Abstract

This study aimed to investigate the foreign language learning needs of undergraduate engineering students enrolled in the faculties of architecture and electrical in Iran. A total of 133 undergraduate students aged between 20-25 years, along with 30 subject-specific instructors from Azad and State universities of Yazd, Iran, participated in the study. The study was conducted using a qualitative-quantitative survey design, which involved questionnaires and interviews. Qualitative data was collected through interviews with 20 subject-specific instructors and ten undergraduate students in their eighth semesters. The analysis of qualitative and statistical data revealed that most students needed to master the English language before they attended their specialized courses. Over one-third of the students expressed dissatisfaction with the teaching methodology, evaluation methods, amount of foreign culture taught in class, and content of the textbook. The subject-specific instructors also expressed dissatisfaction with their students' language skills. It can be concluded that in Iran, the English for Specific Purpose (ESP) course does not fully prepare the students to embark on their studies, as it does not sufficiently take into account their learning needs, present level of foreign language proficiency, objectives of the course, resources available in terms of staff, materials, equipment, finances, and time constraint, as well as the skill of the teachers and the teacher's knowledge of the specific area.

Keywords: academic learning needs, ESP content, EAP methodology, EAP instructors

1. Introduction

ESP is taught with special requirements for English language proficiency, where students practice all English language skills in detail (Hutchinson and Waters (1987)). They learn technical and specific vocabulary related to their jobs, helping them to define their learning roles from a global perspective. All learning materials, including articles, videos, and activities, are related to their profession, making ESP the ideal solution for better-preparing students for their future careers. In Iran, EAP and ESP are becoming increasingly important subfields of EFL instruction (Atai, & Babaii, 2018). However, their integration into tertiary education is still in the early stages. As the need for specialized language instruction grows, educational systems must conduct thorough investigations to identify learners' specific needs. Iranian universities face numerous challenges in accurately determining their students' and faculty's English language requirements. Without addressing these challenges, they may struggle to equip their learners with the necessary language skills to succeed in today's globalized world.

Iran has a unique approach to higher education that encourages students to broaden their reading by exploring professional journals and other English sources. This approach is designed to equip students with the necessary language skills early on, enabling them to tackle subject-specific textbooks in their more specialized courses. However, the Ministry of Science, Research, and Technology's high commission

does not provide clear guidelines for selecting and crafting academic materials that match the linguistic or communicative standards expected by students.

Therefore, ESP is a tailored teaching program that focuses on specific groups of learners. Unlike English for General Purposes courses, which teach general language proficiency, ESP aims to provide technical vocabulary and skills that are relevant to students' future careers. Teaching English in higher education institutions requires suitable methods and techniques that meet the students' needs for their studies and future careers. This study seeks to provide valuable insights to inform the development of targeted ESP teaching materials and methodologies that can better serve the unique needs of learners.

2 Review of The Literature

According to research conducted by Hutchinson and Waters (1987), language usage can vary depending on the context, and language instruction should be customized to meet the unique needs of learners. Language barriers are often a contributing factor to student attrition, as noted by Li and Fu (2021). Peacock (2001) also emphasized the importance of challenging trainees' beliefs about second language acquisition and incorporating this into TESL core courses. Schumann (1998) and Kardash and Scholes (1996) discovered that learners' metacognitive knowledge and beliefs significantly impact their academic learning. Additionally, Spence and Liu

(2013) identified crucial communication skills necessary for engineers in the Asia-Pacific region to succeed in their workplace.

Ferris and Tagg (1996) surveyed a large group of subject matter teachers at four universities in the US to determine the most crucial academic speaking and listening skills required by students across a range of disciplines, including engineering majors. The findings highlighted that taking notes, asking questions, and speaking during office hours were the most essential speaking and listening requirements for students in an English-medium university.

Many studies have been conducted to investigate the effectiveness of advanced ESP courses in an academic context in Iran. (e.g., Atai, & Babaii, 2018; Malmir & Bagheri, 2019; Mashhadi Heidar & Abassy Delvand, 2015; Mostafavi & Mohseni, 2021; Zand-Moghadam, Meihami, & Ghiasvand, 2018 & Mostafavi et al., 2021) There appears to be a lack of research on methods of teaching English to engineering students. Moreover, several studies focusing on technical English for engineering students (e.g., Danaye-Tous & Haghighi, 2014; Hatam & Shafiei, 2012) are based on a fragmented view of course evaluation and consequently focus only on specific aspects. ESP courses (e.g., textbooks, language skills, etc.).

A study conducted by Atai and Shoja (2011) found that undergraduate students place the highest priority on the following skills, in order of importance: utilizing the

internet for research, comprehending subject-specific texts, writing scientific articles, understanding teacher's slides, possessing general vocabulary knowledge, writing emails, translating texts, having proper pronunciation, and possessing knowledge of grammar. The research further revealed that English textbooks, journal articles, and websites were the primary sources used by professors for subject classes, emphasizing the significance of reading. Additionally, the study underscored the critical role of vocabulary in achieving academic success.

The success of a course is contingent upon the students' enthusiasm and positive attitude towards the subject matter. Dornyei and Cheng (2007) recommend implementing effective teaching techniques such as recognizing hard work, building confidence, creating a conducive learning environment, providing engaging tasks and comprehensive instructions, and highlighting the course's value. It is essential to prioritize these elements to ensure the triumph of a course.

