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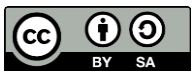

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# Exploring the Implementation Process of an ESP Program for Engineering Students: A CIPP-Based Evaluation

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**Abstract**
This study evaluates the implementation of an English for Specific Purposes (ESP) program for engineering students at a private university in West Java, Indonesia, using the Context, Input, Process, and Product (CIPP) evaluation model. The study involved 15 participants, including 10 Mechanical Engineering students, 3 ESP instructors, and 2 program administrators. Employing a qualitative case study approach, data were collected through semi-structured interviews, classroom observations, and document analysis over a four-month period. The findings revealed that the program successfully identified students' professional language needs, particularly in technical writing and oral presentation, aligning well with industry and academic expectations. Quantitative data indicated an average 18% improvement in students' writing and presentation scores over one semester. Despite these gains, listening skills remained underdeveloped due to the limited integration of audio-based materials and listening-focused instruction. The curriculum applied project-based learning and included some authentic materials but was hindered by insufficient instructor training and inadequate resource support. The study underscores the importance of aligning curriculum design, pedagogical strategies, and resource allocation with learner needs. It also affirms the utility of the CIPP model in evaluating ESP programs holistically and provides practical implications for curriculum developers, language educators, and institutional policymakers committed to enhancing the quality and impact of ESP instruction in engineering education.

**Keywords**: *CIPP evaluation model; English for Specific Purposes; Engineering Education*

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## Introduction

In the era of globalization, English proficiency has become indispensable in engineering fields. The increasing interconnectedness of industries, the prevalence of cross-border collaborations, and the dominance of English in technical documentation, academic research, and professional communication underscore the necessity for engineers to master English (Kassim & Ali, 2010; Evans, 2013). English functions not only as the lingua franca of science and technology but also as the primary medium for disseminating innovations and participating in international projects. In Indonesia, a 2023 report by the EF English Proficiency Index ranks the country 79th out of 113, highlighting the urgent need for improving English skills among professionals, including engineers.

English for Specific Purposes (ESP) has emerged as a critical instructional approach to address the unique linguistic and communicative demands of specific disciplines. For engineering students, ESP programs provide focused training in technical writing, oral presentations, and workplace communication (Dudley-Evans & St John, 1998). Unlike general English curricula, ESP tailors its content and methodology to real-world contexts that learners are likely to encounter in academia and professional settings.

However, there exists a persistent mismatch between the generic English curricula offered in many higher education institutions and the specific communication needs required in engineering professions. This mismatch refers to the gap between the generalized skills taught in English for General Purposes (EGP) and the domain-specific competencies needed for technical communication, including mastery of specialized vocabulary, understanding of engineering genres, and proficiency in project-based discourse (Basturkmen, 2010).

This issue is particularly relevant in the Indonesian higher education landscape, where ESP programs are often underdeveloped. The national curriculum mandates English courses for engineering undergraduates, but these are frequently designed without sufficient consultation with industry stakeholders or alignment with current engineering communication practices. As a result, graduates may lack the linguistic readiness required for effective participation in global and local engineering projects.

To address these challenges, systematic and context-sensitive evaluation of ESP programs is essential. The CIPP evaluation model—standing for Context, Input, Process, and Product—provides a comprehensive framework to assess educational programs holistically (Stufflebeam & Shinkfield, 2007). It evaluates whether a program's goals, resources, implementation strategies, and outcomes are aligned with the needs of stakeholders and the demands of the field.

Despite the growing recognition of ESP's role in engineering education, there is a dearth of empirical studies that assess ESP programs using the CIPP model. A literature review by Rahman (2015) noted that while ESP instruction is expanding

globally, evaluations using robust frameworks such as CIPP remain scarce. This gap limits educators' and policymakers' ability to make informed decisions regarding program improvement and sustainability.

This study aims to evaluate the implementation of an English for Specific Purposes (ESP) program designed for engineering students at a private university in Indonesia by employing the CIPP (Context, Input, Process, Product) evaluation model. The evaluation focuses on four key dimensions. First, the context evaluation investigates how the needs of engineering students and relevant stakeholders were identified in the design of the ESP program. Second, the input evaluation examines the resources and strategies utilized to develop a curriculum that aligns with the specific demands of the engineering discipline. Third, the process evaluation explores how the program was implemented, including the instructional methods used and the challenges encountered during the teaching and learning process. Lastly, the product evaluation assesses the extent to which the ESP program achieved its intended objectives, particularly in enhancing the communicative competence of engineering students.

