

Designing a Problem-Based Learning Module of English for Naval Architecture

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ABSTRACT

Being an archipelagic country is an added value in various fields for Indonesia. One way to develop archipelagic potential in Indonesia is to improve the quality of human resources in related fields, one of which is naval architecture. A quality that is no less important is the ability to speak English. This study aimed to design a teaching material in the form of module of English for naval architecture using problem-based learning in order to expose students to real world problems. This research employed Research and Development (R&D) using ADDIE design. The phases of this model were analysis, design, development, implementation, and evaluation. This research was conducted in Politeknik Negeri Bengkalis and involved 50 students of Naval Architecture department. The research subjects were involved in defining the topic needs for the module, implementing the module and evaluating the module. The topic of the module is the ESP (English for Specific Purposes) topic. There are some parts of the module: the first part of the module is module identity; the second part is module component; the third part is module material; and the last part is evaluation. In the evaluation part, problem-based learning is used. This module is expected to contribute to the improvement of naval architecture students' ability in English and further prepare them for their future work and career.

Key words: Module, Naval Architecture, Problem-based Learning

INTRODUCTION

English has become a global language widely spoken in the world which facilitates communication between people from different countries and cultures. Learning English helps people gain access to many opportunities both personally and professionally (Pentón Herrera & McNair, 2021). In Indonesia, English has become one of compulsory subjects to be taught in the class since kindergarten to university level. Since Indonesia is competing with ASEAN laborers in this 5.0 industrial revolution, having good English skills is needed for the students as they are facing the workforce after finishing their education because it can help them secure the employment they seek (Syahira, 2022).

With the needs of the industrial world, both local and global, growing rapidly along with developments in information technology, the economy and various other aspects of life, English becomes a necessity for working professionals. Communication in English is the main requirement to be able to work in national or international companies (Haryono et al., 2021). As stated by Handayani (2016), a worker with good English skills is more valued in the world of work.

Moreover, Indonesia is an archipelagic country. A quality that is no less important to support the development of maritime potential in Indonesia is the ability to speak English. This is because English is the main language used to communicate internationally. This creates new challenges for English lecturers, including English lecturers of naval architecture, to be able to provide teaching materials that suit the needs of students and the world of work. The need to be fluent in English is a challenge for higher education to be able to equip students with the ability to compete in the era of the industrial revolution. 5.0 (Syukur & Nugraha, 2019).

The teaching and learning of English as a foreign language for the purpose of mastering certain things is called ESP (English for Specific Purposes). In other words, English is learned based on a specific context and based on the special needs of the learners. Based on the researchers' initial literature study, there has been no teaching material in the form of module designed specifically for the learning of English for Naval Architecture.

In regard to the teaching material, the learning method used should expose students to real world problems. In this case, problem-based learning (PBL) method is deemed suitable. The students can see or find problems from real events, collect information to make a decision to solve the problem, and present their results of decision making or problem solving. Therefore, this research aims to design a problem-based teaching material in the form of module for students of naval architecture.

LITERATURE REVIEW

Previous Related Studies

There are several studies related to the topic of this research. The first related study is a study conducted by Pattimura et al. (2020) who developed teaching materials for mathematics lesson using problem-based learning. The teaching materials included syllabus, lesson plan, student worksheet, and mathematical understanding ability test. They intended to provide teaching materials which were valid and practical in order to facilitate the students' learning in mathematics.

The second one is a study conducted by Lytovchenko et al. (2022) who examined the effect of the online problem-based learning (PBL) method on engineering-related vocabulary acquisition by ESP students and their satisfaction with the learning experience. The results of their study showed that the students who were

taught with the PBL method online had statistically higher results in vocabulary acquisition than those taught with traditional methods. Students' attitude to problem-based vocabulary learning was positive.

The third one is a study conducted by Indriani, L. (2022). She conducted a classroom action research at SMAN 25 Bandung to determine the increase in activeness and learning outcomes of students by applying the Problem Based Learning (PBL) model. She found that the application of the problem-based learning model could improve student activity and learning outcomes in English lessons. It was indicated by the results of observations and the results of the English learning achievement tests.

Based on the researchers' literature study, there has been no teaching material in the form of module designed specifically for the learning of English for naval architecture. Additionally, considering the review of the related studies especially on the advantages of implementing problem-based learning, the researchers intended to design an English for naval architecture module using problem-based learning.

The Theory of the Variables

English for Specific Purposes

ESP can be spoken in certain English languages depending on the specific context and special needs of the learner (Yulientinah et al., 2020). The main characteristic of ESP that differentiates it from general English is learning that is oriented towards specific goals, more specifically in the academic and professional fields (Hermawati, 2015). Huchthinson & Waters' statement in Haryono et al. (2021) that learning English for specific purposes or English for Specific Purposes (ESP) is said to be successful if students can use and communicate English professionally in their field of work.

