

English for Academic Purposes in Engineering: A Needs Analysis of Postgraduate Civil Engineering Students in Libya

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Abstract

This study examines the English for academic purposes (EAP) needs of civil engineering master's students in Libya. It aims to systematically identify their learning objectives and needs in order to contribute to the design of effective and context-appropriate training programmes. A qualitative descriptive approach was adopted, based on a needs analysis questionnaire and semi-structured interviews with ten postgraduate civil engineering students from three Libyan universities. The data were analysed using descriptive statistics and reflexive thematic analysis. The results revealed satisfactory reading and writing skills, but persistent difficulties in oral communication, particularly during seminars, discussions and presentations.

Findings reveal satisfactory reading and writing skills, but persistent difficulties in oral communication, particularly during seminars, discussions and assessed presentations. Vocabulary deficiency and limited exposure to authentic spoken English in engineering contexts are main factors contributing to these challenges. The study concludes that EAP courses should focus on oral communication and technical vocabulary development through interactive, discipline-specific tasks, formal assessments and collaboration between engineering and language departments. Implications are offered for curriculum designers, teachers, and policy makers in Libyan higher education.

Keywords: English for Academic Purposes (EAP); Needs Analysis; Civil Engineering; English for Specific Purposes ESP; English-Medium Instruction; Libyan Higher Education

1. Introduction

English has become the primary international language of science, technology and academia, influencing the production, dissemination and assessment of knowledge (Navarro et al., 2022). This dominance of English is even more pronounced in engineering where research articles, standards, textbooks are circulated globally and where multinational collaborations are prevalent. A significant number of postgraduate engineering courses in Libya involve using English language resources and the ability to express concepts verbally and in writing in English. The effectiveness of the English language instruction provided to students for the tasks of their discipline, however is uncertain (Lau & Gardner, 2019). Recognizing the individual needs of postgraduate engineering students in English for Academic Purposes (EAP) is crucial in designing English for Academic Purposes (EAP) programmes (Yacoub, 2025). A systematic needs analysis provides information to help educators determine learners' strengths and weaknesses, select communicative tasks and their preferred learning styles, and customize instruction to

meet the academic needs of engineering education. This paper aims to fill this gap by conducting an analysis (NA) of the needs of post graduate civil engineering students in terms of English for Academic Purposes (EAP) in the Libyan context.

The needs analysis is the basis of English for Specific Purpose (ESP) and English for Academic Purpose (EAP) which emphasizes on the target task, existing proficiency, and learning preference of the learner (Flowerdew, 2012), (Ananta et al., 2025). Needs Analysis gives an empirical basis to course objectives, materials and assessment, identifying needs, lacks and wants of a specific community of practices of a school. Although there is a considerable amount of ESP/EAP research carried out abroad, there is relatively little modern and context-based research to address the needs of Libyan engineering students in EAP. Furthermore, postgraduates are a unique audience with high content knowledge, multiple research loads and increased demands for seminar presentations, group work, and presentations at conferences.

Despite a number of studies dealing with English for Specific Purpose (ESP) and Academic English (EAP) in different educational contexts, few studies have focused on students' academic English needs in the Libyan higher education context to date. Current studies have mainly been conducted in undergraduate students, or in general English language proficiency, leaving little evidence of the communicative difficulties faced when studying engineering at postgraduate level. This gap highlights the need for a context-specific needs analysis to inform the development of more relevant and effective EAP curricula.

This study therefore explores two main research questions: (1) What are the academic English learning needs of Libyan postgraduate students in civil engineering? (2) How can English for Academic Purposes (EAP) courses be (re)designed to better support oral communication and vocabulary development, while maintaining reading and writing skills? The study draws on existing literature such as quantitative analyses of self-assessments of language skills and qualitative data relating to the experiences of postgraduate students when dealing with English mediated engineering tasks.

2. Literature Review

This review brings together the scholarship concerning the ESP/EAP frameworks, needs analysis models and language requirements on the field of engineering education. It provides the conceptual and empirical basis for this study and draws attention to the design principles that underlie the recommendations to follow.