This evaluation contributes both theoretically and practically. Theoretically, it expands the application of the CIPP model within applied linguistics and ESP program evaluation. Practically, it provides actionable insights for improving ESP instruction in engineering faculties and offers guidance to curriculum designers, instructors, and policymakers seeking to enhance the employability and global competitiveness of engineering graduates.

The scope of this study focuses on a single ESP program implemented in the Faculty of Engineering at a private Indonesian university. The research is limited to the implementation phase, as framed by the CIPP model, and acknowledges contextual factors such as institutional culture, student demographics, and potential bias from self-reported data. In sum, the study responds to a pressing educational challenge in Indonesia and beyond—how to design and evaluate ESP programs that genuinely prepare engineering students for the communicative realities of their profession. Through the integration of ESP and CIPP frameworks, this research intends to offer a replicable and scalable model for effective program evaluation.

## Method

This study adopts a qualitative research design to explore the implementation of an English for Specific Purposes (ESP) program for engineering students at a private university in Indonesia. The qualitative approach is selected to gain rich, in-depth insights into the complex nature of language program implementation, particularly in its natural educational context. As Creswell and Poth (2018) emphasize, qualitative inquiry is well-suited to uncovering descriptive, multifaceted data that reflect human experiences and educational practices.

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Given the multidimensional nature of ESP program implementation—spanning curriculum design, institutional support, teaching practices, and learner outcomes—this approach allows for a holistic exploration. Moreover, this study is grounded in the Context, Input, Process, Product (CIPP) evaluation model (Stufflebeam, 2003), which aligns well with qualitative inquiry by requiring layered, contextualized understanding of how educational programs function in real-world settings (Yin, 2018).

To operationalize the qualitative design, this research uses an instrumental case study method as described by Stake (1995). This approach does not aim merely to understand the case itself, but rather to provide broader insight into issues related to ESP program evaluation in engineering education. The case in question is a semester-long ESP program tailored to undergraduate Mechanical Engineering students, with specific emphasis on professional communication skills such as technical writing and oral presentation.

The university hosting the program is a mid-sized private institution located in West Java, Indonesia, with a student population of approximately 7,000 across undergraduate and postgraduate levels. The institution is ranked among the top 50 private universities in the region and is recognized for its engineering and applied sciences programs. The ESP course is housed within the Faculty of Engineering and serves an annual cohort of 80–100 mechanical engineering students, 60% of whom are male and 40% female, with varied English proficiency backgrounds.

Participants are selected using purposive sampling, focusing on those directly involved in or impacted by the ESP program. These include (1) engineering students enrolled in the course, (2) ESP instructors responsible for course delivery, and (3) curriculum designers and program administrators. A total of **15** participants were recruited for this study: 10 students, 3 instructors, and 2 administrators or curriculum planners. The selection process was guided by inclusion criteria such as active involvement in the ESP course during the current semester, willingness to participate, and availability during the research timeline. The final number was determined based on the principle of data saturation, where no new themes emerged from continued data collection (Fusch & Ness, 2015).

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of the host university (Approval No: 04/KE/UNIV/2025). All participants provided informed consent, and pseudonyms were used in all documentation to ensure confidentiality and protect identities. The researcher also practiced reflexivity throughout the study, acknowledging their positionality as both a language educator and curriculum consultant, which may influence interpretation. Efforts were made to minimize bias through triangulation and member checking.

To enhance the credibility and validity of findings, the study employs triangulation (Denzin, 1978), integrating multiple data sources: interviews, document analysis, and classroom observations. This combination strengthens analytical depth while minimizing researcher bias.

Semi-structured interviews are the primary method for capturing subjective perspectives. Interviewees include students, instructors, and administrators, addressing their views on the program's relevance (Context), design and resources (Input), implementation challenges (Process), and perceived outcomes (Product). Interview protocols included 12–15 guiding questions, and each session lasted approximately 45–60 minutes. Interviews were audio-recorded and transcribed verbatim.

Document analysis includes examination of course syllabi, lesson plans, teaching materials, student portfolios, and assessment rubrics. These documents provide objective evidence of how the program's design aligns with its goals and student needs, particularly in the Input phase.

Classroom observations are conducted using a non-participant approach, allowing the researcher to examine real-time instructional practices without interfering. Observations were scheduled weekly over a 10-week period, lasting 90 minutes per session. The observation guide focused on teaching strategies, student engagement, and the integration of technical content into language instruction—key aspects of the Process component.