According to Binalet and Guerra's (2014) research, effective teaching practices, teacher knowledge, and methodology significantly impact student learning in English courses at the tertiary level. Language experts have identified that teaching reading strategies and technical terms are crucial to student success. Moreover, Rahimi and Hassani's (2012) findings suggest that students' attitudes are a reliable predictor of their level of engagement and success. In particular, students' self-efficacy and proficiency level are key factors that influence their opinions, as shown

in Martinovic and Poljakovic's (2010) study. Unfortunately, low self-efficacy can prevent ESP teachers in Iran from integrating technology, designing challenging curricula, and meeting the needs of their students (Atai and Karrabi, 2015).

In Iran, English is the sole foreign language taught to students beginning in junior high school and continuing throughout their tertiary education. SAMT creates ESP materials that aim to enhance reading comprehension skills, but they are selected based on relevant topics within the student's field of study rather than by genre or discourse. Despite having studied the language for seven years, higher education students, particularly those in engineering, often struggle with English acquisition.

In Iranian universities, it is mandatory for students to complete two ESP courses. Despite passing these courses, many students continue to struggle with their English proficiency. Unfortunately, there has been limited research conducted to evaluate the effectiveness of these courses in meeting the needs of students. To address this gap, a study is presently underway to investigate the challenges faced by instructors and students in teaching and learning ESP at two universities in Iran. The ultimate goal is to identify specific obstacles and perspectives held by participants, and to gain a comprehensive understanding of the difficulties encountered in teaching and learning ESP in a technical context.

The following questions were explored in an attempt to find answers:

1. What are the particular English language requirements of Iranian Architectural and Electrical Engineering students at the tertiary level?

2. Which language skills should tertiary-level Iranian Architectural and Electrical Engineering students focus on developing?

3. What are the appropriate content, methodology, and class activities for Iranian tertiary-level students studying Architecture and Electrical Engineering?

4. What factors should be considered when designing their syllabi?

3. Method

3.1. Design of the Study

The present study was devised on a qualitative-quantitative survey basis to delve deep into the issues that are faced by ESP students. To address the research questions that were developed for the study, data was collected from both instructors and students through the use of interviews and questionnaires. The interviews were conducted to gain a comprehensive understanding of the ESP courses, with the results being refined and tabulated. Quantitative research involved collecting numerical data that was analyzed primarily through statistical methods, whereas qualitative research involves collecting non-numerical, open-ended data which requires non-statistical analysis.

3.2 Participants

In this study, 133 male and female students, 20 teachers of Electrical and Architectural Engineering, and 10 English instructors completed the questionnaires. All the students had previously passed a general English course before taking the English course for specific purposes, which lasted for 16 weeks, with two hours of classes per week. It should be noted that the majority of participants were highly motivated to take part in the study and complete the questionnaires.

Additionally, 10 male and female students who studied Electrical and Architectural Engineering at Azad and State Universities of Yazd, Iran were selected voluntarily and then interviewed, along with 10 teachers of Electrical and Architectural Engineering and 10 English instructors. All participants spoke Persian as their mother tongue and had successfully completed both the English for General Purposes (EGP) and ESP courses. The study was conducted at Azad and State Universities of Yazd to gather the necessary data.

3.3 Instruments

The study relied on two key methods: interviews and needs analysis questionnaires.

At the outset of the research, ten undergraduate students, ten English language instructors, and ten subject-specific instructors were interviewed at Azad and State universities of Yazd. The questions probed various topics including the learning requirements of students, specific language skills that needed improvement, areas of difficulty experienced by students, and the attitudes of respondents towards language instruction, content, methodology, and duration of the English course.

Another instrument used in this study was three sets of needs analysis questionnaires: engineering students' questionnaire, English language instructors' questionnaire, and special-subject instructors' questionnaire. The translated version of Mazdayasna and Tahririan, (2008) questionnaires were used to investigate the perception of engineering students and teachers toward the ESP courses. The internal consistency reliabilities of students' and teachers' questionnaires were respectively .936 and .941.

The student questionnaire had two sections. The first section, which consisted of twenty-one items (items 1-21), explored the students' opinions on their expressed needs for English language skills in their academic studies. The second section, consisting of fourteen items (items 22-35), explored the students' opinions on language demands, language needs, attitudes towards language instruction, length of the course, and the content, syllabus, and methodology of the specialized English course.

The first section (items 1-21) required respondents to express their opinions about each statement by marking the options on a six-point Likert scale ranging from 6 (to a very great extent) to 1 (not at all). The first seven items of the second section (items 22-29) also used a Likert scale, while items 29-35 were in multiple-choice format.

The instructors' questionnaire comprised three sections. The first section, items 1-37, explored the instructors' perspectives on the foreign language learning needs of engineering students in using the four macro-English skills and general study skills as related to their academic studies. In the second section, items 38-42, instructors evaluated the English language proficiency of the students by indicating the extent to which they developed the desired competence and performance after passing the ESP course.

The third section of the questionnaire, items 43-47, used the multiple-choice format to explore the instructors' opinions concerning the students' attitude toward language instruction, the length of the course, the content, syllabus, and methodology used in their ESP course. In addition to the questionnaires, semi-structured interviews were conducted with students, English instructors, and subject-specific instructors of universities. The main aim of conducting interviews was to personally elicit information regarding the interviewees' perspectives concerning the learning needs of students, and areas of difficulty that students encounter, as well as exploring the attitude and expectations of the participants regarding the ESP course.

