EVALUATION OF A PROBLEM-BASED LEARNING MODULE IN ENGLISH FOR NAVAL ARCHITECTURE: STUDENTS' PERSPECTIVES

Rindilla Antika[1], Risda Asfina[2]
Politeknik Negeri Bengkalis/ Jurusan Teknik Elektro[1], Jurusan Bahasa[2]
rindillaantika@polbeng.ac.id[1], risdasfina@polbeng.ac.id[2]

Abstract

This study evaluates a Problem-Based Learning (PBL) module designed for English for Naval Architecture, focusing on students' perspectives. In recent years, the need for specialized English language skills in technical fields has become increasingly important, particularly for students in naval architecture. The objective of this research is to investigates students' perspectives towards the use of English for Naval Architecture based PBL module in enhancing students' learning experiences. Employing a descriptive quantitative approach, the study involved 17 students enrolled in the Naval Architecture program. Data were collected through questionnaires, focusing on five key indicators: module quality, the influences of module for skill developments, the implementation of PBL, and the relevance and usefulness of the module. The findings reveal that 88% of students believe the module's quality is good and easy to comprehend for the Naval Architecture's students, and 86% agree that the module content encourages to their skill developments such as problem solving, communication, and collaboration. Furthermore, 86% acknowledge that the implementation of PBL in the module is helpful to solve working problem in work-life, while 88% feel the module is relevance and useful for them both in in the learning process and in the working life. Based on these results, the study recommends continuous improvement and adaptation of the module to better meet the evolving needs of students and the industry, emphasizing the importance of integrating practical applications within the curriculum.

Keywords :English for Naval Architecture Module, PBL, Students' Perspectives

1. PENDAHULUAN

In recent years, the integration of English for Specific Purposes (ESP) into technical disciplines has gained increasing importance, particularly in fields such as naval architecture. As a global language, English is essential for future professionals in maritime industries to communicate effectively in international contexts. However, teaching English to students of naval architecture requires more than traditional language instruction; it demands a curriculum that aligns with their technical needs and fosters practical language skills. To address this challenge, educators have explored innovative pedagogical approaches, including Problem-Based Learning (PBL), which emphasizes student-centered learning and real-world problem-solving.

Problem-Based Learning has been widely acknowledged for its effectiveness in promoting critical thinking, collaborative learning, and practical application of knowledge. PBL is a student-centered instructional strategy that encourages learners to actively engage with real-world problems and develop critical thinking, problem-solving, and communication skills. By presenting students with complex, real-life problems related to their field of study, PBL fosters deep understanding and meaningful application of knowledge. This approach also engages students in active learning, enhancing their language skills within the context of their chosen field.

In the field of naval architecture, effective communication skills are essential for professionals to collaborate with colleagues, interact with clients, and navigate complex projects. English language proficiency plays a crucial role in these interactions, as it enables naval architects to effectively convey ideas, exchange information, and participate in global discussions. However, traditional language

teaching methods may not adequately prepare students for the specific demands of the naval architecture profession.

Recognizing the importance of language proficiency in naval architecture, this study investigates the implementation of a Problem-Based Learning (PBL) module in an English for Naval Architecture course based on the students' perspective. The PBL module was designed to provide students with authentic language learning experiences that are relevant to their future careers. By engaging students in problem-solving tasks related to naval architecture, the module aimed to enhance their language skills and develop critical thinking abilities.

This research aims to identify students' point of view in using the English for Naval Architecture module in Bahasa Inggris Teknik subjects. This module is designed based on Problem Based Learning (PBL). By investigating students' point of view toward the use of the English for Naval Architecture module, it is hoped to give better improvement toward the development of the module itself. Moreover, by doing this research, it can be seen that the English for Naval Architecture module is able to increase students' performance, encourage students' interest in English for Specific Purposes (ESP), achieve the goal criteria and target of teaching and learning process in Bahasa Inggris Teknik subject.