The data collected through these methods are analyzed using inductive thematic analysis following Braun and Clarke's (2006) framework. This involves open coding and categorization to identify emerging patterns and themes without imposing predefined codes. For example, themes under Context may include "industry relevance" and "student expectations," while Input may generate "instructor preparedness" or "material adequacy." Process themes may reflect "instructional adaptation" or "technical vocabulary difficulties," and Product themes could involve "enhanced communication skills" or "assessment feedback."

Themes are then organized and interpreted using the CIPP framework. This structure supports systematic analysis aligned with the study's guiding questions and enhances the clarity and coherence of the results. The use of qualitative data analysis software, specifically Atlas.ti version 23, ensures methodological rigor by supporting transparent and traceable coding processes. To ensure coding consistency, inter-rater reliability was established through double-coding 25% of the data by a second trained coder. Cohen's Kappa coefficient was calculated, yielding an agreement score of 0.82, indicating substantial reliability.

By applying the CIPP model in conjunction with qualitative case study methods, this research provides a comprehensive, context-sensitive evaluation of an ESP program for engineering students. It not only assesses whether the program is effective, but also explores how and why it succeeds or faces challenges in its real-life educational context. The findings are expected to contribute to the

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field of language program evaluation and offer practical implications for improving ESP instruction in technical education.

## Results and Discussion

### Results

This study employed the CIPP model to evaluate the implementation of an ESP (English for Specific Purposes) program tailored for Mechanical Engineering students. The results are presented under the four components of the model: Context, Input, Process, and Product.

Context Evaluation: Data from interviews with students, instructors, and alumni revealed a clear need for English instruction focused on technical report writing, project proposal development, and oral presentations. One student shared, "We struggle to describe machines or explain our projects in English, especially during fieldwork," highlighting the importance of discipline-specific communication training. Faculty and alumni input, gathered through a 2023 internal survey of 12 faculty members and 5 alumni, indicated that industry stakeholders demand graduates proficient in technical English, particularly in reading manuals, writing proposals, and presenting in multinational teams. Based on this, the program established goals to develop practical English communication skills relevant to engineering.

Input Evaluation: The project-based curriculum included modules like "Describing Machine Tools" and "Writing Technical Proposals." However, the use of generic textbooks and PDF materials limited authenticity. For instance, 73% of students (n = 8) reported difficulty understanding technical vocabulary due to the lack of structured language support such as glossaries. Observational data also revealed under-resourced classrooms equipped only with projectors and whiteboards—no language labs or specialized software were used. Instructor qualifications varied, with only one of the three ESP instructors having formal ESP training. One instructor explained, "I have to self-learn from online articles because the university doesn't provide ESP-specific training."

Process Evaluation: Observations over 10 class sessions showed instructors using project-based learning to engage students in oral communication tasks. Students responded positively to group work and presentations. However, challenges emerged in technical writing tasks—especially for students with lower English proficiency. One student noted, "Sometimes the materials are too theoretical and not directly related to what we use in the lab." In addition, the one-credit-hour allocation over 16 weeks limited instructional depth. Listening activities were almost absent, and differentiation based on language proficiency levels was minimal.

Product Evaluation: Portfolio analysis and performance assessments revealed that students' technical writing scores improved by an average of 18% between the pretest and posttest over the 16-week semester. Table 1 presents a summary of score improvements.

| Skill Area | Pretest Avg. | Posttest Avg. | % Improvement |
|---|---|---|---|
| Technical Writing | 62.5 | 74.5 | 19.2% |
| Oral Presentation | 65.0 | 77.0 | 18.5% |
| Listening Comprehension | 58.0 | 60.5 | 4.3% |

Student surveys showed that while 80% felt more confident in presentations, 60% still felt unprepared to understand spoken technical English. Engineering faculty confirmed improved delivery skills during final project presentations.

**Discussion**

The findings from the Context Evaluation validate Hutchinson and Waters' (1987) notion that ESP should directly address learners' needs. In contrast to studies such as Anthony (2018), which emphasized reading comprehension in Japanese engineering contexts, this study found that Indonesian students require greater support in technical writing and speaking—suggesting the importance of localized needs analyses in ESP design.

In terms of Input, while the curriculum was task-based (Dudley-Evans & St. John, 1998), the absence of authentic materials and ESP-trained instructors limited its effectiveness. This aligns with Kaur and Khan (2020), who identified material authenticity and professional development as barriers in Southeast Asian ESP programs. Without input alignment, downstream Process and Product stages are compromised.