The interviewees' opinions on the importance of proficiency in different areas of language skills, namely listening, speaking, reading, and writing, were elicited.

3.4. Data Collection and Procedure

A study was conducted in 2023 to gather information about the learning needs and language difficulties of students and teachers in Architectural and Electrical Engineering courses at Azad and State Universities in Yazd, Iran. The researcher distributed questionnaires and conducted in-depth interviews with participants. The

collected data was analyzed using SPSS Statistical Analysis Software (V28) to ensure reliability.

4. Results

4.1 Results for the First Research Question:

A researcher investigated the English language requirements of Iranian Architectural and Electrical engineering students and their instructors. Table 4.1.1 presents the distribution of attitudes toward listening skills based on the percentage and means of six questionnaire items.

Table 4.1.1

Percentage Distribution of Instructors' and Students' Attitudes about Listening Skills

Needs	Group	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent	Mean Rank
1. Listening to conversations on general topics.	Instructors	0.0	0.0	16.7	53.3	26.7	3.3	4.17
	Students	2.3	5.3	40.6	40.6	8.3	3.0	3.56
2. Listening to lectures	Instructors	0.0	0.0	30.0	63.3	3.3	3.3	3.80
	Students	0.8	7.5	51.1	34.6	5.3	0.8	3.38

3. Listening to presentations in class	Instructors	0.0	0.0	26.7	53.3	16.7	3.3	3.97
	Students	1.5	7.5	25.6	43.6	21.1	0.8	3.77
4. Listening to English mass Media	Instructors	0.0	0.0	56.7	26.7	16.7	0.0	3.60
	Students	0.0	20.3	48.9	26.3	4.5	0.0	3.15
5.Listening to instructions in real situations	Instructors	0.0	0.0	6.7	33.3	43.3	16.7	3.70
	Students	2.3	22.0	48.5	25.0	2.3	0.0	3.03
6. Listening to students, colleagues, and engineers	Instructors	0.0	3.3	43.3	50.0	0.0	3.3	3.57
	Students	1.5	23.3	57.9	14.3	2.3	0.8	2.95

According to the data presented in Table 4.1.1, the average scores of the instructors have been higher than those of the students. It is evident that the instructors believe that the students need more practice in listening to conversations on general topics, while the students prioritize listening to class presentations. Strikingly, both the groups

Comparison of Instructors and Students Based on Listening Skills Levene's test verified the assumption of equal variances, allowing the t-test to be interpreted. Instructors had a significantly higher mean (3.80) than students (3.30) (Table 4.2,

p<0.05). The assumption of equal variances was confirmed by Levene's test, enabling us to interpret the t-test results. According to Table 4.1.2 (p<0.05), instructors had a significantly greater mean score of 3.80 compared to students' mean score of 3.30.

Table 4.1.2

Comparison of Instructors and Students' Groups Based on Listening Skills

Group	Mean	Std. Deviation	Std. Error Mean	F[1]	Sig	t	df	Sig*. (2-tailed)
instructors	3.80	0.568	0.104	0.001	0.985	4.449	161	0.001
students	3.30	0.547	0.047			4.345	42.011	0.001

* Data are presented as the mean ± SD. Evaluated by Independent sample t-test and p<0.05 considered a significant level.

Table 4.1.3

Percentage Distribution of Instructors' and Students' Attitudes about Speaking Skills

Needs	Group	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent	Mean Rank

[1] Levene's Test for Equality of Variances

7. Participating in academic discussions	Instructors	0.0	0.0	23.3	73.3	3.3	0.0	3.81
	Students	0.8	10.5	45.1	33.1	6.8	3.8	3.46
8. Speaking at seminars, meetings and presentations	Instructors	0.0	0.0	40.3	56.7	3.3	0.0	3.63
	Students	0.8	18.3	53.4	21.1	5.3	1.5	3.17
9. Asking and answering questions in class	Instructors	0.0	0.0	33.3	56.7	10.3	0.0	3.77
	Students	0.0	15.3	47.4	32.3	5.3	0.0	3.28
10. Asking and answering questions in seminars	Instructors	0.0	3.3	50.3	43.3	3.3	0.0	3.47
	Students	0.0	31.6	48.9	17.3	2.3	0.0	2.90
11. Talking with professionals in real situations	Instructors	0.0	3.3	33.3	53.3	10.3	0.0	3.70
	Students	1.5	37.6	39.1	19.5	1.5	0.0	2.84
12. Talking with lecturers, Students and engineers	Instructors	0.0	33.3	26.7	60.3	6.7	3.3	3.80
	Students	0.0	33.1	50.4	7.5	8.3	0.8	2.93

According to the data presented in Table 4.1.3, instructors received higher ratings compared to students. However, both parties acknowledge the difficulty in encouraging academic discussions. Instructors place lesser importance on asking and answering questions during seminars, while students consider conversing with professionals in real-life settings as the least significant requirement. These findings highlight potential areas for improvement to optimize the learning experience for all involved.

Comparison of Instructors and Students Based on Speaking Skills

Based on the results of Levene's test indicating unequal variance, it is recommended to use the second line t-test. As per Table 4.1.4, a statistically significant difference ($p<0.01$) is observed between instructors and students, with instructors having a higher mean (3.69) as compared to students (3.10).

