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ENGLISH FOR BIOLOGY: A NEED ANALYSIS AT BIOLOGY DEPARTMENT STUDENTS OF UNIVERSITAS ISLAM NEGERI ALAUDDIN MAKASSAR

Widiastuti[1*], Muh. Iqra Maulana S[1], Salsa Sabila[1], Fadilah Mutmainnah[1]
[1]*English Education Department, Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Alauddin Makassar, Indonesia*
*Email: widiastutii1407@gmail.com

Abstract

In the era of global scientific communication, English proficiency is a prerequisite for academic and professional success in the biological sciences. However, General English (GE) courses often fail to address the specific linguistic demands of Biology students, such as understanding complex taxonomy, reading international journals, and writing laboratory reports. This study aims to analyze the specific English language needs of Biology students at UIN Alauddin Makassar to inform the design of a relevant English for Specific Purposes (ESP) curriculum. The study employed a quantitative survey design utilizing a questionnaire based on Dudley-Evans and St. John's (1998) Needs Analysis framework, with 47 undergraduate Biology students as respondents. The findings reveal a significant divergence between learners' present capabilities and their target needs. Students perceive a critical need for reading comprehension and mastery of technical vocabulary (Mean = 4.42), yet report low self-efficacy in productive skills, particularly speaking and academic writing. Additionally, students expressed a strong preference for interactive and digital learning strategies over traditional lecture-based methods. These findings suggest that the current English curriculum requires a paradigm shift toward an ESP-based approach that prioritizes scientific literacy, technical vocabulary acquisition, and practical communication skills relevant to the biological field.

Keywords: *English for Specific Purposes (ESP); Needs Analysis, Biology Students; Curriculum Design; UIN Alauddin Makassar*

INTRODUCTION

English has become the dominant language of global scientific communication, playing a crucial role in the dissemination of knowledge across disciplines. In the field of Biology, most academic publications, research findings, and scientific terminologies are presented in English. As a result, students in higher education are required not only to understand English as a general subject but also to use it as a tool for accessing and producing scientific knowledge. Without sufficient English proficiency, students may face significant challenges in engaging with international academic resources and participating in global scientific discussions.

In Indonesian universities, English is generally taught as a compulsory subject across disciplines. However, in many cases, the instruction still follows a General English (GE) approach, which focuses on basic grammar, everyday communication, and general language skills. While this approach may be suitable for general purposes, it often fails to address the

specific linguistic demands of students in specialized fields such as Biology. Biology students are required to comprehend complex scientific texts, understand technical and Latin-based terminology, and produce academic writing such as laboratory reports and research papers. These requirements indicate that a more specialized approach to English instruction is necessary.

This is where English for Specific Purposes (ESP) becomes relevant. ESP emphasizes that language learning should be tailored to the specific needs of learners, particularly in relation to their academic or professional contexts. According to Hutchinson, T., & Waters, A. (1987) ESP is not defined by a particular methodology but by its focus on learners' needs. In scientific disciplines, including Biology, this involves developing skills such as reading academic journals, understanding discipline-specific vocabulary, and communicating scientific ideas effectively. Therefore, implementing an ESP-based curriculum can help bridge the gap between what students learn in the classroom and what they need in their field of study.

A key component in designing an effective ESP program is Needs Analysis (NA). Needs Analysis is a systematic process used to identify learners' necessities, lacks, and wants. It helps educators understand what learners need to do in their target situation, what they can currently do, and what gaps exist between these two conditions. Dudley-Evans (1998) propose a comprehensive framework that includes Target Situation Analysis, Present Situation Analysis, and Learning Needs Analysis. By applying this framework, educators can design courses that are more relevant, effective, and aligned with students' real academic and professional demands.

Despite the growing importance of ESP, previous studies in the Indonesian context have shown that many ESP courses are still not fully aligned with students' specific needs. In some cases, courses labeled as ESP still rely heavily on General English materials, resulting in a mismatch between the curriculum and the learners' actual requirements. Furthermore, limited research has specifically focused on the needs of Biology students, particularly at UIN Alauddin Makassar. This indicates a gap in the literature that needs to be addressed in order to provide more context-specific and data-driven curriculum development.