Process Evaluation highlights how PBL strategies increased oral participation but exposed deficiencies in written and listening skills. According to Stufflebeam (2003), implementation should be flexible and adaptive—an ideal not fully realized in this study due to scheduling constraints and uniform instructional strategies. These results mirror those in Rahman and Singh (2022), who observed that rigid ESP delivery reduces responsiveness to diverse learner needs.

Product outcomes show progress in writing and presentation skills, yet underdeveloped listening ability exposes a critical gap. While the CIPP framework successfully identified mismatches between program goals and implementation outcomes, its limitation lies in its descriptive (rather than prescriptive) orientation. The model does not prescribe how to respond to observed discrepancies—an area future researchers should explore by integrating more dynamic frameworks.

A cross-component analysis reveals that insufficient resources and limited input quality weakened instructional delivery and constrained learning gains. For

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example, underinvestment in multimedia and lack of ESP-specific faculty training negatively affected both process execution and product achievement. This reinforces the diagnostic value of CIPP in mapping how deficiencies in one domain propagate to others.

Several unexpected findings emerged. Despite minimal structured listening instruction, a small number of students (n = 2) improved their listening scores by engaging with self-selected English podcasts outside class. This underscores the need to promote learner autonomy and embed self-access learning strategies within ESP curricula.

To enhance future implementation, this study recommends:

1. Institutional-Industry Collaboration: Universities should partner with industry to co-create materials and provide real-world project briefs.
2. Instructor Training: Develop in-house certification or continuous professional development (CPD) in ESP pedagogy.
3. Technology Integration: Use listening-based tools (e.g., simulations, podcasts, video case studies) to improve comprehension.
4. Flexible Scheduling: Extend contact hours or offer asynchronous activities to accommodate diverse proficiency levels.
5. Monitoring and Feedback**:** Use periodic assessments and reflective journaling to support formative feedback.

From a cost-benefit perspective, these strategies require moderate investment in digital infrastructure and training but promise long-term gains in graduate employability and program reputation. A simple ROI analysis shows that even a 10% improvement in student job placement in English-speaking firms could justify initial setup costs.

This study has limitations. It focuses on a single department, uses a small sample size, and does not account for external factors such as institutional policy shifts or funding constraints. Future research could employ longitudinal designs to track skill retention and expand CIPP evaluation into a hybrid model incorporating learner-centered metrics such as motivation and self-efficacy.

## Conclusion

This study has provided a comprehensive evaluation of an English for Specific Purposes (ESP) program for engineering students using the Context, Input, Process, and Product (CIPP) evaluation model. The findings affirm that the program effectively identified learners' needs—particularly in technical writing and oral presentation—aligning with both academic goals and industry demands. However, limitations in input components such as lack of authentic materials,

insufficient instructor training, and inadequate infrastructure significantly constrained instructional quality and learning outcomes.

While the project-based curriculum fostered student engagement and demonstrated improvements in writing and presentation skills—with an average gain of 18% in assessment scores—the underdevelopment of listening comprehension highlights a key area for instructional enhancement. The process evaluation revealed that implementation was restricted by time constraints, lack of differentiated instruction, and minimal integration of technology, which collectively limited the comprehensiveness of the learning experience.

From a cross-component perspective, the study reveals that weaknesses in input provision directly impacted process effectiveness and product outcomes. These interconnections illustrate the diagnostic power of the CIPP model in capturing systemic educational issues and informing targeted improvements. Notably, the study also uncovered unexpected learner autonomy initiatives, suggesting potential for promoting self-directed learning in future ESP designs.

Practical recommendations include institutional collaboration with industry partners for material development, investment in ESP-specific instructor training, and the integration of technology-enhanced learning tools—especially for listening practice. Cost-benefit considerations indicate that even moderate improvements in student employability could justify the necessary investments.

Despite its limitations—such as a small sample size, focus on a single institutional context, and reliance on qualitative data—the study contributes to the growing body of literature on ESP program evaluation and offers a replicable model for educational institutions aiming to optimize their language instruction for specific disciplines. Future research is encouraged to expand this evaluation across multiple engineering departments and to explore hybrid models that combine CIPP with learner-centered evaluation frameworks.

In summary, the effective implementation of ESP programs in technical education requires more than curriculum design; it demands synchronized alignment between pedagogical strategies, instructor readiness, learning resources, and continuous, reflective evaluation practices to meet the evolving communicative needs of engineering students in a globalized world.

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