

Needs Analysis in English for Moroccan Applied Mathematics Graduate Students at Ibn Zohr University

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Abstract

This study examined the English academic needs of students in the Applied Mathematics in the Science of Engineering (AMSE) master program at the Faculty of Sciences, Ibn Zohr University, Morocco. It aimed at determining the gap between students' language needs and their actual competencies and identifying learners' perceptions of their linguistic needs and their linguistic difficulties. The study was conducted based on a mixed-methods design approach with multiple data collection instruments. As a research framework, the Dudley-Evans and St John's (1998) needs analysis model was used. The results showed that participants attach different values to the importance and competence of macro- and micro-language skills. Students and teachers placed a high value on grammatical knowledge. Students valued grammar, speaking, and writing highly, while subject matter teachers valued grammar, speaking, and writing highly, but listening and pronunciation skills were valued as less important. The study showed that learners' English proficiency level is average. Their average English levels then influenced their academic achievement. Based on the aforementioned results, the researchers proposed that syllabus designers should address the macro- and micro-skills regarding academic studies when developing and redesigning course syllabus and its objectives in the ESP context.

1. INTRODUCTION

Moroccan educational reforms have given great importance to the learning of English as a foreign language (Ministry of National Education, Vocational Training, Higher Education, and Scientific Research, 2015). English has become an important aspect of the academic context, professional domains, and social lives of students (Smith, 2019). Investigating students'

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language needs is necessary to improve their academic achievement and professional performance (Johnson et al., 2021). English for Specific Purposes (ESP) courses tend to serve and target skills related to a particular field (Dudley-Evans & St John, 1998). By doing so, there is an urgent need for a solid foundation for the development of ESP courses to meet the language needs of students. This is especially true at the level of science English language teaching. The first step in this direction is to conduct a thorough assessment of the students' language needs. Very few researchers in the Moroccan context have undertaken such an analysis (Ahmed & Ali, 2020). The current study was conducted with the primary goal of resolving this situation. Examining science master students' language needs is essential to help ESP teachers develop, in the future, relevant language materials that will enable them to improve their academic performance while also meeting their professional needs.

The purpose of this study is to look into the English language needs of students in the AMSE master program. The researchers believe that investigating the language needs of science master students of AMSE at the faculty of sciences at Ibn Zohr University is significant, important, and timely. Students' language needs should be carefully analyzed and determined to enhance their academic and professional performance and to help design, later on, an appropriate syllabus relevant to their needs. This may assist learners in their field of study in meeting their academic needs. The study will help ESP teachers in the process of articulating relevant course objectives in relation to students' needs. It will also be a valuable resource for syllabus designers to formulate appropriate materials for this course. Finally, it will be a contribution to the body of research on ESP. This study aims to answer the following research questions:

1. What are students' perceived English language needs?
2. What academic English language skills do students and teachers think are necessary for studying applied mathematics in the field of engineering?
3. What are their English difficulties and problems?

2. REVIEW OF THE LITERATURE

2.1.English for specific purposes (ESP)

It is difficult to arrive at a universal definition of ESP; one could argue that any language is an ESP text in the sense that when teaching something to students, a specific type of English is required for that teaching outcome. (Qotbah, 1990). When it comes to ESP courses, the purpose of the course should indeed be defined with clarity and precision. Then, it is not easy to distinguish between ESP and EGP. Many Scholars believe there is a distinction between ESP and English for General Purposes (EGP). ESP definitely focuses on enabling learners to perform specific tasks. EGP, on the other hand, concentrates on developing learners with general knowledge to cope with educational operations. So, ESP tasks are defined, while EGP tasks are not defined (Widdowson, 1983).

ESP is defined by Strevens (1988) according to absolute characteristics and variable characteristics. In terms of absolute characteristics, ESP differs from EGP in the sense that it is designed to meet the needs of the learners. It is discipline-specific and centred on language appropriate to syntax, lexis, discourse, and semantics. Besides, in terms of variable

characteristics, ESP is defined in relation to the skills to be learned. According to the same researcher, ESP is primarily related to the subject matter. Robinson (1991) backs up his definition, claiming that ESP is defined by a limited period and homogeneous classes in which students are engaged. ESP courses rely on specific vocabulary, functions, and related skills of specific disciplines or domains.

ESP was defined using two key defining criteria and a number of characteristics by Robinson (1991). According to him, the two criteria refer to the fact that ESP is typically goal-oriented and is designed based on the needs of the learners, to specify what exactly the learner needs to perform through the medium of English. Regarding general characteristics, ESP courses are taught to adult homogeneous classes concerning professional background and field of specialization within a limited period.

