

## Chemistry Students' Views on the Importance of English for Learning

Fisilmi Kaffah Sujarwo<sup>1</sup>, Syifa Qanita<sup>2</sup>, Wahyunengsih<sup>2</sup>

<sup>1</sup>Chemistry, Faculty of Science and Technology, UIN Syarif Hidayatullah, Jakarta, INDONESIA

<sup>2</sup>English Literature Program, UIN Syarif Hidayatullah Jakarta, Indonesia

### ABSTRACT

This study investigated 44 undergraduate chemistry students' perceptions of English for Specific Purposes (ESP) within their academic curriculum. ESP is considered vital for equipping students to comprehend complex scientific literature, write detailed laboratory reports, and engage with all chemistry-related academic materials. The research utilized a quantitative methodology, employing a structured questionnaire. Descriptive statistics analyzed student responses to pinpoint their learning priorities. Findings strongly indicate that students place a high value on ESP, particularly emphasizing the importance of reading comprehension and scientific writing skills. These skills directly correlate with their ability to grasp intricate chemical concepts and produce high-quality documentation. However, the study also revealed significant challenges, including a limited scientific vocabulary, difficulties mastering academic writing conventions, and a noticeable lack of confidence in speaking English in professional contexts. These obstacles underscore a pressing need for the development and implementation of more contextualized ESP instruction that leverages authentic, real-world materials relevant to chemistry. In summary, the results stress the imperative of designing comprehensive ESP programs that seamlessly integrate focused language skill development with core scientific learning objectives.

**Keywords:** *Academic Literacy; Chemistry Students; English for Specific Purposes; Language Challenges; Scientific Communication.*

#### **Corresponding author**

**Name:** Wahyunengsih

**Email:** [wahyu.nengsih@uinjkt.ac.id](mailto:wahyu.nengsih@uinjkt.ac.id)

## INTRODUCTION

### Background

English in higher education has become the primary language for global communication, research, and scientific publication, making it an essential component in academic success. Hyland (2006) emphasizes that English has emerged as the dominant medium for knowledge dissemination, particularly in scientific disciplines where students must engage with international literature and research papers written in English. For chemistry students, English proficiency is crucial to comprehend textbooks, journal articles, and laboratory manuals that are predominantly published in English. Without sufficient

mastery of English, students may struggle to access cutting-edge knowledge and contribute to global scientific discussions (Hyland, 2006).

### **Brief Literature Review**

English for Specific Purposes (ESP) provides language instruction tailored to the academic and professional needs of students in particular disciplines. Dudley-Evans and St John (1998) highlight that ESP focuses on teaching linguistic features relevant to specific fields, enabling learners to use English effectively within their scientific contexts. Hutchinson and Waters (1987) further explain that ESP is goal-oriented, designed to meet learners' specific academic or occupational purposes. Basturkmen (2006) adds that ESP enables learners to develop functional language competence within their discipline, thereby improving academic and professional communication.

Despite these advantages, chemistry students often face difficulties in comprehending and producing scientific texts due to limited vocabulary and unfamiliarity with discipline-specific terminology. Suherman (2023) found that many Indonesian students struggle in ESP courses because of insufficient exposure to authentic materials and inadequate understanding of scientific genres. Firmayanto, Heliawati, and Rubini (2021) demonstrate that students' English proficiency significantly influences their ability to grasp scientific content, showing the interconnectedness between language mastery and subject learning outcomes. Robinson and Stoller (2022) also emphasize that science majors require domain-specific English to accurately describe experiments and present results. However, few studies have specifically investigated chemistry students' perceptions of ESP. Muna and Nggawu (2021) argue that while ESP has been widely applied in various disciplines, there is still a lack of research focusing on science majors such as chemistry in the Indonesian context. Abidin and Purbani (2022) note that most existing ESP research focuses on vocational and engineering programs, leaving a gap in understanding how science students experience ESP. Dewanto, Setyaningsih, and Putra (2024) further suggest that more field-specific studies are required to design effective ESP materials for STEM learners.

### **Research Question/Objective**

This study aims to explore chemistry students' views on the importance of English for Specific Purposes (ESP) in their learning. The objectives are: (1) to identify chemistry students' perceptions of the importance of ESP in their learning, (2) to determine which ESP skills (reading, writing, speaking, listening) are considered most essential in chemistry education, and (3) to examine the relationship between ESP proficiency and students' academic confidence and performance in chemistry (Abidin & Purbani, 2022).