2. LITERATURE REVIEW

A. English for Specific Purposes

English for Specific Purposes (ESP) represents a contemporary approach to teaching and utilizing English tailored to specialized fields and studies that align with the specific needs of the users' academic and professional domains (Bastaman, 2010; Fauziningrum & Nicolas, 2019; Syakur et al., 2020). Furthermore, the objectives of English language instruction in Indonesia are articulated in the Minister of Education and Culture Decision No. 096/1967 dated December 12, 1967, which aims to enhance students' communicative competence in English, encompassing the skills of listening, reading, writing, and speaking.

ESP can be defined through the lenses of 'purpose' and 'specificity' related to English language teaching, indicating the necessity of addressing the 'needs' of learners who study English in response to the particular requirements of the target situations in which they are expected to use the language. This necessitates that the language used in instruction be 'authentic' and 'genuine,' rather than contrived or artificial, to effectively fulfill its intended purpose (Salmani-Nodoushan, 2020).

ESP encompasses three main features: (a) authentic materials, (b) goal-oriented orientation, and (c) self-direction. While the concept of 'authentic materials' is straightforward, the other two features require brief elaboration. The goal-oriented orientation pertains to the simulation of communicative tasks designed to prepare students for real-life target situations. Conversely, self-direction refers to the characteristic of ESP that transforms 'language learners' into 'language users'; it emphasizes the importance of teaching learning strategies and fostering self-regulated learning among students (Salmani-Nodoushan, 2020; Sinhaneti, 2015).

According to Hutchinson and Waters (Wahyono & Puspitasari, 2015), ESP is an approach to language learning wherein the content and instructional methods are tailored to the learners' specific reasons for studying. Thus, it can be stated that ESP constitutes specialized learning. In the context of this study, the focus is on providing English instruction specifically designed for students in naval engineering, referred to as English for Naval Architecture.

B. Problem Based Learning

Problem-Based Learning (PBL) is an instructional method focused on real-world problem-solving, encouraging students to engage actively with the learning material by presenting conceptual issues that stimulate their desire to learn (Ikawati, 2023; Nuarta, 2020). This learning approach aids students in identifying problems derived from real-world events, gathering information through independent strategies, making decisions to resolve the issues, and presenting their findings through performance demonstrations (Indriani, 2022).

PBL is characterized by its demand for students to actively formulate problems, seek solutions, and enhance their critical thinking abilities through experiential learning (Badriyah et al., 2021; Saeidi et al., 2021). The PBL model challenges students to engage in collaborative learning, often

working in small groups as the context for their educational experience. In this process, the educator's role is to facilitate opportunities for students to actively address the problems presented. Students who may hesitate to pose questions to the educator are encouraged to seek assistance from peers within their group or from other groups (Ikawati, 2023; Sudarmika, 2021).

The characteristics of Problem-Based Learning include the following: (a) problems serve as the starting point for learning; (b) the issues raised are real-world, unstructured problems; (c) these problems require multiple perspectives; (d) they challenge students' existing knowledge, attitudes, and competencies, necessitating the identification of learning needs and exploration of new areas; (e) self-directed learning is a central component; (f) the utilization of diverse knowledge sources, their application, and evaluation is an essential process within PBL; (g) learning is collaborative, communicative, and cooperative; (h) the development of questioning and problem-solving skills is as important as mastering content knowledge for finding solutions; (i) the openness of the process in PBL includes synthesis and integration of the learning experience; and (j) PBL involves evaluating and reflecting on students' experiences and learning processes (Rusman, 2016, as cited in Ikawati, 2023).

Based on the above explanations, it can be concluded that the Problem-Based Learning model is a student-centered instructional approach that revolves around problems presented by the teacher, where students apply their knowledge and skills to resolve these issues. The main characteristics of the PBL model can be summarized as follows: (1) the problem serves as the starting point, (2) the problems are rooted in real-world contexts, and (3) the issues necessitate multiple perspectives for effective resolution

C. Learning Module

A module is an educational resource designed scientifically to enhance the outcomes of the learning process. It aims to assist students in achieving specific objectives or competencies. According to Kustandi & Darmawan (2020), a module is a planned unit of instructional programming, designed in the form of printed materials to aid learners in achieving the objectives or competencies associated with each course.

