13	English for Event Management: A Mixed Methods Study for Needs Analysis and Course Design	Sama Alotaibi	2021	THESEUS JOURNAL, 10(2)	Yes	No	Yes
14	AN ENGLISH LANGUAGE NEEDS ASSESSMENT OF SAUDI COLLEGE OF TECHNOLOGY STUDENTS WITH RESPECT TO A NUMBER OF BUSINESS DEPARTMENTS	Alotaibi, Hadeen T. Alotaibi	2021	Open Access, The University of Manchester	Yes	No	Yes
15	General Students' Perceptions of ESP Material and Its Impact on Their Language Proficiency: A Case Study of a Saudi Arabian University	Sama Al, Hadeen, Hassan Hadeen, Nasser Hadeen	2022	Arab World English Journal (AWEL), Volume 10, Number 4, December 2018, pp. 5-17	Yes	No	Yes
16	English Needs in the Two-Year Bachelor in Saudi Arabia	Alotaibi et al.	2022	International Journal	Yes	Yes	Yes
17	Needs Analysis in ESP: A Saudi Arabian Perspective	Alotaibi et al.	2021	TESOL Journal	Yes	Yes	Yes
18	Needs Analysis in ESP for Saudi Engineers	Alotaibi et al.	2022	Journal of ESP	Yes	Yes	Yes
19	Needs Analysis in ESP: A Saudi Arabian Perspective	Alotaibi et al.	2021	TESOL Journal	Yes	Yes	Yes
20	Needs Analysis in ESP for Saudi Engineers	Alotaibi et al.	2022	Journal of ESP	Yes	Yes	Yes

Appendix B: Framework Used for Collecting and Analyzing the Data

D (Methods in Data generation)	code
Interviews	D1
structured Interview	D2
Unstructured Interview	D3
Questionnaires (online)	D4
semi-structured interview	D5
Interviews (online)	D6
Questionnaires (staff)	D7
Student Questionnaires	D8
Teachers Questionnaires	D9
Surveys (online)	D10
Surveys	D11
Observations	D12
Document Analysis	D13
Performance Tests	D14
Analysis of Meetings notes	D15
Open-ended questions on questionnaires	D16

E (Methods in data Analysis)	code
Content Analysis	E1
Statistical Analysis SPSS	E2
Statistical descriptive Analysis	E3
Thematic Analysis	E4
Discourse Analysis	E5
Narrative Analysis	E6
Correlational Analysis	E7
NVivo software Qualitative	E8
Quantitative	E9
Genre Analysis	E10
Document Analysis	E11

D					
Case no.	Methods in Data generation				
1	D5	D4	X	X	X
2	D16	D9	X	X	X
3	D4	X	X	X	X
4	D5	D8	D12	X	X
5	D8	X	X	X	X
6	D8	D7	D4	X	X
7	D4	X	X	X	X
8	D5	D8	X	X	X
9	D5	D7	D8	D9	X
10	D5	D8	D9	X	X
11	D5	D8	D9	X	X
12	D5	D8	D9	D7	D13
13	D5	D8	X	X	X
14	D5	D13	X	X	X
15	D10	D16	X	X	X
16	D1	D8			
17	D5	D4	X	X	X
18	D10	D6	X	X	X
19	D10	X	X	X	X
20	D6	D4	D13	X	X
21	D5				

E			
Methods in Data Analysis			
E4	E2	X	X
E3	X	X	X
E3	X	X	X
E4	E9	E3	X
E2	X	X	X
E2	X	X	X
E3	X	X	X
E3	E4	X	X
E4	E2	X	X
E2	E8	X	X
E3	E4	X	X
E2	E4	E11	X
E3	E4	X	X
E11	E4	X	X
E1	E3	X	X
E2	E4		
E3	E4	X	X
E3	E4	X	X
E3	X	X	X
E2	E4	E11	X
E4	E10		