2.2. Theoretical Frameworks in ESP

The theoretical underpinning of ESP draws from several linguistic and pedagogical ideas, including communicative language teaching, genre analysis, and needs analysis (NA) (Dudley-Evans & St John, 1998). Communicative language teaching emphasizes the relevance of actual communication and task-based learning activities in language learning, identifying with the goal of ESP to enhance learners' language competency for real-world communication motives (Hyland, 2006). Genre analysis provides insights into the textual elements and communicative roles of discipline-specific genres, enabling the creation of ESP materials and activities that mirror the language use standards of specific professional or academic domains (Swales, 1990). NA acts as a core element in ESP course design by identifying learners' language needs, goals, and expectations within their target contexts, hence directing curriculum design and instructional techniques (Hutchinson & Waters, 1987).

2.3. The Importance of ESP in Today's Globalized World

ESP plays a crucial role in the academic setting, particularly for science students in universities, by providing them with the essential language skills specific to their respective professions, hence enhancing their chances of success. Having a high level of English proficiency allows students to easily access a vast amount of scientific research that is published in the highest quality international journals and databases. Proficient knowledge and understanding of scientific concepts in English enable students to stay updated with the most recent advancements in their fields, critically assess research discoveries, and make valuable contributions to academic discussions (Kwong & Yap, 2022). Moreover, English proficiency improves collaboration and networking opportunities with colleagues, scholars, and organizations globally. Students who can communicate competently in English can participate in multidisciplinary research projects, attend international conferences, and engage in beneficial exchanges of ideas with colleagues from varied cultural and linguistic backgrounds (Xu et al., 2024). ESP programs targeted at the demands of students prepare them for worldwide employment prospects in academia, business, and research institutes. English fluency boosts students' competitiveness in the global employment market, as many scientific papers, conferences, and partnerships are performed in English (Wang & Zhang, 2023). By learning the language of science, students can pursue advanced studies, gain employment prospects overseas, and contribute to scientific discovery on a worldwide scale.

Empirical research in ESP covers a wide range of issues, including NA, curriculum development, materials design, assessment, and classroom pedagogy (Belcher, 2009). In the Moroccan context, recent studies have concentrated on evaluating the language demands of learners in business, science, engineering, and tourism (Ait-Kaki & Belmekki, 2019; Ahmed & Ali, 2020). The findings of these studies have underlined the significance of completing rigorous NA to personalize ESP programs to learners' individual linguistic, communicative, and sociocultural demands. Additionally, previous studies have examined innovative ways to ESP curriculum design and material development, including genuine texts, multimedia resources, and technology-enhanced learning activities to boost learners' engagement and language competency (Ahmed & Ali, 2020). Despite the increasing interest in ESP within the Moroccan educational system, various gaps and obstacles continue. Limited resources, inadequate teacher training, and the need for improved alignment between ESP programs and learners' academic needs and professional aspirations are among the primary problems facing ESP implementation in Morocco (Ait-Kaki & Belmekki, 2019; El Ouahabi, 2014). Moreover, there is a need for more rigorous empirical research that investigates the efficiency of ESP instructional approaches and materials in boosting learners' language competency and communicative skills within specific academic and professional contexts.

2.4. Micro- and Macro-language Skills

Micro- and macro-language skills are distinct levels of linguistic competency, encompassing both language use and communicative abilities for effective communication. Microlanguage abilities refer to the smaller and more detailed aspects of language use, including grammar, vocabulary, and pronunciation. Grammar involves the structural rules regulating sentence construction, including syntax, morphology, and sentence mechanics (Richards & Schmidt, 2010). Vocabulary alludes to the lexicon of words and phrases used in communication, covering both receptive (understanding) and productive (expressing) components (Nation, 2001). Pronunciation is the accurate articulation and intonation of sounds and stress patterns in spoken language, contributing to intelligibility and comprehensibility in oral communication (Celce-Murcia et al., 2010). Macro-language skills involve broader communicative competencies that involve the integration of multiple language components to comprehend and produce discourse across various modalities (Grabe & Stoller, 2011). These skills include reading, writing, listening, and speaking. Reading involves understanding written materials, while writing involves creating coherent and ordered writing. Listening involves understanding key concepts and implicit meanings, while speaking involves fluency, precision, and coherence in oral expression (Bygate, 2009).

In this study, a full grasp of both micro and macro language skills is crucial for examining language proficiency and communicative competence among participants. By evaluating participants' proficiency in grammar, vocabulary, and pronunciation (micro-skills), researchers can acquire insights into their capacity to use language structures appropriately and express themselves effectively and fluently. Furthermore, by analyzing participants' proficiency in speaking, writing, listening, and reading (also known as macro skills), researchers can assess participants' overall communicative proficiency and language performance in academic contexts by evaluating their capacity to comprehend and produce discourse across various modalities.