2.1 ESP and EAP

Frameworks ESP emerged to meet the communicative demands of learners operating in specialized academic and professional settings (Raikhel et al., 2025), (Bhatia et al., 2011), (Pilla et al., 2025). Traditional models of ESP consider ESP to be a methodology where content, approach and evaluation are modified to meet learners' objectives. EAP in ESP targets the discourse practices of academic communities, such as the academic discourse genres (e.g., research report, lab report) and the rhetorical strategies and study skills (Hyland & Wong, 2019). The recent research highlights the role of EAP in the mediation of participation in communities of practice, especially when English-medium instruction (EMI) is related to local language contexts.

2.2 Need Analysis Models

Needs analysis is used as a guide for planning and designing specialized English courses (ESP/EAP) and is conducted by determining learners' needs and target levels in relation to their current objectives and

skills. Hutchinson and Waters (1987) proposed a widely cited taxonomy of target needs – necessities, lacks, and wants– and learning needs, with the latter placing an emphasis on the way in which the learner learns to acquire the necessary skills (Razika, 2017). With the early models like Munby's (1978) communicative needs processor which were criticised for over-specification, they laid the groundwork for systematic task analysis and consultation with stakeholders (Ma, 2026). Contemporary perspectives advocate triangulation using multiple instruments and sources (e.g., questionnaires, interviews, classroom observation, document analysis), as well as consideration of contextual constraints and institutional resources (Chand, 2025).

These theoretical approaches to needs analysis have been followed up in recent research with a growing focus on the needs of English language learners in various disciplines of study. One such setting is engineering education, in which students are required to learn technical content while also acquiring the skills and strategies of communication in the field. Thus, knowledge of the linguistic requirements of engineering programmes is a good starting point for creating a successful EAP approach.

2.3 Language Requirements in Engineering Education

Engineering students need to be able to understand technical lectures, interpret multimodal representations (graphs, equations, diagrams), work as part of a team to solve problems, and present results in reports and presentations. Oral communication and productive vocabulary have been found to be chronic problems even if reading skills are comparatively high. Common challenges include discipline-specific language, stress-induced pronunciation of technical terms and pragmatic skills in seminars. The observations align with the recent recommendations to include oral expression-based English for Academic Purposes (EAP) pedagogies in STEM settings, where literary genres are considered (Anderson, 2025), (Hua, 2025).

The literature reviewed above shows the value of performing context-specific needs analysis to make sure that learners' actual academic needs are represented in EAP programmes. The identified research gap of Libyan postgraduate students of civil engineering regarding their English language needs led to the present study which used a qualitative descriptive approach to get insight into the students' perceived needs and to formulate practical curriculum development recommendations.

3. Methodology

A qualitative descriptive design was used to gain insight into students' perceived needs and experiences, and provide implications for action in the course design process. The study was carried out in three Libyan universities with postgraduate (master level) civil engineering courses.

3.1 Participants and Sampling

The number of participants were 10 post graduate civil engineering students, seven male, three female, all of whom were voluntary and aged between 25 to 35 years. They were all graduates of undergraduate programs, which were taught mostly in Arabic and included a significant amount of reading in English. A convenience sampling was conducted because of access issues, but the sample is heterogeneous in terms of years of study, research area (e.g., transport, materials, structures), and prior exposure to EAP courses.

3.2 Instruments

The two tools that were used were: (1) a needs-analysis questionnaire that assessed the perceived level of proficiency in reading, writing, listening, speaking and vocabulary, and preference for learning activities; and (2) semi-structured interviews with five participants to gain a deeper understanding of their

experiences and expectations. Items on the questionnaire were a mix of Likert-type questions and open-ended. The interview questions were focused on issues regarding presentation difficulties, seminar attendance, use of vocabulary, and received support in language courses.

3.3 Procedures and Ethics

The data were collected during four weeks. Informed consent was given and anonymity and confidentiality were assured. Results are presented using pseudonyms. There were no academic penalties for not participating or for participating. Ethical approval was given following standard departmental procedures.

3.4 Data Analysis

Descriptive statistics (frequency, percentage) were used for the summarization of the questionnaire data. The data from interviews were transcribed and analysed through reflexive thematic analysis (Byrne, 2022). The coding was mainly related to the barriers to oral communication, lexical difficulties, and preferred pedagogies. The quantitative trends and the qualitative themes were integrated, which gave a triangulated view of the needs of the students in learning English for academic purposes.