Therefore, this study aims to analyze the English language needs of Biology students at UIN Alauddin Makassar by examining their necessities, lacks, and learning preferences. Specifically, this study seeks to identify the students' target needs in their academic and future professional contexts, evaluate their current level of English proficiency, and explore their preferred learning strategies. The findings of this study are expected to contribute to the development of a more effective ESP-based curriculum that is relevant to the students' field of study and supports their academic success in the global scientific community.

METHOD

This study employed a quantitative research design utilizing a survey method to systematically investigate the English language requirements of Biology students. This approach was specifically selected to obtain a comprehensive and broad overview of the students' attitudes, target needs, and perceived language proficiencies within a structured framework. By utilizing quantitative data, the researcher aimed to identify significant patterns and trends that could inform future curriculum development.

The methodology focused on capturing a representative snapshot of the learners' present situation compared to their target situation requirements. This systematic investigation allows for a precise determination of the "lacks" or gaps in current proficiency levels, providing an empirical basis for transitioning from a General English approach to a more specialized English for Specific Purposes (ESP) model.

The population of this study was the undergraduate students of the Biology Department at the Faculty of Science and Technology, UIN Alauddin Makassar. A sample of 47 students was selected using purposive sampling. The participants were chosen because they had completed at least one semester of General English and were currently engaged in core Biology courses requiring English references.

The primary instrument was a structured questionnaire adapted from Dudley-Evans and St. John's (1998) framework. The questionnaire consisted of 8 sections corresponding to different aspects of needs analysis (Professional Information, Personal Information, Lacks, Wants, etc.). Items were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

The data collected were analyzed using descriptive statistics. Frequencies, percentages, and mean scores were calculated for each item to determine the central tendency of student responses. The results were then interpreted narratively to draw pedagogical implications.

RESULT AND DISCUSSION

This section presents and discusses the findings of the study based on data collected from 47 Biology students at UIN Alauddin Makassar. The analysis is organized according to key components of Needs Analysis, including target needs, present situation, learners' lacks, learning preferences, and professional communication.

Overall, the findings indicate a clear pattern in which students perceive English primarily as an academic necessity rather than a general communication tool. At the same time, there is a noticeable gap between the students' expected competencies and their current level of proficiency. This gap is further influenced by students' learning experiences and preferences, which tend to favor interactive and technology-based approaches over traditional methods.

Table 1. Professional Information (Target needs)

Item Statement	Mean Score	Interpretation
I need English to read/understand professional/academic texts.	4.65	Very High
English is required for writing reports/papers.	4.10	High
The English I need involves technical vocabulary/specialized terms.	4.58	Very High
I will use English regularly in my future profession.	4.25	High

Table 1 indicates that Biology students assign the highest importance to reading academic texts and mastering technical vocabulary. The mean score for reading (4.65) is the highest among all items, suggesting that students view English as a key tool for accessing

scientific knowledge. This pattern reflects a strong orientation toward receptive skills, particularly in academic contexts.

This finding is consistent with (T., & W. A. Hutchinson, 1987) who emphasize that ESP should be based on learners' necessities in their target situation. In scientific disciplines, reading is often the most essential skill because students are required to engage with textbooks, journal articles, and research reports. Similarly, (Halliday, 1993) highlight that scientific discourse is characterized by high lexical density, which explains why students also prioritize technical vocabulary (Mean = 4.58).

This result is also in line with previous studies in ESP contexts, where reading has been identified as a dominant skill for students in science-related fields. One possible explanation for this trend is that academic exposure in Biology relies heavily on written materials rather than oral interaction. Students are frequently required to read and interpret scientific texts, while opportunities for spoken communication in English may be limited.

However, the relatively lower score for writing reports (4.10) suggests that while students recognize its importance, they may not yet fully understand the complexity of academic writing. This indicates a potential imbalance between perceived importance and actual awareness of skill demands. Therefore, ESP instruction should not only prioritize reading but also gradually integrate writing skills to support students' academic development.

Table 2. Personal Information and Attitude

Item Statement	Mean Score	Interpretation
I am motivated to master English for my future.	4.70	Very High
I feel confident when using English.	2.45	Low
I hope this course helps me communicate in my field	4.60	Very High

Table 2 reveals a significant discrepancy between students' motivation and their confidence. While motivation is extremely high (4.70), confidence is notably low (2.45). This indicates that students are highly aware of the importance of English but lack the confidence to use it effectively.