2.5. Needs Analysis (NA)

NA is regarded as the foundation of an ESP course in English Language Teaching (ELT) (Dudley-Evans & St John, 1998). Basturkmen (1998) defines NA as "the identification of difficulties and standard situations by observation of participants functioning in a target situation in conjunction with interviews and questionnaires" (p.2). "Language needs analysis is most often used where the learners in selected situations face very similar difficulties," she adds (Basturkmen, 1998, p.2). According to Basturkmen (1998), "the goal of needs analysis is not only to identify elements but also to establish relative importance, to determine what is necessary or merely desirable" (p.2).

The meaning of needs varied based on the aim of analysis, but any definition takes the student as the focus of analysis, which is described as objective and subjective (Brindley, 2001), "perceived and felt" (Berwick & Johnson, 1989), "Necessities, wants and lacks" (Hutchinson and Waters, 1987). Objective needs are the target needs for which learners' real-world communicative needs and requirements are identified. They are identified for a variety of reasons. They are identified for the courses to reflect students' needs and prepare them for their intended use of the target language, such as communicative competence, linguistic sub-skills, relevant content, and so on.

Similarly, needs can include what learners will be expected to do with the target language in the target situation and how learners can best achieve good language mastery during the learning period (West, 1994). It is critical to differentiate between "target needs" and "learning needs" (Hutchinson & Waters, 1987). They define target needs as "what the learner needs to do in the target situation," while learning needs are "what the learner needs to do in order to learn" (Hutchinson & Waters, 1987, p.54).

2.6. English Language Learning in Moroccan Educational Reforms

The Moroccan educational system has experienced major changes in recent years with an emphasis on ESP programs, to modernize and globalize the system. The improvements demonstrate a wider acknowledgement of the significance of English proficiency in a globalized world (Ministry of National Education, Vocational Training, Higher Education, and Scientific Research, 2015). Smith (2019) argues that English proficiency is becoming essential for Moroccan students to effectively compete in the global labour market and actively participate in international academic discussions. In addition, incorporating English language instruction into the curriculum is consistent with the government's endeavours to foster socio-economic advancement and encourage international investment (Jones, 2020).

The World Bank (2018) highlights the importance of English language learning in Morocco's educational reforms, particularly in terms of its role in improving employability and opening doors to higher education. According to Johnson et al. (2017), proficiency in English provides Moroccan graduates with access to educational opportunities overseas and enhances their competitiveness in industries such as tourism, technology, and business. Moreover, the focus on ESP programs indicates a deliberate change in direction towards providing students with language abilities that are customized for particular professional environments (Garcia, 2016).

These initiatives demonstrate a wider devotion to cultivating linguistic diversity and enhancing intercultural communication in Moroccan society (UNESCO, 2016). Incorporating English language instruction into its educational system, Morocco aims to bolster its global competitiveness and align with the requirements of the 21st-century knowledge economy.

Recent studies have highlighted the developing nature of ELT in Morocco and its impact on learners and educators alike. In this regard, an investigation conducted by Hassan et al. (2023) analyzed the efficacy of communicative language teaching methods in Moroccan classrooms, highlighting the significance of interactive and student-centred approaches in enhancing language competency. Additionally, a study by Ahmed and Ali (2022) addressed the obstacles and opportunities of incorporating technology into English language training, pointing to the potential of digital tools in increasing learning outcomes and encouraging digital literacy in an ESP context.

Ultimately, the integration of English language learning into Moroccan educational reforms, specifically through ESP initiatives, demonstrates a multifaceted approach designed to equip students with the necessary linguistic abilities and proficiencies required for success in an interconnected global society. The focus on ESP programs highlights the deliberate connection between language education and the specific requirements of different professional environments, improving graduates' chances of becoming part of worldwide businesses. Despite the presence of constraints such as teacher training, resource allocation, and the development of curriculum, continuing research and new approaches to teaching provide great opportunities to improve English language education in Morocco. Effective and relevant English language programs in Moroccan schools and universities can be ensured by fostering collaboration among policymakers, instructors, and stakeholders.

Several studies have been conducted in international and national contexts. Chan's (2001) study at Hon Kong Polytechnic University revealed that students and teachers are concerned about improving their ability to communicate orally at conferences and seminars. Students identified problems affecting their English learning, such as thinking in their mother tongue, lack of confidence, weak vocabulary development, and difficulty understanding meaning. Teachers and program coordinators also identified similar issues. Desta (2008) conducted an NA study to investigate students' language needs in fine arts at Mekelle College of Teacher Education. The study revealed that all students agreed on the great importance of micro-skills, namely, grammar, vocabulary, and pronunciation. Next, Zareian (2015) investigated the language needs of postgraduate ESP students majoring in hospitality management in Iran. It reveals that the English course does not meet students' language needs, and the adopted language textbooks do not serve students' needs. Additionally, the content of the course should be relevant to the field of study, and the course should be taught by ESP instructors. Chatsungnoen's (2015) study on the English language needs of students in an ESP program at Agriculture University in Thailand found low English proficiency among students, affecting academic and occupational studies. Reading and translation skills were identified as crucial in the occupational context. Additionally, there was a mismatch in perceptions of students' needs among ESP teachers and stakeholders.