Table 4.1.4

Comparison of Instructors and Students' Groups Based on Speaking Skills

Group	Mean	Std. Deviation	Std. Error Mean	F[2]	Sig	t	df	Sig*. (2-tailed)
instructors	3.69	0.358	0.065	9.424	0.003	5.247	161	0.001
Students	3.10	0.600	0.052			7.154	70.941	0.001

* Data are presented as the mean ± SD. Evaluated by Independent sample t-test and $p<0.05$ considered as significant level.

[2] Levene's Test for Equality of Variances

Table 4.1.5

Percentage Distribution of Instructors' and Students' Attitudes about Reading Skills

Needs	Group	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent	Mean Rank
13. Reading original textbooks	Instructors	0.0	0.0	3.3	13.3	50.0	33.3	5.13
	Students	0.8	8.3	34.6	33.1	21.8	1.5	3.71
14. Reading articles in professional journals	Instructors	0.0	0.0	3.3	6.7	33.3	56.7	5.43
	Students	0.0	18.3	33.8	24.8	18.8	4.5	3.58
15. Reading technical reports	Instructors	0.0	0.0	0.0	10.0	43.3	46.7	5.37
	Students	0.0	10.5	33.1	34.6	18.8	3.0	3.71
16. Reading English newspapers and magazines	Instructors	0.0	0.0	6.7	6.7	50.0	36.7	5.17
	Students	1.5	24.1	32.3	24.1	15.3	3.0	3.36
17. Reading texts on the Internet	Instructors	0.0	0.0	0.0	13.3	50.0	36.7	5.23
	Students	2.3	21.1	31.6	21.1	18.8	5.3	3.49

According to the research, professional journal articles were deemed significant by instructors, whereas students gave priority to original textbooks and technical reports. In contrast, instructors considered reading original textbooks the least important, while students did not place much value on reading English newspapers and magazines. These results underscore the significance of comprehending the

distinct outlooks and preferences of instructors and students, regarding their reading requirements.

Comparison of Instructors and Students Based on Reading Skills

Levene's test indicates unequal variances, so we use the t-test for unequal variances. Table 4.1.6, shows a significant difference ($p<0.01$) between instructors and students, with instructors' mean (5.27) being higher than students' (3.57).

Table 4.1.6

Comparison of Instructors and Students' Groups Based on Reading Skills

Group	Mean	Std. Deviation	Std. Error Mean	F[3]	Sig	t	df	Sig*. (2-tailed)
instructors	5.27	0.557	0.102	7.770	0.006	10.183	161	0.001
Students	3.57	0.872	0.076			13.393	65.599	0.001

* Data are presented as the mean ± SD. Evaluated by Independent sample t-test and $p<0.05$ considered as significant level.

Table 4.1.7

Percentage Distribution of Instructors' and Students' Attitudes about Writing Skills

Needs	Group	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent	Mean Rank
21. Taking lecture notes	Instructors	0.0	0.0	16.7	70.0	10.0	3.3	4.00
	Students	0.8	5.3	48.9	30.8	11.3	3.0	3.56

[3] Levene's Test for Equality of Variances

22. Taking notes from Textbooks	Instructors	0.0	0.0	23.3	60.0	13.0	3.3	3.97
	Students	0.8	18.0	53.4	20.3	6.8	0.8	3.17
23. Writing a paper for oral presentation	Instructors	0.0	3.3	23.3	60.0	13.0	0.0	3.83
	Students	0.8	33.8	39.8	21.1	4.5	0.0	2.95
24. Writing term papers	Instructors	0.0	3.3	33.3	30.0	33.3	0.0	3.93
	Students	1.5	36.8	27.8	24.1	9.0	0.8	3.05

Table 4.1.7 data shows higher scores for instructors than students. However, both groups recognize the importance of taking comprehensive lecture notes for academic success. This emphasizes its value as a learning strategy, regardless of one's role in education.

Comparison of Instructors and Students Based on Writing Skills

The independent sample t-test requires verifying the assumption of equal variances using Levene's test. As the assumption holds, the t-test is interpretable. The results in Table 4.1.8, indicate a significant difference ($p<0.05$) between instructors and students. Instructors had a higher mean (4.49) compared to students (1.82) (Table 4.11).

Table 4.1.8

Comparison of Instructors and Students' Groups Based on Writing Skills

Group	Mean	Std. Deviation	Std. Error Mean	F[4]	Sig	t	df	Sig*. (2-tailed)
Instructors	4.49	0.454	0.083	0.201	0.654	32.217	161	0.001
Students	1.82	0.400	0.035			29.736	39.783	0.001

* Data are presented as the mean ± SD. Evaluated by Independent sample t-test and $p<0.05$ considered as significant level.

4.2 Results for the Second Research Question:

The second research aimed to explore the language proficiency skills needed by Iranian students pursuing Architectural and Electrical engineering degrees. Instructors completed a questionnaire to assess language abilities, and results were analyzed and presented in Table 4.2.1, providing insights into language learning needs of engineering students in Iran.

[4] Levene's Test for Equality of Variances

Table 4.2.1

Instructors' Views about Engineering Student's Skill after Passing the Specialized English Course

	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent	Mean Rank
38. I judge the engineering students' listening ability has been improved	0.0	0.0	0.0	30.0	66.7	3.3	3.73
39. I judge the engineering students' speaking ability has been improved	0.0	0.0	0.0	43.3	50.0	6.7	3.63
40. I judge the engineering students' writing ability has been improved	0.0	0.0	0.0	26.7	66.7	6.7	3.80
41. I judge the engineering students' reading ability has been improved	0.0	0.0	13.3	20.0	13.3	53.3	5.07
42. I judge the engineering students' communicative competence has been improved	0.0	0.0	16.7	30.0	50.0	3.3	4.40

Table 4.2.1 data shows that instructors rated students' abilities above average (3). Reading skills have significantly improved. Communicative competence of students, including writing and speaking, was evaluated. Listening skills can improve, while speaking skills require less improvement.