The application of modules is expected to facilitate a well-structured, independent, and comprehensive learning environment, with clearly defined outcomes (Gunawan, 2022). Consequently, the use of modules enables instructors to implement teaching more effectively, while simultaneously providing students with a framework that simplifies their understanding of the subject matter. Furthermore, modules or instructional materials can be developed in various formats tailored to the specific needs and characteristics of the content to be delivered (Permendikbud No 20, 2018). A complete module typically comprises components such as teacher's instructions, student activity sheets, student worksheets, answer keys for student worksheets, assessment sheets, and answer keys for assessments.

The primary function of a module is to serve as a learning material utilized during students' educational activities. Through the use of modules, students are expected to engage in a more directed and systematic learning process. This structured approach is intended to facilitate mastery of the competencies demanded by their coursework. Additionally, modules are designed to provide guidance for learners throughout their academic journey (Irawan et al., 2022). In conclusion, modules represent a comprehensive educational tool that synthesizes printed textbooks (both in content and assessment) organized systematically with engaging presentation styles. Their primary aim is to achieve the desired learning outcomes effectively.

D. English for Naval Architecture Based PBL Module

The English for Naval Architecture module is an English for Specific Purposes (ESP) resource designed to meet the needs of students in the Naval Architecture program, specifically for the Technical English course. This module is intended for third-semester students in the Naval Architecture department and comprises ten instructional units developed based on a needs analysis conducted among students and lecturers in the department. The module is designed using a Problem-Based Learning (PBL) approach.

Each chapter of this module is divided into five sections: module identity, module components, module content, conclusion, and evaluation. The module identity section includes information about the institution, department or study program, course code, course name, chapter title, number

of pages, year, and the sessions for which the module is intended. The module components section outlines the chapter title, basic competencies, topics and subtopics covered, competency indicators, and references. The module content section aligns with the chapter titles and presents the relevant material. The conclusion section provides a summary of the entire module, while the evaluation section contains questions and exercises designed to assess students' understanding of the material after studying the module.

The English for Naval Architecture module comprises ten chapters: types of ships, parts of ships, ship materials, ventilation systems and coating systems, ship technology, oil tankers, container ships, bulk carriers, SOLAS, marine pollution, technical reports in naval architecture, and presentations in naval architecture. The Problem-Based Learning method is incorporated into the evaluation section, where students are presented with a problem related to the chapter's topic and subtopics. Students are required to solve these problems individually, in pairs, or in groups, thereby applying their knowledge in practical scenarios.

3. RESEARCH METHODOLOGY

This research was conducted as a descriptive study using a qualitative approach. As noted by Creswell & Poth (2016), qualitative research seeks to comprehend a phenomenon by focusing on a comprehensive understanding, rather than fragmenting it into discrete variables. The objective of this approach is to provide a holistic view and an in-depth understanding, rather than performing a numerical analysis of data. Purposive sampling was employed as the sampling technique, as the study aimed to explore the perspectives of students regarding the English for Naval Architecture based PBL module. The participants of this study comprised 17 students enrolled in Bahasa Inggris Teknik courses in Politeknik Negeri Bengkalis.

Data collection was carried out using questionnaires. Questionnaires were administered to the students after they used the module. The indicators used for data collection were adapted from Miekley's textbook evaluation criteria (as cited in Mukundan & Nimehchisalem, 2012), providing a structured framework for assessing the module from multiple perspectives. The questionnaire indicators are module quality, the influences of module for skill developments, the implementation of PBL, and the relevance and usefulness of the module. The questionnaire items were validated before distributed to the students and the validated items were 20 questions. The data were analyzed quantitatively. The data collected from questionnaire were analyze by using percentage formula suggested by Arikunto (2021) which can be seen as follows;

$$P=F/N \times 100\%$$

Note:
P = Percentage of answer
F = Frequency
N = Amount of students

4. RESULTS AND DISCUSSION

The findings of the research describe the students 'perspectives on the English for Naval Architecture Based PBL module. The evaluation of the module is based on four key indicators: module quality, the influences of module for skill developments, the implementation of PBL, and the relevance and usefulness of the module. These indicators provide a comprehensive framework for assessing the effectiveness and suitability of the textbook from the learner-centered viewpoints.