In the Moroccan context, a few empirical studies have been conducted on ESP. Midoul (2012) conducted a study on needs analysis at ENSAM in Meknes. The study targeted students who are in their third year of engineering studies. Another study on the effects of NA on ESP courses at Mohammadia School of Engineers was carried out by EL Hiani (2016). The researcher employed participatory needs analysis and testing methods to examine the needs of first-year electrical engineering students. Thirty undergraduate students studying renewable energy engineering at the Higher School of Technology in Fes were the subject of a need analysis by Ait Hattani (2019). The survey findings suggest that the participating students show strong favourable sentiments towards the English language for both their personal and professional lives. The students struggle with productive English language abilities, namely speaking and writing. Zaidoune and Chroqui (2020) examine the English language needs of second-year master's students studying management and economics at Hassan 1st University. The findings indicate that the students have a keen interest in all four language skills, but they specifically desire to enhance their productive skills. The findings also indicate that they anticipate a requirement for English in order to facilitate communication. Additionally, Ahmed and Ali (2020) evaluated the language needs of science students in Moroccan universities, stressing the need to undertake focused NA studies to inform the development of ESP programs customized to learners' professional and academic needs.

3. RESEARCH METHODOLOGY

3.1. Research Design

A mixed-methods research design was used in this study. The quantitative data from assessments and the qualitative data from needs analysis questionnaires and interviews were used to answer the research question about the students' English language difficulties. The quantitative data from the needs analysis questionnaires and the qualitative data from the interviews and document analysis were used to answer research questions about students' perceived English language needs in terms of language skills. The needs analysis model of Dudley-Evans and St John (1998) was used to frame the study's research questions. This model allows for a thorough understanding of the students' perceived English language needs. Furthermore, it contains a number of pertinent aspects.

3.2. Participants

This study involved 24 graduate students enrolled in the AMSE master program at the faculty of sciences at Ibn Zohr University. Among the courses that they are taking in the fall term 2018-2019 academic year is English. With regard to gender, 8 of the students were females, whereas 16 were males. The study involved 12 AMSE course instructors in different subjects of the master program as well. The inclusion of this category, AMSE subject instructors, is done because they are part of the target population of needs analysis (Richards, 2001). Overall, the study surveyed a total of 36 respondents.

3.3. Data Collection Instruments and Procedure

3.3.1. Research Instruments

Two NA questionnaires, adapted from Desta (2008) and Chatsungnoen (2015), were administered; one was administered to the AMSE students and another to speciality subjects' instructors, which were modified to go hand-in-hand with the purposes of the study. The two questionnaires were designed to collect large amounts of focused, standardized, organized data

from a large sample of respondents in a relatively short period of time with little risk of researcher bias. Furthermore, they assume knowledge of the appropriate questions and test hypotheses about answers (Long, 2005).

The next research instrument is structured interviews with the students of the AMSE program and their instructors. In the field of linguistics, the interview is a vital data-gathering tool (Long, 2005). Its goal is to ensure that each interviewee receives the exact same questions in the same order. It was used as an instrument to collect data because it helped the researcher ask all the respondents the same questions in the same order. This made it easy to replicate the discussion and standardize the interview. This instrument helped the researcher cross-check the data gathered from questionnaires. The interviews were conducted at the Faculty of Sciences at Ibn Zohr University in the Department of Mathematics. The interviewees refused to be recorded; the interviewer had just taken notes. The interview questions were carefully selected and appropriately formulated in advance.

The researcher administered a placement test to AMSE students so as to identify their English language level. Particularly, it enabled the researcher to bridge the gap between the needs of learners and their current abilities. (Long, 2005). It was also an effective tool to get to know students' problem areas. It consisted of sixteen tasks with an overall total of 230 items. In terms of scoring, each item was given one point. Each score represents a specific language level category. Based on their scores, respondents were classified according to their appropriate language level. The test was adopted from Cambridge's official website.

In the present study, an adaptation of Cunningsworth's (1995) text material evaluation checklist was used to explore the content of relevant documents. Document analysis was helpful for the researcher to paint a broad and overall picture of learners' needs because documents are manageable and practical for needs analysis data gathering. Additionally, documents are reliable, which means they can be read and checked repeatedly while staying constant (Bowen, 2009). Most importantly, the researcher employed document analysis in order to gather information that could no longer be collected through other research instruments.