4.3 Results for the Third Research Question:

To improve the teaching of Architectural and Electrical Engineering courses, we gathered feedback from students and instructors through questionnaires. Table 4.13 presents the students' assessment of the educational content.

Table 4.3.1

Students' Evaluation of Educational Content, Methodology and Class Activity

	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent	Mean Rank
22. I feel satisfied with the number of students in the class	0.8	21.8	33.1	31.6	10.5	2.3	3.36
23. I feel satisfied with the topics included in the textbook	0.8	17.3	51.9	24.1	6.0	0.0	3.17
24. I am satisfied with the teaching method used in the class	4.5	19.5	41.4	33.1	1.5	0.0	3.08
25. I feel satisfied with the teacher's evaluation method	3.0	21.1	50.4	21.8	3.0	0.8	3.03
26. I feel satisfied with the current textbook	4.5	22.6	51.9	19.5	1.5	0.0	2.91
27. I feel satisfied with the amount of foreign culture that is taught in my class	3.8	24.8	57.9	12.8	0.8	0.0	2.82

28. I feel satisfied with the content of the textbook	8.3	24.1	57.9	8.3	1.5	0.0	2.71

Students' feedback indicates average rating of 3 for educational content received. Lowest satisfaction is linked to textbook content and foreign culture in curriculum. Class size has highest satisfaction level. Results suggest educators need to focus more on textbook content and cultural perspectives inclusion. Class size plays a significant role in students' satisfaction.

Table 4.3.2

Percentage Distribution of Instructors' Attitudes about General Study Skills

	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent	Mean Rank
30. Learning common core vocabulary	0.0	0.0	50.0	50.0	0.0	0.0	3.50
31. Learning semi-technical Conversation	0.0	0.0	30.0	63.3	6.7	0.0	3.77
32. Learning Technical Conversation	0.0	0.0	50.0	43.3	6.7	0.0	3.57
33. Learning new engineering technologies	0.0	0.0	20.0	63.3	16.7	0.0	3.98

34. Learning new words in sentences, synonyms, and paraphrases	0.0	0.0	30.0	63.3	6.7	0.0	3.77
35. Learning technical reading skills of skimming and scanning	0.0	0.0	10.0	83.3	6.7	0.0	3.97
36. Practicing how to use engineering vocabulary in real settings	0.0	0.0	33.3	60.0	0.0	6.7	3.80
37. Attending `Grammar Workshop where common difficulties of students can be explained	0.0	0.0	40.0	50.0	10.0	0.0	3.70

Instructors gave feedback on study skills. General study skills were rated higher than the average score. Learning new engineering technologies and technical reading skills were rated highest. Learning common core vocabulary and technical conversation were rated lowest. This suggests that learners may need more guidance in these areas. Teaching should be adjusted accordingly to optimize learning outcomes.

4.4 Results for the Forth Research Question:

The study examined crucial factors for developing syllabi for Iranian Architectural and Electrical engineering students. Data from questionnaires filled by students and

instructors were analyzed and presented in Table 4.4.1, highlighting preferred syllabus design choices. This information can be used to create effective syllabi that meet the needs and expectations of these students.

Table 4.4.1

Architectural and Electrical Engineering Students Preferred

	individually	in pairs	in small groups
Instructors	0.0	76.7	23.3
Students	18.8	39.1	42.1

Based on the data collected, it was discovered that the assumption made by the instructors regarding the preference of students to work in pairs was incorrect. The analysis revealed that the majority of students preferred to work in small groups instead.

4.5 Analysis of the Interviews

I interviewed architecture, electrical, and English instructors, as well as ten undergraduate students in their third through eighth semesters at Azad and State University of Yazd. I also interviewed three groups of ten engineering instructors on relevant subjects.

Table 4.5.1*The Verbal Data of the Semi-structured Interviews*

Items	Instructors' Perspectives	Students' Perspectives
The reason for learning English	*To write a thesis and academic paper, the students need to read studies written by non-Iranian researchers.*	*The majority of engineering studies and published books were in English.*
Which skills are most important for graduate studies and future career	*Reading comprehension was considered essential for academic studies. For a future career, the listening and speaking proficiency required.*	*All four skills were vital for my academic and future career.*
The learning style	*Teach English through carefully selected technical text and teamwork.*	*Learn English by reading academic papers and trying to analyze them.*
The students lack after passing the course	*They lack everything.*	*They could not listen, speak, and write in English. Additionally, they lack the reading proficiency and the skill to translate.*
The way to increase motivation	1. *Academic success in graduate studies* 2. *Financial success in a future career*	1. *Academic success in graduate studies* 2. *Financial motivation in a future career*
The factors and exercises to consider in the design of the ESP Textbook	*Select texts from reliable sources and incorporate practical activities, tasks, and reading comprehension exercises.*	*In addition to the instructors' view, the students wanted some related texts and activities.*
The sources for the ESP textbook	*textbooks published by SAMT*	

Reading comprehension is the most important language skill for academic studies, while listening and speaking are needed for future careers. English proficiency is a requirement for different jobs, especially the ability to communicate and report information. Students need all four language skills, but the ESP course focuses more on reading comprehension. The most effective way to learn English is by studying technical texts with word definitions and pronunciations or popular academic papers by summarizing the main message.