F			
Triangulation of Sources			
Case no.	F2	F6	X
1	F2	F6	X
2	NA	X	X
3	X	X	X
4	F2	F1	X
5	NA	X	X
6	NA	X	X
7	NA	X	X
8	NA	X	X
9	F1	F2	F5
10	F1	F2	X
11	F1	F2	X
12	F1	F2	F3
13	F1	F2	F6
14	X	X	X
15	X	X	X
16	F1	F2	
17	F1	F2	
18	X	X	X
19	F1	F3	F4
20	F1	F2	F4
21	F1	F2	

G			
Triangulation of Methods			
G1	G5	G9	X
G1	G5	X	X
G5	G17	X	X
X	X	X	X
G4	G6	G10	X
NA	X	X	X
NA	X	X	X
NA	X	X	X
G1	G5	X	X
G1	G4	X	X
G4	G5	X	X
G4	G6	G7	G14
G4	G6	X	X
G4	G11	X	X
G9	G17	X	X
G16	G6	G7	
G4	G15	X	X
G9	G1	X	X
G9	X	X	X
G1	G6	G11	

Appendix C: Summary of the general characteristics of the 21 needs analysis (NA) studies

Author (year)	Context	Target Population	Data source	Methods in generating data	Methods in data analysis	Triangulation of sources and/or methods	New Technologies in NAs Methodologies	Reported NAs Methodological Difficulties
Ghadim (2014)	EAP/EMP	Medical students/Medical practitioners	Students/medical practitioners	In person semi structured interview online questionnaire	Thematic Analysis Statistical Analysis SPSS	Students Health practitioners/ In person semi structured interview online questionnaire	Online questionnaire	NA
Habibullah and Alhakeem (2014)	EAP	Engineering students	Students/ Subject teacher(s)	written Questionnaires Open ended questions on questionnaires	Statistical descriptive Analysis	written Questionnaires Open ended questions on questionnaires	NA	NA
Fadel and Elyas (2013)	EAP	Foundation Year students in the scientific lane	students	online questionnaire	Statistical descriptive Analysis	NA	Google Docs Google Forms	NA
Alwanadani (2016)	EAP	Engineering students	ESP teacher(s) Subject teacher(s) Students	Observation written questionnaire In person Semi-structured interviews	Thematic Analysis Statistical descriptive Analysis	ESP teacher(s) Subject teacher(s) Students/ Observation written questionnaire In person Semi-structured interviews	NA	NA
Alghamdi and Zamir (2016)	EAP	EFL Female Students	Students	Written questionnaire	Statistical Analysis SPSS	NA	NA	NA
Alghamdi (2018)	EAP/EMP	Medical students/Medical practitioners	Students/medical practitioners	Written questionnaire	Statistical Analysis SPSS	Students medical practitioners	Questionnaires was sent through the Email to participants	NA
Fadel and Rajah (2017)	EAP	Faculty of Computing and Information Technology	Students	Online questionnaire	Statistical descriptive Analysis	NA	Google Docs Google Forms	NA
Alshabeh et al., (2017)	English for Military Purposes (EMP)	Military students at Prince Sultan Air Base	Students	In person semi structure interview written questionnaire	Statistical descriptive Analysis Thematic Analysis	In person semi structure interview And written questionnaire	NA	NA
Shenail (2018)	EAP/EMP	Nursing undergraduate students	ESP teacher(s) Subject teacher(s) Students	In person semi structure interviews Written questionnaires	Thematic Analysis Statistical Analysis SPSS	ESP teacher(s) Subject teacher(s) Students/ In person semi structure interviews Written questionnaires	NA	Time consuming for interviews
Muhammad and Abdul Rauf (2019)	EAP	Engineering students	Subject teacher(s) Students	written questionnaire In person semi structured interview	NVivo software Qualitative Statistical Analysis SPSS	Subject teacher(s) Students/ written questionnaire In person semi structured interview	NA	NA
Alghamdi (2019)	EAP	Business Students	ESP teacher(s) Subject teacher(s) Students	Written questionnaires In person semi structured interview	Statistical descriptive Analysis Thematic Analysis	ESP teacher(s) Subject teacher(s) Students/ Written questionnaires In person semi structured interview	NA	NA