The Module Quality

Module quality refers to how well a learning resource meets its educational objectives, addressing various aspects that cater to both instructors' and learners' needs (Donnelly & Fitzmaurice, 2005**)**. High-quality modules are distinguished by a clear structure, relevant content, engaging learning activities, and appropriate assessments. In this study, five key indicators were used to assess the quality of the English for Naval Architecture module: students' comprehension of the material, the structure of the module, the relevance of the topics to the field of naval architecture, the presentation of content, and the clarity of language.

The first indicator revealed that 91% of students believed the module effectively helped them understand the material, while 95% agreed that the content was relevant to the needs of Naval Architecture students. Regarding the module's structure, 88% of students stated that it was easy to

follow and understand. Furthermore, 86% agreed that the content was presented in a systematic manner. The clarity of language used in the module was also well-received, with 81% of students expressing satisfaction. Overall, these results highlight a positive perception of the module's quality, with most students finding it effective, well-organized, relevant, and clear in its language use. The detailed findings of students' perspectives on the quality of the English for Naval Architecture module are illustrated in Figure 1 below.

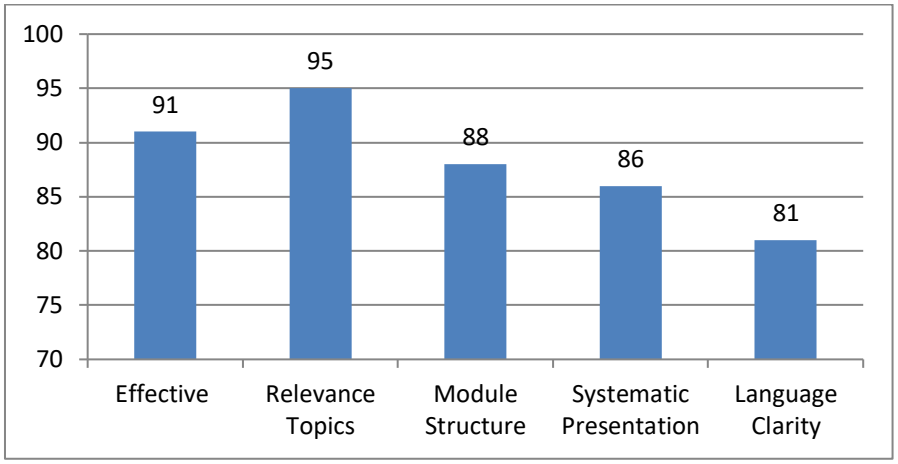


Figure 1. Students' Responses toward the English for Naval Architecture's module quality

The Influences of Module for Skill Developments

The influences of a well-designed educational module on skill development are profound and multifaceted. A good-quality module serves as a structured framework that guides learners through the acquisition of essential competencies. It promotes active engagement through interactive activities, real-world problem-solving scenarios, and collaborative projects, all of which contribute to enhanced critical thinking and analytical skills (Pertiwi et al., 2024). By incorporating assessments and feedback mechanisms, modules facilitate ongoing reflection and self-assessment, enabling learners to identify areas for improvement (Aricò & Lancaster, 2018). Ultimately, the strategic design and implementation of educational modules can significantly influence skill development, preparing students to meet the demands of their respective fields and excel in their future careers.

The second indicator for evaluating students' perceptions of the module pertains to its impact on skill development. To assess this influence, the questionnaire administered to students included five specific sub-indicators: problem-solving skills, confidence in using technical English, enhancement of professional communication skills, collaboration abilities, and critical and analytical thinking skills. The analysis of the questionnaire data revealed compelling results, with 89% of students reporting that the module significantly contributed to the enhancement of their problem-solving skills. Additionally, 85% of participants indicated that the module bolstered their confidence in using technical English effectively. Moreover, 80% of respondents acknowledged that the module played a crucial role in improving their communication skills within professional contexts. In terms of collaboration and critical thinking abilities, 87% of students affirmed that the use of this module had a positive impact on their capacity to collaborate effectively and to think critically and analytically. Thus, the findings indicate that the implementation of this module significantly influences the development of students' skills, enhancing both their linguistic capabilities and their overall knowledge acquisition. This emphasizes the module's effectiveness as a tool for fostering essential competencies in students. The results reflecting students' perspectives on the influences of module for skill development are presented in Figure 2 below.