Reading comprehension is crucial for academic success, while listening and speaking skills are important for professional careers. Different English language qualifications are required for various jobs, emphasizing the need to communicate effectively and report information accurately. The most effective way to learn English is to read technical texts carefully, with definitions and pronunciations, and to study academic papers, summarize their main ideas, and get the gist of the message.

The results of the last question were in line with the findings of the questionnaires. items. The instructors emphasized selecting texts from reliable and original sourcebooks and papers for the coursebook design, including some practical activities and tasks. The participants expressed their need to include some related

technical texts and reading comprehension tasks. As the comprehensive and authoritative English language sources, the instructors named English for the Architectural and Electrical Engineering which is published by SAMT organization.

5. Discussion and Conclusion

A study in Iranian engineering universities explored the foreign language learning needs of undergraduate students, including those enrolled in ESP courses and their instructors. The study found that students needed specialized English courses throughout their undergraduate studies to fulfill their short-term goals. Instructors consistently reported that the students need to develop their general study skills, reading skills, and oral communication skills, and expand their vocabulary. Most students perceived that they should attain an appropriate level of English proficiency before attending their specialized courses.

Students felt that English instructors lacked the expertise to teach specialized English courses. Subject-specific instructors believed EFL instructors should teach ESP courses, with some thinking they should have specialized knowledge. Atai recommends EAP instructors reconsider their roles and broaden their language teaching strategies, but this may be impractical.

The second research question aimed to find out the types of skills that Architectural and Electrical students need to develop. Subject-specific instructors were dissatisfied with students' language skills after passing the ESP course. They claimed that students do not have sufficient proficiency in reading, writing, speaking, or listening, which makes it difficult for them to perform tasks in English. Most students agreed that reading comprehension is the most important skill, followed by listening, writing, and speaking, for their engineering studies. Similarly, almost all subject-specific instructors stated that students need to improve their reading skills greatly, followed by listening, writing, and speaking skills.

In this study, instructors and students were surveyed to assess the importance of four skills in an English for Specific Purposes (ESP) course for Architectural and Electrical students. The results showed that the instructors prioritized the four skills higher than the students. Additionally, most respondents believed that there was a great need to develop all sub-skills of the four skills in the course content.

The study also examined the appropriateness of the content, methodology, and class activities for the Architectural and Electrical students. A notable number of students expressed dissatisfaction with various issues, including the teaching

methodology, evaluation method, foreign culture taught in the class, and the content of the textbook. One-third of the students, on the other hand, were moderately satisfied with these issues.

The study emphasized the importance of consistent course design in ESP courses. The courses are not designed uniformly in terms of syllabus, materials, methodology, and expected English proficiency level on entry. Each university offers these courses independently of others. The instructors in different engineering universities do not use the same materials, and some instructors compile their own materials or select articles for their classes. Some courses may be conducted by English as a Foreign Language (EFL) instructors, while others may be taught by subject-specific instructors.

The study further examined the factors that should be considered in designing the syllabus for Architectural and Electrical students. The findings revealed that the design of the course should take into account the learning needs of the students, their present knowledge and knowledge gaps, the objectives of the course, the resources available, and the skills and knowledge of the specific area of the teachers. If these factors are not considered, the design of the course may be unsuitable for the situation, and the expected results may not be achieved.

In conclusion, the study suggests that ESP courses for engineering students are conducted without consultation or collaboration with the content departments and without assessing students' learning needs. The goals of the course may be unrealistic, and its provision inadequate to prepare the students to face the challenges and demands posed by their specialist departments unless serious measures are taken to resolve the major problems revealed by this study.

The study has limitations due to a small sample size of only 133 participants who were architectural and electrical engineering students. The findings may not be applicable to other educational settings or populations. The research was limited to students from the aforementioned disciplines, and a more comprehensive understanding could have been gained if ESP teachers had also been included. Although the study provided valuable insights, it is important to be mindful of these limitations when interpreting and applying the results.

After conducting extensive research on architectural and electrical engineering students' English language requirements, this study proposes some recommendations for additional research that could be beneficial. Firstly, it would be worthwhile to explore the English language requirements of engineering students in other faculties such as mechanics, to determine whether their requirements are comparable to those of architectural and electrical students. This would help in

identifying any gaps or overlaps in the language needs of engineering students across different disciplines.

Secondly, this study suggests evaluating students' objective and subjective needs at the post-graduate and doctoral levels. This would provide valuable insights into the specific language needs of students at these levels, which could be used to design targeted language programs that cater to their unique requirements.

Lastly, to my knowledge, there has been no official assessment of students' needs about English for Specific Purposes (ESP). Therefore, this study recommends that comparable research be conducted at other universities of arts, sciences, psychology, and so on. This would help in identifying the specific ESP needs of students across different disciplines and could guide the development of ESP programs that are tailored to their needs.

References

Abassy Delvand, S., & Mashhadi Heidar, D. (2015). A survey on the efficiency of ESP teachers in Iranian universities. *International Journal of Foreign Language Teaching and Research*, *3*(11), 59-66.

Atai, M. R., Babaii, E., & Lotfi Gaskaree, B. (2018). Investigating the Processes and Means Involved in EAP Teacher Learning: A Sociocultural Analysis of In-service Teachers' Experience as They Professionally Learn. *Iranian Journal of English for Academic Purposes*, *6*(1), 116-135.