This phenomenon can be interpreted as a "confidence-competence paradox," where learners' willingness to learn is not matched by their perceived ability. Basturkmen (2010) emphasizes that subjective needs, including learners' attitudes and emotional factors, significantly influence the learning process. The low confidence level may be a result of limited exposure to authentic English use in academic settings.

This finding is also consistent with previous research showing that students in EFL contexts often experience anxiety when using English, especially in speaking and writing. One possible explanation is that traditional teaching methods tend to focus on grammar and theoretical knowledge rather than communicative practice. As a result, students may have knowledge of the language but lack the ability to use it in real situations.

Another possible factor is the lack of a supportive learning environment. When students are not encouraged to participate actively or are afraid of making mistakes, their confidence may decrease. Therefore, ESP instruction should incorporate strategies that

promote active engagement, such as group discussions, presentations, and collaborative tasks. These approaches can help bridge the gap between motivation and confidence.

Table 3. Present Proficiency

Item Statement	Mean Score	Interpretation
My speaking ability is good for daily conversation.	2.80	Moderate/Low
I can understand lectures/presentations in English.	3.10	Moderate
I can read/understand academic texts.	3.25	Moderate
I have sufficient vocabulary in my field.	2.90	Low

Table 3 presents students' current proficiency levels, which are generally moderate to low. Although reading is identified as a primary need, the mean score for reading ability (3.25) indicates that students are not yet fully capable of handling academic texts effectively. This gap between target needs and current abilities represents the "lacks" component in Needs Analysis.

The low score for vocabulary (2.90) is particularly significant, as vocabulary knowledge is essential for understanding scientific texts. This finding supports Dudley-Evans and St. John (1998), who argue that identifying gaps between present and target situations is crucial for designing effective ESP courses.

Compared to previous studies, this pattern is commonly observed in ESP contexts, where students recognize the importance of English but lack sufficient proficiency. One possible explanation is that General English courses do not provide enough exposure to discipline-specific language. As a result, students may develop general language skills but struggle with specialized vocabulary and academic texts.

The relatively low speaking score (2.80) also indicates limited opportunities for oral communication. This suggests that students are not frequently engaged in speaking activities, particularly those related to their field. Therefore, improving both vocabulary and speaking skills should be prioritized in order to reduce the gap between current abilities and target needs.

Table 4. Learners' Lacks

Item Statement	Mean Score	Interpretation
I struggle to speak fluently in professional context	4.30	High Agreement
My Writing is insufficient for academic reports	4.15	High Agreement
I need to improve grammar and vocabulary for my studies	4.80	Very High

Table 4 highlights the specific difficulties experienced by students. The highest mean score (4.80) indicates a strong need to improve grammar and vocabulary, which are

fundamental components of language proficiency. Students also report difficulties in speaking and writing, particularly in academic contexts.

This finding is consistent with (Hyland, 2006), who emphasizes that academic communication requires both linguistic competence and familiarity with disciplinary conventions. The difficulty in writing suggests that students are not fully equipped to produce academic texts, such as laboratory reports or research papers.

Compared to previous studies, similar patterns have been observed in ESP contexts, where productive skills are often more challenging than receptive skills. One possible explanation is that students have fewer opportunities to practice writing and speaking in meaningful contexts. Writing, in particular, requires not only language knowledge but also an understanding of structure, coherence, and academic conventions.

The high level of difficulty in speaking may also be related to psychological factors, such as anxiety and lack of confidence. When students are not accustomed to using English in real situations, they may hesitate to speak. Therefore, ESP instruction should include activities that simulate real academic contexts, such as presentations, discussions, and collaborative projects.

Table 5. Learning Preference

Item Statement	Mean Score	Interpretation
I learn better through discussion/group work.	4.15	High
I prefer learning through real examples/simulations.	4.40	High
I like using videos/apps/internet.	4.55	Very High
I prefer interactive teaching methods over lectures.	4.60	Very High

Table 5 shows that students strongly prefer interactive and technology-based learning approaches. The highest mean score (4.60) indicates a clear preference for interactive teaching methods over traditional lectures. Students also show strong interest in digital tools and real-life simulations.

This finding aligns with Dudley-Evans and St. John (1998), who emphasize the importance of learner-centered instruction in ESP. Interactive learning allows students to actively engage with the material and apply their knowledge in meaningful contexts.

This result is also supported by previous studies, which show that technology-enhanced learning can improve student engagement and motivation. One possible explanation is that digital tools provide visual and interactive elements that make learning more accessible and interesting, especially in scientific disciplines like Biology.