4. Results

This section gives quantitative data summaries of self-assessment of skills and then qualitative data from the themes of the interviews. Overall participants' strengths were seen in reading and writing and their weaknesses in speaking and vocabulary.

4.1 Participant Demographics

Variable	Category	<i>n</i>	%
Gender	Male	7	70
	Female	3	30
Age (years)	25–29	6	60
	30–35	4	40
Prior EAP Course	Yes	6	60
	No	4	40

The participants were diverse in terms of gender and age, and were mostly those who had previously taken EAP courses. The diversity of prior training is relevant to interpreting perceived skill profiles.

4.2 Self-Perceived Proficiency by Skill

Skill Area	High (n)	Moderate (n)	Low (n)
Reading	6	4	0
Writing	5	4	1
Listening	3	5	2
Speaking	1	3	6
Vocabulary	2	4	4

The largest percentage (60%) of negative self-assessments was recorded by speaking, followed by vocabulary (40%). Students' sustained engagement with technical texts and structured reports was demonstrated as reading and writing revealed skills from average to high.

While the questionnaire identified speaking and vocabulary as the areas of greatest perceived difficulty, the interview data provided further insight into the reasons underlying these challenges. The qualitative results described below complement the quantitative results in that they provide insight into students' personal experiences and perceptions of academic English usage in engineering contexts.

4.3 Thematic Results of the Interviews

The students' experiences in the context of academic English in engineering revealed three themes: lack of oral experience in engineering; limited productive vocabulary; and learning preferences with interactive tasks.

Theme 1: Lack of opportunities for oral practice

Students reported minimal exposure to oral communication activities in their previous studies, which overweighted written assignments. As one participant explained 'Sometimes I understand the content of the lecture, but I can't express my ideas clearly in English during presentations.' - Participant 4 Presentation anxiety was common and often associated with insufficient rehearsal time, a lack of feedback, and unfamiliarity with genre-specific rhetorical moves (e.g., signposting, managing Q&A).

Theme 2: Productive vocabulary and pronunciation of technical lexis

Often students reported a mismatch in technical term recognition and productive, context appropriateness or correct use. For some, the pronunciation of polysyllabic words was challenging, and there was sometimes avoidance. Participant 7 said, "We do know the technical terms, but it is very challenging to pronounce them. This theme also involved some lack of understanding of collocation (mainly verb–noun combinations), which affected fluent discussions about design decisions and procedures.

Theme 3: Preference for interactive, feedback-rich pedagogy

Small group discussion, structured presentation with feedback from peers and teachers, and combined tasks that require listening, note-taking, and speaking were among the preferred activities of participants. Students highlighted that using formative assessment as a strategy decreased their anxiety and allowed them to try out new vocabulary and discourse strategies.

Overall, the results show that students' receptive language ability is lower than their productive language ability. The participants' self-confidence in reading technical texts and in writing assignments was high, while their confidence in oral communication, especially in seminars, presentations and academic discussions, was low. The results presented here serve as a foundation for understanding students' needs in English in the context of engineering education and EAP research.

5. Discussion

The findings are consistent with those of earlier studies on ESP/EAP (English for Special Purposes/EAP) which have shown that oral communication is a constant problem in engineering courses even if students are fairly competent in reading and writing. According to the needs analysis approach, there are two significant gaps that need to be taken into consideration, which are oral expression and vocabulary, in terms of the needs of seminar participation and oral presentation. The alignment between student wishes (e.g., more presentation practice) and the requirements of target situations strengthens the argument for reallocating teaching time towards interactive oral expression activities. Theoretically, the findings justify the pedagogical approaches related to learner-centredness in EAP which focus on genre knowledge, the use of disciplinary lexicon and dialogic feedback. They also reflect on the need for multi-stakes needs analysis based on the triangulation of needs from various stakeholders (students, subject teachers, EAP teachers) so as to ensure ecological validity. Pedagogical ideals must also be taken into account in the Libyan context in relation to institutional logistical constraints, such as timetable constraints, class size, resource availability, etc.