Atai, M. R., & Karrabi, M. (2015). An Exploratory Study of Teacher Efficacy Doubts in English for Specific Academic Purposes (ESAP) and English for General Purpose (EGP) Instruction. *Iranian Journal of Applied Linguistics*, *18*(1).

Atai, M. R., & Shoja, L. (2011). A triangulated study of academic language needs of Iranian students of computer engineering: are the courses on track? *RELC Journal*, *42*(3), 305-323.

Binalet, C. B., & Guerra, J. M. (2014). A study on the relationship between motivation and language learning achievement among tertiary students. *International Journal of Applied Linguistics and English Literature*, *3*(5), 251-260.

Cheng, H. F., & Dörnyei, Z. (2007). The use of motivational strategies in language instruction: The case of EFL teaching in Taiwan. *International journal of innovation in language learning and teaching*, *1*(1), 153-174.

Danaye Tous, M., & Haghighi, S. (2014). Evaluation of ESP textbooks: Evidence from ESP textbook of computer engineering major. *International Journal of Research Studies in Language Learning*, *3*(2), 55-68.

Ferris, D., & Tagg, T. (1996). Academic oral communication needs of EAP learners: What subject-matter instructors actually require. *Tesol Quarterly*, *30*(1), 31-58.

Hatam, A. H., & Shafiei, S. (2012). The Evaluation of the Effectiveness of ESP Courses in Enhancing Technical Translation Proficiency: A Case Study of ESP Course for Mechanical Engineering Students. *English Language Teaching*, *5*(5), 68-78.

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

Kardash, C. M., & Scholes, R. J. (1996). Effects of preexisiting beliefs, epistemological beliefs, and need for cognition on interpretation of controversial issues. *Journal of Educational psychology*, *88*(2), 260.

Li, X., & Fu, H. (2021). Needs analysis on ESP course for business and engineering students in a Chinese local university. *Creative Education*, *12*(6), 1387-1396.

Malmir, A., & Bagheri, M. (2019). Instructors and learners' attitudes about English for science and technology: Learning and target needs of mechanical engineering students. *Iranian Journal of English for Academic Purposes*, *8*(1), 17-34.

Martinović, A., & Poljaković, I. (2010). Attitudes toward ESP among university students. *FLUMINENSIA: časopis za filološka istraživanja*, *22*(2), 145-161.

Mazdayasna, G., & Tahririan, M. H. (2008). Developing a profile of the ESP needs of Iranian students: The case of students of nursing and midwifery. *Journal of English for Academic purposes*, *7*(4), 277-289.

Mostafavi, S., Mohseni, A., & Abbasian, G. R. (2021). The pedagogical efficacy of ESP courses for Iranian students of engineering from students' and instructors' perspectives. *Asian-Pacific Journal of Second and Foreign Language Education*, *6*, 1-20.

Peacock, M. (2001). Pre-service ESL teachers' beliefs about second language learning: A longitudinal study. *System*, *29*(2), 177-195.

Rahimi, M., & Hassani, M. (2012). Attitude towards EFL textbooks as a predictor of attitude towards learning English as a foreign language. *Procedia-Social and Behavioral Sciences*, *31*, 66-72.

Schumann, J. H. (1998). The neurobiology of affect in language. *Language learning*, *48*.

Spence, P., & Liu, G. Z. (2013). Engineering English and the high-tech industry: A case study of an English needs analysis of process integration engineers at a semiconductor manufacturing company in Taiwan. *English for specific purposes*, *32*(2), 97-109.

Zand-Moghadam, A., Meihami, H., & Ghiasvand, F. (2018). Exploring the English language needs of EAP students of humanities and social sciences in Iran: A triangulated approach. *Issues in Language Teaching*, *7*(1), 135-164.

Appendices

Appendix A

Subject-Specific Instructors' Questionnaire

Dear Participants, the following questionnaire is part of a research project that investigates the needs of Architectural and Electrical Engineering students taking English as a required course. The first section of the questionnaire is designed to explore the opinions of the subject-specific instructors about the expressed language needs of engineering students in using the four macro-English skills for their academic studies.

Please tick () the relevant choice for each question

Listening skills

The engineering students need English for:	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
1. listening to conversations on general topics.						
2. listening to lectures						
3. listening to presentations in class						
4. listening to English mass Media						
5. listening to instructions in real situations						
6. listening to students, colleagues and engineers						

Speaking skills

The engineering students need English for:	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
7. participating in academic discussions						

8. speaking at seminars, meetings and presentations						
9. asking and answering questions in class						
10. asking and answering questions in seminars						
11. talking with professionals in real situations						
12. talking with lecturers, Students and engineers						

Reading skills

The engineering students need English for:	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
13. reading original textbooks						
14. reading articles in professional journals						
15. reading technical reports						
16. reading English newspapers and magazines						
17. reading texts on the Internet						
18. reading laboratory reports						
19. reading instructions for engineering new technologies						

20. reading the information to progress the project and interpret data						

Writing skills

The engineering students need English for:	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
21. taking lecture notes						
22. taking notes from Textbooks						
23. writing a paper for oral presentation						
24. writing term papers						
25. writing articles for journals						
26. writing technical reports						
27. writing case reports						
28. writing proposals and reports						

29. writing instructions to engineers						

General study skills

The engineering students need English for:	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
30. learning common core vocabulary						
31. learning semi-technical Conversation						
32. learning technical Conversation						
33. learning new engineering technologies						
34. learning new words in sentences, synonyms, and paraphrases						
35. learning technical reading skills of skimming and scanning						
36. practicing how to use engineering vocabulary in real settings						

37. attending `Grammar Workshop where common difficulties of students can be explained						

The second section aims to explore the special-subject instructors' views in terms of what the engineering students lack after passing the specialized English course. `Lacks are reflected in subject-specific instructors' assessment of their students' language skills on the scale as described below. Please tick () the relevant choice for each question.