Author (year)	Context	Target Population	Data source	Methods in generating data	Methods in data analysis	Triangulation of sources and/or methods	New Technologies in NAs Methodologies	Reported NAs Methodological Difficulties
Said (2018)	EAP/EMP	Technical College students	ESP teacher(s) Students college administrator Managers of technical companies Curriculum Documents	In person semi structured interview written questionnaire Document analysis	Statistical Analysis SPSS Thematic Analysis Document Analysis	ESP teacher(s) Students college administrator Managers of technical companies Curriculum Documents/ In person semi structured interview written questionnaire Document analysis	NA	NA
Al-Mukaid (2019)	EAP	Female undergraduate students studying health sciences	ESP teacher(s) Students Medical practitioners	In person semi structured interview Written questionnaire	Statistical descriptive Analysis Thematic Analysis	ESP teacher(s) Students Medical practitioners/In person semi structured interview Written questionnaires	NA	Questionnaire clarity Participant privacy Interview scheduling Access to participants Bias risk in categorization
Alharbi (2020)	EAP	Students majoring in Business Management and Administration	Students Results from previous test	In person semi structured interview Document analysis	Thematic Analysis Document Analysis	In person semi structured interview Document analysis/ Students Results from previous test	NA	Interview translations Google Sheets with extra data Bias risk in categorization
Alfarh et al., (2020)	EAP	Undergraduate students enrolled in the Management and Business Administration	Students	Online survey Open ended questions within the questionnaire	Content Analysis Statistical descriptive Analysis	Online survey Open ended questions within the questionnaire	QuestionPro electronic survey	questionnaire Adjusted for validity
Muhammad and Ahmed (2020)	EMP	computer science Students	Subject teacher(s) Students	Written questionnaire In person interview	Statistical Analysis SPSS Thematic Analysis	Written questionnaire In person interview/ Subject teacher(s) Students	NA	NA
Alshabeh (2021)	EAP	Engineering students	Subject teacher(s) Students	In person semi structured interview Online questionnaire	Statistical descriptive Analysis Thematic Analysis	In person semi structured interview Online questionnaire/ Subject teacher(s) Students	Online Questionnaires	Selecting Sources and methods Challenge in understanding of the context
Aldaylan (2022)	EMP	Banking Employees	Employees	Online survey Online interview	Statistical descriptive Analysis Thematic Analysis	Online survey Online interview	Interviews by video conferencing Survey Monkey platform	NA
Al-Malki et al., (2022)	ETP (English for Tourism purposes)	Tourism employees	Subject teacher(s) Hotel managers Tourism employees	Online survey	Statistical descriptive Analysis	Subject teacher(s) Hotel managers Tourism employees	Online surveys	Limited participant diversity Survey Instrument Reliability and Validity Challenges to meet participant due to COVID-19 The Complexity in Statistical Analysis
Alhamdani and Alghamdi (2023)	EMP	Hospitality and Hotel Management Students	Subject teacher(s) Students Hospitality Employees English language textbooks currently	Online questionnaire Online interview and Document analysis	Statistical Analysis SPSS Thematic Analysis Document Analysis	Subject teacher(s) Students Hospitality Employees/ Online questionnaires Online interview and Document analysis	Google Docs Google Forms Interview by zoom	Low response from 1000 students and graduates Time-consuming interview process Diverse backgrounds made English language needs challenging
Hassani (2024)	EAP	Applied Medical Sciences Students	Subject teacher(s) Students	In person semi structured interviews	Thematic Analysis	Subject teacher(s) Students	NA	NA