3.3.2. Data Analysis Procedure

After administering the questionnaires, both students' and instructors' questionnaires were collected and analyzed. The data was coded and prepared for analysis by the social science statistical package (SPSS). Different SPSS statistical methods of analysis were used to determine whether there were any significant differences in opinion between subject teachers and students. The data was coded and prepared to be analyzed by the statistical package of social science (SPSS). Different SPSS statistical means of analysis were considered in order to find out whether there were any significant differences of opinion among the subject teachers and the students.

4. RESULTS

4.1. Students' Perceived English Academic Needs

4.1.1. A Comparison of the Value of Macro-language Skills for AMSE Students

As compared and illustrated in Table 1, the statistical mean value shows that students' English linguistic needs in speaking are high (4.45) and their writing skills are important (4.51) as well.

By the same token, teachers assigned (4.51) and (4.56) mean values to the same skills, respectively. On the other hand, the mean values of reading and listening according to students are 4.43 and 4.20 respectively, and 4.34 and 4.10 according to teachers, respectively. Both students and teachers valued speaking and writing (productive) skills more than reading and listening (receptive). In other words, this could imply that productive skills were prioritized over the two receptive skills, reading and listening. Specifically, students tended to give high importance to writing laboratory reports, describing diagrams, tables and graphs, articles, summaries and emails and faxes. Students also valued oral communication skills in seminars, conferences, tutorials, and meetings. AMSE students believe that attending conferences and seminars is critical to their academic studies.

Table 1. Responses of Students and Teachers Towards Language Skills Importance

Skill	Respondent	English academic linguistic needs
		Mean
Reading	Students	4.42
	Teachers	4.36
Speaking	Students	4.45
	Teachers	4.51
Writing	Students	4.51
	Teachers	4.56
Listening	Students	4.13
	Teachers	4.10
All	Students	4.37
	Teachers	4.38

4.1.2. Comparing the Importance of Micro-language Skills for AMSE Students Based on Students' and Teachers' Responses

Table 2 shows how students value vocabulary, grammar, and pronunciation in their academic studies. According to Table 2, students place a high value on grammar for academic studies, with an aggregate mean of 4.57. Moreover, they assign high value to vocabulary for their academic studies (4.46). The table shows that the aggregate mean of pronunciation (M = 4.37) is the lowest among other academic skills. Still, pronunciation is highly important for students' academic studies. On the other hand, teachers attached the following mean scores: 4.58, 4.48, and 4.47, respectively, on the importance of good grammar knowledge, vocabulary, and pronunciation for students' academic linguistic needs.

Table 2. Responses of Students and Teachers to the Importance of Micro-Language Skills

Sub-skill	Respondent	Academic linguistic needs
		Mean
Grammar	Students	4.57
	Teachers	4.58
	All	4.57
Vocabulary	Students	4.46
	Teachers	4.48
Pronunciation	Students	4.37
	Teachers	4.47

Vocabulary	Teachers	4.48
	All	4.47
Pronunciation	Students	4.37
	Teachers	4.49
	All	4.43
All	Students	4.52
	Teachers	4.51

4.2. Students' English Language Competence: Macro-language Skills

Table 3 shows that the aggregate mean for current students' academic linguistic competence in the four macro-skills is 2.65. Furthermore, it demonstrates that the mean values of reading, speaking, writing, and listening skills for academic studies are 2.70, 2.68, 2.62, 2.60, and 2.65, respectively. The mean values for current students' competence in the four academic macro-skills are average. In this case, the aggregate mean is 2.65.

Table 3. Students' Self-Rating of Competence: Macro-Language Skills

Current competence		
Domain	Macro-language skills	Mean
Academic studies	Reading	2.70
	Speaking	2.68
	Writing	2.62
	Listening	2.60
	All	2.65

4.3. Students' English Language Proficiency and Difficulties

As elicited from interviews, all AMSE students believed they lacked language proficiency and rated their language levels as "beginners" or "intermediate." The English course instructor believed that students entered the program with limited knowledge of English in regards to language abilities. Students were facing difficulties understanding terminologies related to their field. Interviewees emphasized the relevance of special vocabulary to link their knowledge to academic studies and their future professions. The analysis of relevant documents revealed that there was no English material precisely tailored for AMSE students. As a result, the instructor adopted his own materials for the course based on his experience using internet references to design course materials. Materials selection did not take into consideration the integration of skills. Most of the time, each skill is taught separately. Regarding activities, the materials show that multiple activities were integrated, for instance, skimming, scanning, gap-filling, questions of multiple choices, correcting mistakes, and true or false questions. This means that the course materials, objectives, and syllabus are not sufficient to cater for the students' needs.