	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
38. I judge the engineering students' listening ability has been improved						
39. I judge the engineering students' speaking ability has been improved						
40. I judge the engineering students' writing ability has been improved						
41. I judge the engineering students' reading ability has been improved						
42. I judge the engineering students' communicative						

competence has been improved						

The third section aims to explore the opinions of the subject-specific instructors, concerning the engineering students' language demands, language needs, attitudes towards language instruction, length of the course as well as the content, syllabus, methodology of the specialized English course. Please tick () the relevant choice for each question

43. The Architectural and Electrical engineering students prefer to work and study ------

(a) individually

(b) in pairs

(c) in small groups

44. The specialized English course should be offered in the -----

(a) 2nd semester

(b) 3rd semester

(c) 4th semester

(d) 3rd year

(e) 4th year

45. How long should specialized English courses be offered to students of engineering?

(a) one semester

(b) two semesters

(c) throughout the four years of their studies.

46. English should be taught by ----------

(a) English teachers

(b) Subject-specific instructors

(c) Both English language teachers and subject-specific instructors

47. What do you expect English teachers who teach you English to know?

(a) general vocabulary and expressions

(b) specialized engineering vocabulary

(c) both general vocabulary and expressions as well as specialized engineering vocabulary

Appendix B

Architectural and Electrical Engineering Students' Questionnaire

Dear Participants,

The following questionnaire is part of a research project that investigates the needs of Engineering students taking English as a required course.

Background Information

1. Name and family name: (optional) ----------

2. Age ---------- years

Please tick () the relevant choice for each question

3. Sex: (a) male (b) female

4. Department in the Engineering University

(a) Electrical (b) Architectural

5. Have you passed the General English course?

(a) Yes (b) No

6. Have you enrolled for specialized English course?

(a) Yes (b) No

The first section of the questionnaire aims to explore the opinions of the Engineering students on them expressed needs in using the four macro-English skills for their studies. Please tick () the relevant choice for each question.

Listening skills

As an engineering student, I need English for:	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
1. listening to conversations on general topics.						
2. listening to lectures						
3. listening to presentations in class						
4. listening to English mass Media						
5. listening to instructions in real situations						
6. listening to students, colleagues and workers						

Speaking skills

As an engineering student, I need English for:	Not at all	A little	To some extent	To a moderate extent	To a great extent	To a very great extent
7. participating in academic Discussions						
8. speaking at seminars, meetings and presentations						
9. asking and answering questions in class						

10. asking and answering questions in seminars						
11. talking with professionals in real situations						
12. talking with lecturers, students						

Reading skills

As an engineering student, I need to develop my reading skills for:	**Not at all**	**A little**	**To some extent**	**To a moderate extent**	**To a great extent**	**To a very great extent**
13. reading engineering textbooks						
14. reading articles in professional journals						
15. reading engineering reports						
16. reading English newspapers and magazines						
17. reading texts on the Internet						

Writing skills

As an engineering student, I need to develop my writing skills for:	**Not at all**	**A little**	**To some extent**	**To a moderate extent**	**To a great extent**	**To a very great extent**
18. taking lecture notes						
19. taking notes from textbooks						
20. writing a paper for oral Presentation						
21. writing term papers						

The second section aims to explore the opinions of Engineering students concerning their language demands, language needs, attitudes towards language instruction, length of the course as well as the content, syllabus, and methodology of the specialized English course. Please tick () the relevant choice for each question.

	Not at all	A little	To some extent	To a moderate extent	To a great Extent	To a very great extent
22. I feel satisfied with the number of students in my class						
23. I feel satisfied with the topics included in the textbook						
24. I feel satisfied with the methodology utilized in my class						
25. I feel satisfied with my teacher's evaluation method						
26. I feel satisfied with the present textbook						
27. I feel satisfied with the amount of foreign culture taught in my class						
28. I feel satisfied with the content of the textbook						

Please tick () the relevant choice for each question

29. I prefer to work and study ------

(a) individually (b) in pairs (c) in small groups

30. The specialized English course should be offered in the -----

(a) 2nd semester (b) 3rd semester (c) 4th semester (d) 3rd year (e) 4th year

31. How long should specialized English courses be offered to students of Architectural and Electrical Engineer?

(a) one semester (b) two semesters (c) throughout the four years of their studies.

32. How often do you like to study the specialized English course?

(a) once a week (3 hours)

(b) twice a week (1.5 hours)

(c) three times a week (1 hour

33. I prefer to be taught by -------

(a) Native English instructors

(b) Iranian English instructors

(c) Subject specialist instructors

34. I prefer to master my English ----------

(a) before starting my specialized subject courses

(b) at the same time that I am taking my specialized subject courses

(c) after completing my specialized subject courses

35. It is important for me to learn my subject lessons ----------

(a) through Persian books and sources

(b) through English books and sources

(c) through Persian and English sources