English language teaching contexts that lack authentic communicative opportunities and contexts are found to gain from the following types of oral activities: progress low-stakes oral activities to build up

fluency and confidence before high-stakes assessed oral presentations. Moreover, by focusing on the most useful technical and semi-technical terms, corpus-based vocabulary teaching can help increase student's rate of using and understanding these words.

6. Conclusion and Pedagogical Implications

This study offers contextual evidence of the academic English (AE) needs of Libyan postgraduate students in civil engineering. Their ability to read and write is satisfactory although they do need focussed work on their oral and lexical skills. The key of AAP teaching is to focus on the oral communication of the subject, put in place the teaching of technical vocabulary and integrate the formative assessment and feedback. Specifically, we recommend that: (1) engineering courses present and/or host seminars on engineering-related topics on a weekly basis; (2) vocabulary lists based on corpora and collocation exercises be used; (3) presentation strategies, academic discourse markers, pronunciation of technical vocabulary, and communication skills of academic disciplines be addressed explicitly; (4) co-teaching and/or coordination between engineering professors and academic English (AE) teachers; and (5) iterative needs analysis and teacher professional development be provided by AE centres backed by the institution.

Limitations of this study include the small sample size, which was convenience-based, and the use of self-assessment of skills. Classroom observation, performance-based speaking assessment, and longitudinal study might be used for further research to assess the effect of the restructured EAP programmes.

References

1. Ananta, B. D. B., Sholahuddin, M. F. T., Khotib, D. A., & Farah, R. R. (2025). Need analysis of English for Specific Purposes (ESP) in Psychology: Identifying linguistics demands for academic and professional success. *English Learning Innovation*, 6(1), 108–123.
2. Anderson, K. A. (2025). Integrative genre-based pedagogy: Enhancing social responsiveness in English medium of instruction and STEM education. *Journal of English for Academic Purposes*, 74, 101483.
3. Bhatia, V., Anthony, L., & Noguchi, J. (2011). ESP in the 21st century: ESP theory and application today. *Proceedings of the JACET 50th Commemorative International Convention*, 143, 143–150.
4. Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity*, 56(3), 1391–1412.
5. Chand, S. P. (2025). Methods of data collection in qualitative research: Interviews, focus groups, observations, and document analysis. *Advances in Educational Research and Evaluation*, 6(1), 303–317.
6. Flowerdew, L. (2012). Needs analysis and curriculum development in ESP. *The Handbook of English for Specific Purposes*, 325–346.
7. Hua, C. (2025). Gesturing Minds: How Embodied Semiotics Strengthen Academic Discourse Processing in STEM-Focused EAP Classrooms. Available at SSRN 5868022.
8. Hyland, K., & Wong, L. L. (2019). *Specialised English: New directions in ESP and EAP research and practice*. Routledge.
9. Lau, K., & Gardner, D. (2019). Disciplinary variations in learning styles and preferences: Implications for the provision of academic English. *System*, 80, 257–268.

10. Ma, L. (2026). Positive bias in ESP assessment. *English for Specific Purposes*, 83, 291–304.
11. Navarro, F., Lillis, T., Donahue, T., Curry, M. J., Reyes, N. Á., Gustafsson, M., Zavala, V., Lauría, D., Lukin, A., McKinney, C., & others. (2022). Rethinking English as a lingua franca in scientific-academic contexts: A position statement. *Journal of English for Research Publication Purposes*, 3(1), 143–153.
12. Pilla, M. P. A., Fiallos, B. A. G., Molina, P. E. C., & Melo, N. N. N. (2025). Development of communicative competence in specific contexts: Teaching English for Specific Purposes (ESP) in fields such as Medicine, Business, and Technology. *Ciencia Latina: Revista Multidisciplinar*, 9(1), 10262–10276.
13. Raikhel, A. M., Feltsan, I. M., & Bilak, M. V. (2025). *English for academic and professional purposes: Fortering communicative skills and specialized terminology in education*.
14. Razika, B. (2017). The role of needs analysis in ESP course design. *Algeria: Mohamed Kheider University of Biskra*.
15. Yacoub, E. S. (2025). Aligning English Language Instruction with Engineering Needs: Comprehensive Needs Analysis Framework for ESP Syllabus Design. *Anatolian Journal of Education*, 10(2), 203–216.