Furthermore, the preference for group work and simulations suggests that students value collaborative learning. This approach not only enhances language skills but also develops critical thinking and problem-solving abilities. Therefore, incorporating interactive and technology-based methods can significantly improve the effectiveness of ESP instruction.

Moreover, the high mean scores for students' preference for using applications and the internet (M = 4.55) and for interactive methods (M = 4.60) indicate a clear need to integrate

advanced technology into Biology ESP classrooms (Rafiq et al., 2021). Recent empirical and review studies further demonstrate that AI-based tools and digital learning environments can substantially reduce language learning anxiety while enhancing learners' engagement and overall language development (AlTwijri & Alghizzi, 2024).

In addition, AI-supported and mobile-assisted platforms have been shown to accelerate the acquisition and long-term retention of both general and technical vocabulary, suggesting strong potential for supporting the mastery of complex biology-related terminology (Koleini et al., 2024). By leveraging these pronounced digital preferences, ESP instructors can design technology-enhanced, task-based activities that help reconcile the "confidence paradox" identified in this study, thereby fostering not only theoretical motivation but also sustained, practical participation in globally oriented scientific communication (Mulyadi et al., 2023)

Table 6. Communication Needs

Item Statement	Mean Score	Interpretation
I need to understand technical terms in my field.	4.75	Very High
I need to write formal reports/documents.	4.20	High

Table 6 reinforces the importance of specialized communication skills. The highest mean score (4.75) highlights the critical need for understanding technical terminology, while formal writing is also considered important (4.20).

This finding confirms that students' needs are highly specific and closely related to their academic and professional contexts. In ESP theory, this reflects the principle that language instruction should be tailored to the specific demands of the discipline.

Compared to previous studies, the dominance of technical vocabulary is a common finding in science-related ESP research. One possible explanation is that scientific communication requires precision and accuracy, which depend heavily on the correct use of terminology.

The need for formal writing also indicates that students must be able to produce structured and coherent texts. This suggests that ESP instruction should include explicit teaching of academic writing skills, such as organization, clarity, and appropriate language use. Additionally, integrating real-world tasks, such as writing reports and presenting research, can help students develop practical communication skills relevant to their field

The findings in Table 6, which show the highest mean scores for mastery of technical terminology (M = 4.75) and formal report writing (M = 4.20), suggest that Biology students perceive lexis as a central foundation of their scientific literacy Hyland (2022). However, control of terminology alone is insufficient if it is not accompanied by an understanding of the rhetorical structure of scientific texts (Tan et al., 2023). Recent ESP research indicates that students can often recognize technical vocabulary but still struggle to integrate it into coherent written arguments, particularly in science-related courses (Khammee et al., 2024). Consequently, instruction should not focus merely on memorising isolated words, but should adopt a genre-based approach that familiarises students with the rhetorical conventions of disciplinary writing and research articles (Hyland, 2024). Integrating Genre-Based Instruction into ESP courses can better equip Biology students to communicate their

research findings with precision and professionalism in line with international journal standards (Orfanò & Wingate, 2024).

CONCLUSION

This Needs Analysis confirms that the current "one-size-fits-all" approach to English teaching at UIN Alauddin Makassar is insufficient to meet the complex and specialized demands of Biology students. The findings collectively demonstrate a significant gap between students' present English proficiency and their target situation needs, particularly in academic reading, technical vocabulary mastery, and formal scientific writing. Despite their high motivation to succeed in the global scientific arena, students consistently report low confidence in using English productively, a paradox that underscores the urgent need for a more contextually relevant curriculum.

In light of these findings, a comprehensive curriculum redesign is strongly recommended. The syllabus should be reorganized around biological themes such as Cell Biology, Ecology, and Genetics, replacing grammar-centered structures with discipline-specific content. Authentic materials, including scientific journals, laboratory manuals, and biology textbooks, should serve as the primary teaching resources to bridge the gap between classroom instruction and real-world academic demands. Furthermore, while reading comprehension remains the highest priority, it must be integrated with productive skill activities such as presenting laboratory results or writing academic reports to holistically address students' lacks and build their communicative confidence. Ultimately, this study provides an empirical foundation for developing a tailored ESP syllabus that empowers Biology students at UIN Alauddin Makassar to engage meaningfully and competitively in the global scientific community.

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