Figure 1 illustrates students' English language level. The majority of students (72%) were classified as having an intermediate level in English, and 25% of them were ranked as beginners, but only 3% of AMSE students were classified in the advanced level category.

Figure 1. Students' English Language Level

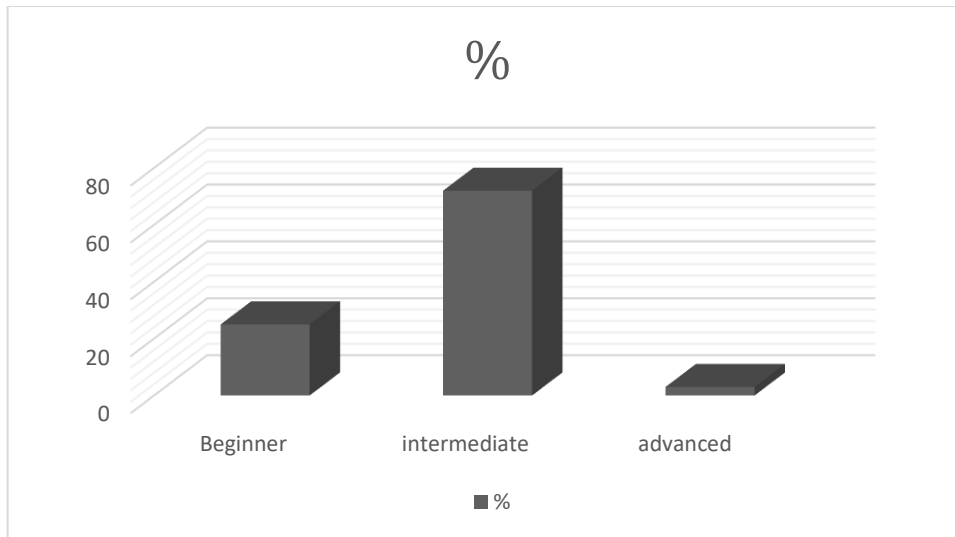


Table 4 below summarizes students’ English language difficulties. It illustrates that students were facing different language problems in both macro- and micro-language skills to different degrees. First, regarding the degree of difficulty, students registered having language problems mostly with grammar, reading, speaking, vocabulary, writing, and listening. Their mean value scores are 2.38, 2.50, 2.88, 2.97, 3.00, and 3.32, respectively.

Table 4. Students’ English Language Difficulties

	Students’ English language difficulties					
	Listening	Speaking	Writing	Reading	Vocabulary	Grammar
Mean	3,00	2,50	2,97	3,32	2,88	2,38
Median	3,00	2,00	3,00	3,00	3,00	2,00
Mode	2	2	2	2	3	1
Sum	102	85	101	113	98	81

5. DISCUSSION

5.1. Students Perceived English Academic Needs

Students and teachers in the Applied Mathematics for Science Engineering (AMSE) program place a higher value on productive skills—speaking and writing in particular—than receptive skills—reading and listening. This finding is consistent with previous research conducted in English for Specific Purposes (ESP)-related contexts. This priority of speaking and writing abilities fits with a study by Midoul (2012), who identified a similar trend among language learners. Similarly, Chan's (2001) needs analysis research of students at Hong Kong Polytechnic University found that students stressed the relevance of speaking and writing in many academic and professional contexts. Specifically, students in the AMSE program appreciated their capacity to write scientific papers, articles, emails, and faxes, as well as to vocally communicate in seminars, panel discussions, and conferences, corresponding with the findings of Zaidoune & Chroqui (2020). Furthermore, despite potential inconsistencies between learners' needs and course offerings, AMSE students' recognition of the academic

value of all four language skills—reading, writing, speaking, and listening—reflects Zareian's (2015) findings, which indicate a high perceived importance of English language proficiency in various academic and professional domains. Overall, our findings underline the vital relevance of addressing learners' academic and linguistic needs in ESP to guarantee that language courses properly prepare them for their academic and professional goals.

Students' emphasis on the value of grammar, vocabulary, and pronunciation is consistent with results from related research conducted in contexts related to English for Specific Purposes (ESP). Desta (2008) reported a similar tendency among learners, underscoring the value of grammatical knowledge in increasing English language fluency and comprehension skills, particularly in the context of reading scientific papers and research. Additionally, the awareness of the importance of verbal communication skills, such as engaging in conferences, seminars, and class debates, mirrors the findings of prior research (Desta, 2008). Moreover, the priority given to micro-language abilities above macro-skills by students emphasizes the crucial role that these underlying language components play in boosting overall language proficiency, in line with the findings of Richards and Schmidt (2010). However, despite the acknowledged relevance of both micro- and macro-language skills, the English course offered to AMSE students was judged to be inadequate in addressing their linguistic needs. This disparity between learners' needs and their present linguistic ability resonates with Basturkmen's (1998) notion of a "needs–analysis gap," showing a misalignment between learners' perceived requirements and the resources available to address those needs. Overall, our findings underline the significance of addressing both micro- and macro-language abilities in ESP training to guarantee that language courses effectively meet the different linguistic needs of learners in specialized academic environments.