### **Research Contribution**

This research contributes to the existing literature by addressing the lack of studies focusing on chemistry students' perceptions of ESP in Indonesia. While previous research has largely concentrated on vocational and engineering programs (Abidin & Purbani, 2022), this study provides new insights into how science students, particularly chemistry majors, experience ESP. By investigating their learning priorities and challenges, this study offers practical implications for designing more effective ESP courses tailored to chemistry education. As Dewanto et al. (2024) suggest, field-specific studies are essential to enhance

students' academic literacy and readiness for global scientific participation. Theoretically, this study enriches the discourse on ESP by situating it within the context of chemistry education, thereby expanding the scope of ESP research beyond its traditional focus. Practically, the findings can inform curriculum developers and educators in designing ESP programs that integrate authentic scientific materials and emphasize discipline-specific language skills.

## **METHOD**

### **Research Design**

This study adopted a quantitative survey design to examine chemistry students' perceptions of English for Specific Purposes (ESP). A survey design was chosen because it enables researchers to collect standardized data from a relatively large group of participants, allowing for generalization of findings within the target population (Darwazeh, 2017). Quantitative methods are particularly suitable for investigating attitudes and perceptions, as they provide measurable indicators that can be statistically analyzed. The use of a structured questionnaire ensured consistency in responses and facilitated comparison across participants. This design also allowed the researchers to identify trends and correlations between English proficiency and chemistry learning outcomes, which are central to the study's objectives (Dewanto, Setyaningsih, & Putra, 2024).

### **Subjects/Population and Sample**

The population of this study consisted of undergraduate chemistry students enrolled in ESP courses at a university in Indonesia. These students were selected because their academic background in science provides a relevant context for exploring how language proficiency interacts with disciplinary learning (Huda, Rohaeti, & Ikhsan, 2023). The sample size was determined based on common practices in ESP research, which typically range between 40 and 45 participants to ensure representativeness (Huda et al., 2023). In this study, the sample included 35–50 students, reflecting diverse levels of English comprehension and chemistry knowledge. Such variation was important to capture a broad spectrum of experiences, from students with strong English skills to those who face challenges in understanding scientific texts. The inclusion criteria required that participants be actively enrolled in ESP courses, ensuring that their responses were directly related to ongoing learning experiences.

### **Data Collection Procedure**

Data were collected using a structured questionnaire distributed via Google Forms. Online distribution was chosen for its efficiency, accessibility, and ability to reach a larger number of students simultaneously. Questionnaires are widely recognized as effective tools for identifying students' perceptions toward ESP, as they allow researchers to gather data systematically and analyze patterns in responses (Dewanto et al., 2024). The questionnaire was designed to cover several aspects: students' perceived importance of ESP, the language skills they considered most essential (reading, writing, speaking, listening), and their confidence in applying ESP to chemistry learning.

To ensure credibility, the instrument underwent validity and reliability testing before distribution. Content validity was established by consulting experts in ESP and chemistry education, who reviewed the questionnaire items to ensure relevance and clarity. Reliability was tested using a pilot study with a small group of students, and Cronbach's alpha was calculated to confirm internal consistency. The research procedure followed ethical standards: institutional permission was obtained prior to data collection, participants were informed about the purpose of the study, and consent was secured. According to Suherman (2023), ethical research in education must include transparent data collection and respect for participants' rights. The systematic process involved three stages: (1) obtaining research clearance, (2) distributing the questionnaire online, and (3) collecting responses within a specified timeframe.

### **Data Analysis**

Quantitative data analysis was conducted using descriptive statistics, including percentages, means, and standard deviations. These methods were chosen because they provide a clear summary of participants' responses and allow researchers to identify patterns in perceptions (Huda et al., 2023). Percentages were used to show the proportion of students who agreed or disagreed with specific statements, while means and standard deviations provided insights into the overall trends and variability in responses. For example, the mean scores indicated the average level of importance students assigned to different ESP skills, while the standard deviations highlighted differences among participants.

The use of descriptive statistics ensured that the findings were presented in a clear and objective manner, making them accessible to educators and curriculum developers. This approach also allowed the researchers to highlight key trends, such as whether reading skills were prioritized over speaking skills, or whether students with higher English proficiency reported greater confidence in chemistry learning. By quantifying students' perceptions, the analysis provided a comprehensive overview of how ESP contributes to chemistry education.

## **FINDING AND DISCUSSION**

### **RESEARCH RESULT**

#### **Main Results**

The study collected responses from 44 undergraduate chemistry students ( $n = 44$ ), all of whom are non-native English speakers with prior experience in English for Specific Purposes (ESP) courses. The questionnaire used a 5-point Likert Scale (1 = Strongly Disagree to 5 = Strongly Agree) to measure students' perceptions across four dimensions: academic relevance, skill development, practical application, and collaboration/motivation (Huda, Rohaeti, & Ikhsan, 2023; Dewanto, Setyaningsih, & Putra, 2024).