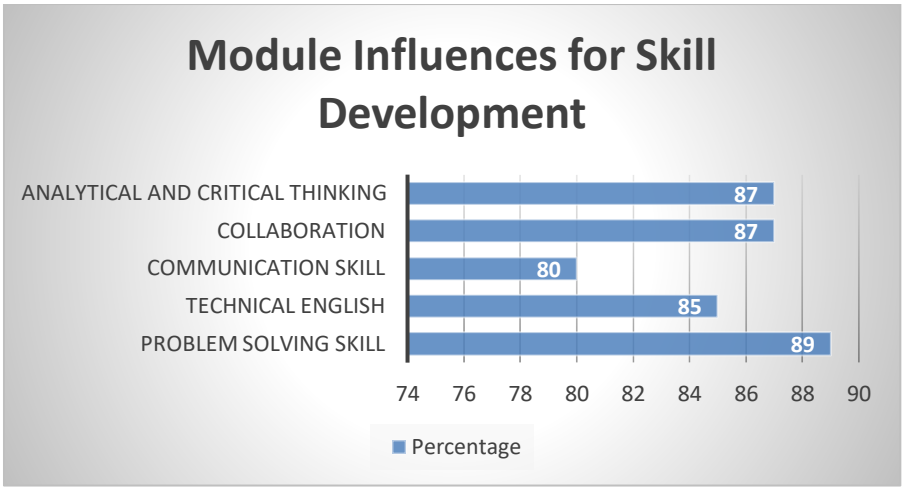


Figure 2. Students' Responses toward the English for Naval Architecture's Module Influences Skill Development

The Implementation of PBL

The third indicator examined in this study is the implementation of Problem-Based Learning (PBL) within the module. This module was specifically designed to incorporate PBL principles, and it encompasses five sub-indicators related to the effectiveness of this implementation: learning motivation, critical thinking, concept comprehension, learning engagement, and group discussions. Regarding learning motivation, 86% of students reported that the module inspired them to be more active in their learning endeavors. Furthermore, the module facilitated critical thinking, with 86% of students indicating that it encouraged them to analyze and address problems related to Naval Architecture. Additionally, 84% of students found that the module enhanced their understanding of technical concepts, making them more accessible and comprehensible. The engagement level of students also increased, as 84% indicated that the PBL-based module made the learning process more interesting. Group discussions proved particularly effective, with 92% of students asserting that these collaborative activities deepened their understanding of the subject matter.

These findings suggest that the implementation of PBL in the classroom not only fosters greater student engagement but also enhances critical thinking skills throughout the learning process. These results are consistent with the research conducted by Indriani (2022) found that the integration of PBL in educational settings significantly promotes active student participation. Similarly, the research conducted by Badriyah et al (2021) also supports the notion that PBL implementation encourages students to engage in critical thinking when confronted with complex problems. Collectively, these studies underline the efficacy of PBL as a pedagogical approach that cultivates active learning and deepens conceptual understanding among students. The results can be shown in the Figure 3 below;

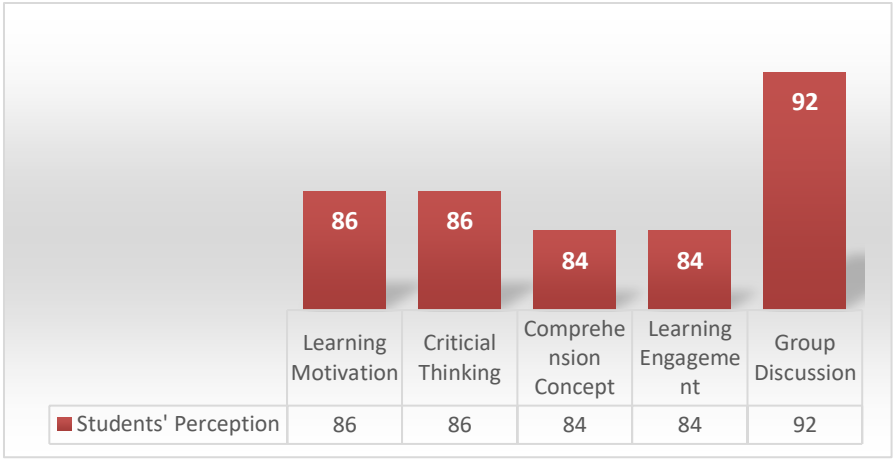


Figure 3. Students' Responses toward the Implementation of PBL in English for Naval Architecture's Module