5.2. Students' English Academic Needs

With varying degrees of agreement, teachers and students agreed on the necessity of English academic linguistic skills. Precisely, priority is given to writing and speaking (productive skills), which corresponds to what both teachers and students rated as highly important. This would imply that learners need English for their academic purposes to write assignments, laboratory reports, scientific research and articles, messages, emails, faxes, summaries, and describe diagrams, tables and graphs, and to speak at conferences, seminars and in class discussions more than reading and listening. Similar to this, Mognhode and Woldemariam (2015) note that Adama Science and Technology University's business students are also driven to study ESP. Regarding teachers' responses, they go in line with students' responses in relation to what has been mentioned. Across the three domains, both students and teachers underestimated the importance of listening compared to other skills since it was rated as the lowest one. These findings were corroborated by teachers' giving value to each language skill as they are aware, to a large extent, of students' needs in ESP (Hutchinson & Waters, 1987).

Based on the findings, both respondent groups, teachers and students, appear to be in consensus on the vital significance of grammar academically ($M=4.57$) compared to other skills. Moreover, they agree with the significance and importance of specialized vocabulary ($M = 4.47$) academically. In contrast, they undervalue pronunciation academically as compared to other sub-skills, similar to Abuklaish (2014) in the Libyan context. Thus, it could be said that the group responses on the significance of grammar and vocabulary reveal that these skills are

essentially significant to the enhancement of students' difficulties in academic linguistic skills (Nation, 2001). In other words, the English course being offered should address language sub-skills as healthy factors in the improvement of AMSE students' language skills. This means that language sub-skills, vocabulary, grammar and pronunciation, go hand in hand with language skills—reading, speaking, writing, and listening.

5.3. The Extent to which the Course Targets Learners' Needs

The analysis recognizes a considerable disparity between the English language course materials and the reported needs of AMSE students. Similar studies in ESP contexts have stressed the vital relevance of aligning course materials with learners' individual needs and situations to promote language learning efficacy (Belcher, 2009; Dudley-Evans & St John, 1998). The use of generic syllabi from other programs taught by the same faculty members and the lack of an analysis of needs before material preparation point to a frequent trend in language education where instructional resources may be unauthentic and irrelevant (Johns, 1997). Moreover, the mismatch between the curriculum and the needs that students perceive highlights the need for customized ESP courses that meet the linguistic, communicative, and professional needs of learners in order to guarantee successful language instruction in specialized fields like AMSE (Hutchinson & Waters, 1987).

5.4. Students' English Proficiency

Discussing AMSE students' current competence in the four macro-skills, one could conclude that it is average, as the aggregate mean is 2.72. This would suggest that the students' needs for English academically are high, but their current English language abilities are average; the same level was found by Chatsungnoen's (2015) study in Thailand. Consequently, both speaking and listening abilities are lower than reading and writing abilities, despite the fact that they place a high value on speaking and writing abilities.

The aggregate mean for students' current competency in macro-skills academically is 2.65. This would suggest that students' listening skills are lower than other skills, followed by writing, speaking, and reading. It could be said that despite the high importance participants assigned to speaking and writing skills, their current competence in academic studies appears to be average. When comparing to similar studies, Moghnode and Woldemariam (2015) discovered that while the students are aware of their shortcomings, their limits are limited to the ability to do particular English-language tasks, such as writing. Thus, the course appears to have failed to make up for the discrepancy between linguistic needs and abilities of students.

To conclude, students' self-evaluation of the significance of mastering macro-language abilities, such as speaking, writing, reading, and listening, seems to be high; their current language abilities in these skills appear to be average. In addition to this, it is registered that their listening skill seems to be the lowest, though they attach less importance to it. This could be explained due to the students' high school background in listening skills. Moreover, students give high importance to their speaking and writing skills across the three domains. This shows students' emphasis on the significance of performing multiple tasks in the English language as far as productive skills are concerned. It can be concluded that the course being offered failed to develop their perceived English language skills.

5.5. Students' English Academic Difficulties

The majority of students (72%) were classified as possessing intermediate linguistic proficiency in English, and 25% of them were ranked as beginners. In the same token, Chatsungnoen's (2015) study revealed that students had low levels of English proficiency. This implies that additional efforts should be made on the part of the students in order to improve their English level. This finding was supported by the students' self-rated linguistic skills.