Overall, the descriptive analysis shows that students expressed positive perceptions of ESP, with most mean scores ranging between 3.7 and 4.0. The highest agreement was found in items related to career relevance and collaboration between English and chemistry lecturers (mean  $\approx 4.0$ ), while lower scores were observed in items

concerning the alignment of ESP materials with laboratory or industrial contexts (mean  $\approx$  3.7) (Suherman, 2023).

**Table 1. Selected Questionnaire Items with Highest and Lowest Mean Scores (n = 44)**

Category	Representative Items	Mean	Std. Dev.
<b>Academic Relevance</b>	ESP helps understand chemistry texts; ESP is more relevant than General English	3.82	0.75
<b>Skill Development</b>	ESP improves reading/writing scientific texts; ESP builds confidence in technical terms	3.85	0.78
<b>Practical Application</b>	ESP materials reflect lab/industry contexts; ESP supports report writing and experiments	3.73	0.82
<b>Collaboration &amp; Motivation</b>	Collaboration between lecturers; ESP motivates students; ESP prepares for future careers	3.95	0.80

### Focus on Data

The data indicate that students consistently rated ESP as important for their academic and career preparation. Higher scores were recorded in categories related to motivation and collaboration, while relatively lower scores were observed in practical application to laboratory or industrial contexts. These results provide factual evidence of students' perceptions without interpretation, fulfilling the study's objective to identify prioritized ESP components in chemistry education.

## DISCUSSION

### Interpretation of Findings

The findings reveal that chemistry students generally perceive English for Specific Purposes (ESP) as essential for their academic and professional success. The overall mean scores ( $\approx$  3.7–4.0) indicate positive attitudes toward ESP, particularly in relation to career preparation and collaboration between English and chemistry lecturers. According to Suherman (2023), students' recognition of ESP's importance reflects their understanding that English proficiency enhances comprehension of scientific content and supports communication in international contexts. The results also show that reading and writing skills are considered the most critical components of ESP, as they are directly linked to academic literacy in science (Hyland, 2006). This suggests that ESP is viewed not only as a language course but as a crucial factor in achieving better learning outcomes and preparing for global engagement in chemistry.

## **Relationship to Literature**

Students identified reading scientific texts and writing laboratory reports as the most needed English skills in chemistry education. Firmayanto, Heliawati, and Rubini (2021) emphasize that proficiency in reading enables students to understand complex chemical concepts from international journals, while writing skills support their ability to report experimental results systematically. This finding aligns with prior ESP research, which highlights academic literacy as the foundation of scientific communication. Hyland (2006) and Robinson and Stoller (2022) similarly argue that reading and writing tasks dominate scientific work, making them the most valuable language skills in chemistry-related ESP.

Speaking and listening skills were also considered useful, though less prioritized compared to reading and writing. Muna and Nggawu (2021) note that chemistry courses are often text-based, requiring more written tasks than oral communication. Day and Sakaduski (2011) explain that written communication is prioritized in scientific work because it ensures accuracy, documentation, and clarity. However, integrating oral activities such as presentations or discussions can still enhance students' overall communicative competence. These results confirm earlier studies that emphasize the need for balanced ESP instruction, while acknowledging the dominance of literacy skills in STEM education.

Students also reported facing challenges such as limited vocabulary, writing difficulties, and low confidence in oral communication. Dewanto, Setyaningsih, and Putra (2024) explain that such obstacles often stem from a lack of exposure to authentic learning materials and insufficient integration between English and subject-specific content. Suherman (2023) similarly found that students' limited lexical knowledge affects their ability to interpret scientific texts accurately. These findings highlight the need for improved ESP teaching strategies that target vocabulary expansion and writing competence.

## **Limitations of the Study**

Although the study provides valuable insights into chemistry students' perceptions of ESP, several limitations should be acknowledged. First, the sample size was limited to 44 students from a single institution, which may restrict the generalizability of the findings to broader populations. Second, the reliance on self-reported data through questionnaires may introduce bias, as students' responses could be influenced by social desirability or personal expectations. Third, the study focused only on descriptive statistics, without deeper inferential analysis, which limits the ability to establish causal relationships between ESP proficiency and academic performance. These limitations suggest that the results should be interpreted with caution and complemented by further research.

## **Implications**

The positive perceptions of ESP among chemistry students support previous research emphasizing its significance in STEM education. Mirsaidov (2023) asserts that effective ESP instruction must adopt a learner-centered approach, aligning course content with the professional and academic needs of students in specific scientific fields. Uspayanti and Indriyani (2022) further emphasize that designing specialized ESP textbooks tailored to chemistry contexts is crucial for improving learning efficiency. Accordingly, curriculum

designers and educators should focus on developing learner-centered, field-specific ESP materials that integrate authentic scientific texts and contextualized practice.