The Relevance and Usefulness of the Module

The last indicator evaluated in this study is the relevance and usefulness of the module, which comprises five sub-indicators: relevance to the curriculum, applicability of material in the workplace, preparation for professional challenges, perceived learning value, and alignment with learning expectations. A substantial 86% of students reported that the module aligns well with the curriculum for Technical English. Furthermore, 91% of students concurred that the material presented within the module can be effectively applied in real-world professional contexts.

In addition, 91% of students recognized that the module is instrumental in preparing them to confront professional challenges within the field of Naval Architecture. Moreover, 87% of students indicated that the implementation of this module enriches their learning experience, facilitating both the acquisition of Technical English and the development of essential problem-solving skills. Lastly, 86% of students affirmed that the module meets their expectations for English language learning. These findings are consistent with the primary objectives of the module's design, which aim to assist, facilitate, and motivate students to engage in self-directed learning while addressing their knowledge requirements relevant to the professional landscape, particularly in the domain of Technical English (Donnelly & Fitzmaurice, 2005). The result can be shown in Figure 4 below;

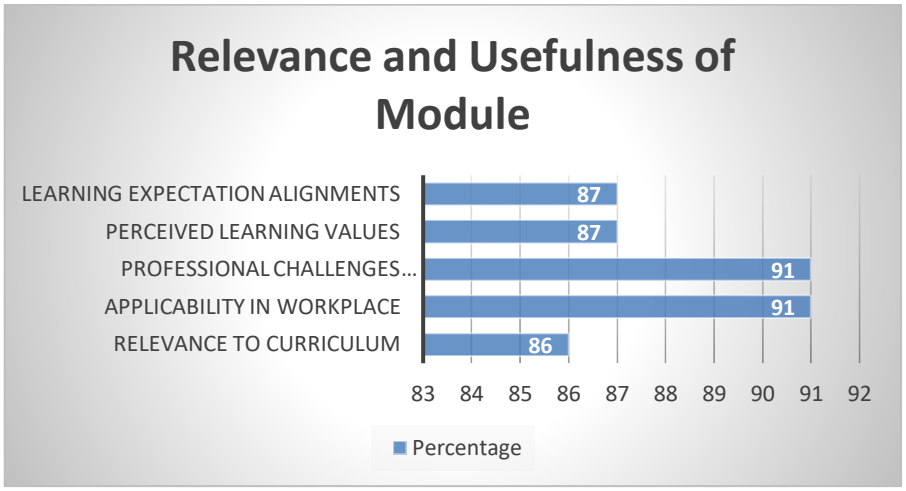


Figure 4. Students' Responses toward the Relevance and Usefulness of English for Naval Architecture's Module

5. CONCLUSION AND SUGGESTIONS

This study evaluated the effectiveness of a Problem-Based Learning (PBL) module in English for Naval Architecture, focusing on students' perspectives. The findings indicate that the module is well-aligned with the curriculum, with a significant majority of students recognizing its relevance and applicability in real-world scenarios. The module effectively prepares students for the professional challenges they will face in the field, enhancing their Technical English proficiency and problem-solving skills. Overall, the PBL module has been positively received, contributing to students' learning experiences and meeting their expectations for English language acquisition in the context of Naval Architecture.

Based on the results, several recommendations can be made. First, it is essential for educators to continue refining the module content to ensure it remains current and relevant to industry demands. Additionally, further research could explore the long-term impacts of PBL modules on student outcomes in various engineering disciplines. Finally, incorporating feedback mechanisms that allow students to voice their experiences and suggestions could lead to continuous improvement of the module, ultimately enhancing the learning experience and outcomes for future cohorts.

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