Briefly, it appears that many students believed that their receptive skills were far superior to their productive skills. This could be because of students' high exposure to receptive skills compared to productive skills at an early stage of learning English. Moreover, this might be due to the lack of attention in the early stages of English learning (Myles, 2002; Sadeghi & Richards, 2015). Moreover, the pleasure stated by students with their listening and reading skills is consistent with findings from prior research demonstrating that learners often consider these skills easier to develop and assess compared to speaking and writing (Brown, 2007; Sadeghi & Richards, 2015). Speaking, writing, and grammar were reported by both students and teachers as highly important to students professionally and academically. The priority assigned to speaking, writing, and grammar by both students and teachers highlights the value of these skills in language use (Myles, 2002; Sadeghi & Richards, 2015). Effective communication in verbal and written forms, along with grammatical accuracy, is vital for academic success (Nation, 2001). Therefore, the consequences of these findings suggest that English language courses should prioritize the development of speaking, writing, and grammatical abilities to satisfy the different needs of learners (Brown, 2007; Larsen-Freeman, 2001).

6. CONCLUSION AND IMPLICATIONS

The study aimed to assess the English language needs of AMSE master students at Ibn Zohr University. It found that students faced challenges in both macro and microlanguage skills, with grammar, speaking, and writing being the most challenging. Students and teachers place high value on grammatical knowledge professionally, academically, and socially. The majority of students (72%) were classified as intermediate-level English learners, while 25% were beginners. Students expected the course to allow them to achieve linguistic fluency and practical abilities. Some participants showed medium interest in the English course, while others showed strong desire. The English course instructor underlined the importance of modifying and redesigning the course to better meet the students' academic and professional needs. The study concluded that the course failed to meet learners' real and perceived needs due to a lack of student needs analysis, resulting in a failure to meet their intellectual, professional, and social needs.

Cross-cultural factors bearing on ESP programs in the Moroccan setting are very important. The strongly collectivist attitude characteristic of Moroccan society, where group harmony and cooperation from within groups tend to be more valued than individual achievement, is believed to impact ESP teaching strategies toward collaborative and group-based learning (Hassall, 2017). Shaping educational interactions will affect how learners are going to conduct themselves with regard to ESP materials (Bennani, 2018). In Morocco, the diglossic setting,

Darija (Moroccan Arabic), Standard Arabic and French, influences linguistically the integration of ESP because of aspirations bound to linguistic prestige and possible means of global communication (Mahiri, 2020). Educational resource disparities between urban and rural areas further underscore the level of need for equity in ESP initiatives (El Alaoui, 2019). The growing value of English proficiency at the professional level in Moroccan industries necessitates ESP programs, equipping the learner with skills needed for professional advancement and/or global mobility (Nasri, 2018). Culturally sensitive ESP instruction will recognize Moroccan styles of communication and learning preferences to guarantee effective curriculum design that will work for real learners who succeed in a variety of professional settings (Chlyeh, 2021).

The study recommends that teachers should tailor content to AMSE students' academic linguistic abilities and interests, bearing in mind cross-cultural ESP aspects (Liew & Khor, 2014), focusing on activities that align with their intermediate English level. This approach will help students overcome language difficulties and enhance their English level. The study also emphasizes the importance of improving students' productive skills for academic needs, requiring course content that is academically oriented. Activities should be academically needs-driven, incorporating authentic-like contexts and exposure to natural language (Basturkmen, 2015). An integrated approach, including speaking, writing, reading, and listening, should be used to enhance students' English linguistic skills and language learning (Oxford, 2001; Su, 2007). The emphasis should be placed on integrating all macro- and micro-language skills, with a focus on productive skills and specialized vocabulary.

This study aims to develop and redesign an English for Science (ESP) course for AMSE students to meet their academic linguistic needs. It also explores the perspectives of stakeholders and policymakers after the program's implementation. Future research could include a survey of master's programs and employers to improve understanding of workplace language usage. The modified needs analysis model could be replicated to examine the English language needs of learners from similar master programs at the same university. This research could also explore the English linguistic needs of students from various disciplines at the same university, filling research gaps.

This study has limitations, including a mixed-method approach for data collection, the inability to observe the teaching and learning processes of AMSE classes, and the inability to explore the linguistic needs of employers. Observations could have provided more insight into students' English language competencies and interactions, but the needs analysis questionnaire and placement test were assumed to be sufficient. Additionally, access to doctoral students from AMSE master programs could have provided more relevant data. These limitations highlight the need for further research and data collection to better understand the needs of AMSE students.

Abbreviations

AMES: Applied Mathematics in the Science of Engineering

ELT: English Language Teaching

ESP: English for Specific Purposes

NA: Needs Analysis

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