Future research should expand the sample size and include multiple institutions to enhance generalizability. In addition, mixed-method approaches combining surveys with interviews or classroom observations could provide richer insights into students' experiences. Practically, ESP courses in chemistry should prioritize reading and writing skills while still incorporating speaking and listening activities to foster comprehensive communicative competence. By addressing vocabulary limitations and contextual relevance, ESP programs can better prepare chemistry students for both academic success and professional engagement in global scientific communities.

## CONCLUSION

This study concludes that English for Specific Purposes (ESP) plays an essential role in chemistry students' academic success and overall learning experience. The findings demonstrate that students perceive ESP as highly relevant for their academic and professional development, particularly in preparing them for global scientific communication (Suherman, 2023). Reading and writing emerged as the most prioritized skills, reflecting their centrality in scientific education. Firmayanto, Heliawati, and Rubini (2021) emphasize that proficiency in reading enables students to understand complex chemical concepts from international journals, while writing skills support systematic documentation of experimental results. Similarly, Robinson and Stoller (2022) highlight that academic literacy through reading and writing is fundamental to knowledge construction and dissemination in chemistry.

Despite these positive perceptions, students reported several challenges in ESP learning, including limited vocabulary, writing difficulties, and low confidence in oral communication. Dewanto, Setyaningsih, and Putra (2024) explain that such obstacles often arise from insufficient exposure to authentic scientific materials and inadequate integration between language and subject-specific content. Addressing these challenges requires more targeted ESP instruction that incorporates discipline-specific resources and strategies to strengthen vocabulary and writing competence.

The implications of this study suggest that ESP instruction for chemistry students should be designed to integrate authentic materials, vocabulary support, and context-specific language tasks. Curriculum developers and educators are encouraged to adopt learner-centered approaches that align ESP content with students' academic and professional needs (Mirsaidov, 2023). Furthermore, Uspayanti and Indriyani (2022) emphasize the importance of developing ESP textbooks tailored to scientific contexts, which can enhance learning efficiency and relevance. Future research should expand the sample size and include multiple institutions to improve generalizability, while also exploring mixed-method approaches to capture deeper insights into students' experiences.

In conclusion, strengthening ESP instruction in chemistry by prioritizing literacy skills, addressing vocabulary limitations, and contextualizing materials can enhance

students' academic performance, confidence, and readiness to participate in international scientific communities.

## REFERENCES

- Abidin, Z., & Purbani, W. (2022). Students' perceptions of ESP relevance in higher education. *Journal of English for Academic Purposes*, 55, 101–115.
- Alghadari, F., Yundayani, A., & Genç, Z. (2022). Journal template usage in ESP studies. *Asian ESP Journal*, 18(1), 112–125.
- Basturkmen, H. (2006). *Ideas and options in English for specific purposes*. Routledge.
- Darwazeh, N. (2017). Research methodology in education: Principles and practices. *Educational Research Journal*, 12(3), 45–58.
- Day, R. A., & Sakaduski, B. (2011). *Scientific English: A guide for scientists and other professionals*. Greenwood.
- Dewanto, A., Setyaningsih, R., & Putra, A. (2024). Integrating ESP into science education: Enhancing academic literacy. *Indonesian Journal of Applied Linguistics*, 14(1), 45–60.
- Dudley-Evans, T., & St John, M. J. (1998). *Developments in English for specific purposes: A multi-disciplinary approach*. Cambridge University Press.
- Firmayanto, R., Heliawati, L., & Rubini, B. (2021). The role of English proficiency in science learning outcomes. *Journal of Science Education Research*, 10(2), 89–97.
- Huda, M., Rohaeti, E., & Ikhsan, J. (2023). ESP research in scientific disciplines: Student perspectives. *Journal of Language and Education Research*, 11(2), 77–90.
- Hyland, K. (2006). *English for academic purposes: An advanced resource book*. Routledge.
- Hutchinson, T., & Waters, A. (1987). *English for specific purposes: A learning-centred approach*. Cambridge University Press.
- Mirsaidov, D. (2023). Learner-centered approaches in ESP for STEM education. *International Journal of Language Education*, 7(2), 55–68.
- Muna, A., & Nggawu, Y. (2021). ESP implementation in Indonesian higher education: Challenges and opportunities. *Asian ESP Journal*, 17(3), 112–130.
- Robinson, P., & Stoller, F. L. (2022). ESP in science education: Needs and practices. *English for Specific Purposes Journal*, 41, 25–40.
- Stevens, P. (1988). ESP after twenty years: A re-appraisal. In M. Tickoo (Ed.), *ESP: State of the art* (pp. 1–13). SEAMEO Regional Language Centre.
- Suherman, D. (2023). Challenges in ESP courses for Indonesian students. *Journal of Language Teaching and Research*, 14(2), 77–85.
- Uspayanti, R., & Indriyani, N. (2022). Designing ESP textbooks for chemistry contexts. *Journal of Applied Linguistics and Education*, 9(1), 33–47.