Problem-Based Learning

Problem-based learning is an approach to learning that helps students find problems from real events, collect information through self-determined strategies to make a decision to solve the problem which will then be presented in the form of a performance (Indriani, 2022). One of the characteristics of problem-based learning is using small groups as a context for learning (Pattimura et al., 2020). Students who are reluctant to ask teachers can ask friends in their group or other groups. They also do not feel afraid to express their opinions so that they can be motivated to study actively.

There are some steps of the problem-based learning method (Indriani, 2022). The first step is teachers provide problems to students where these problems relate to everyday life. The second step is teachers organize students in several groups. The

third step is teachers help students organize learning tasks according to the problem. The fourth step is students collect knowledge and carry out experiments according to the problem solving given. The last step is students develop and present the results of their work.

METHOD

Design and Sample

This research employed Research and Development using ADDIE design (Peterson, 2003). The phases of this model were Analysis, Design, Development, Implementation, and Evaluation. This research was conducted in State Polytechnic of Bengkalis which involved 50 students of Naval Architecture department in year 2020. The research subjects were involved in defining the topic needs of ESP module, the implementation of the module, and in determining the module as the users

Instrument and Procedure

In development phase, the researchers developed the module based on the material which already designed. Then, the module was tried out to the students in the implementation phase whereas the students respond of the users were collected as the evaluation phase.

Data Analysis

In analysis phase, the researchers examined the needs of English topics and materials for Naval Architecture students. The researchers designed the teaching material or English module based on the analysis results in the design phase.

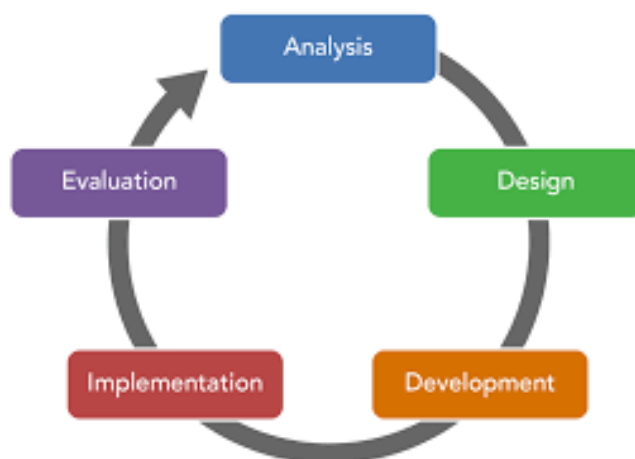


Figure 1. ADDIE Research Design

RESULT AND DISCUSSION

Analysis

The first phase in this research is to determine the information and data about the needs in learning English for Naval Architecture subject. The data are gained through questionnaires and interview to Naval Architecture students and lecturers. The students were given four categories to define their needs in learning English such as students' ability in English, students' needs of English skills, students' needs of English sub-skills, and the topic for English material for English for Naval Architecture subject. The results showed that most of students were lacked of speaking, grammar, and pronunciation. It was shown that there is a correlation between speaking ability with grammar and pronunciation ability (Tiranant et al., 2022).

Moreover, the data also exposed that the English skills needed were speaking and listening whereas they also desired to learn pronunciation. For naval architecture students, the ability to speak English fluently is needed because they will communicate with foreign crew on board and have to understand the operation manual (Giannarou, 2021). The questionnaires also revealed some topics that the students needed to learn in English for Naval Architecture subject. They also wished to learn about writing a technical report and performing an English presentation.

The data showed that both students and lecturers required the English teaching and learning process which could stimulate their interest and critical thinking which was obtained from the interview data. A learning method used to fulfill this need was Problem Based Learning (PBL). As stated by Ali (2019) that PBL provides students to practice using the language for authentic communication and to develop problems-solving skills which initiate critical thinking. These data were applied to design an ESP module for Naval Architecture students which employed Problem Based Learning.

Design

The results of need analysis served as a guideline to design an English for Naval Architecture module. The first step in designing this module was determining the learning outcomes that are adjusted to the Indonesian National Qualifications Framework (KKNI). Focus Group Discussion (FGD) is conducted to examine the learning outcomes of English for Naval Architecture subject which focused on four components namely attitude, general skills, special skills, and knowledge. This FGD also discussed the topic included on lesson plans which was accordance with the syllabus and the students' needs.

The second step in this phase is defining the topics for the module based on the need analysis' results. There are twelve (12) topics in this module; they are Types

of Ships, Parts of Ships, Ship Hull, Ship Materials, Ventilation System and Coating System, Naval Ship Technology, Oil Tanker, Container Ship and Bulk Carrier, Safety of Life at Sea (SOLAS), The International Safety Management (ISM) Code, Marine Pollution, Technical Report in Naval Architecture, and Presentation in Naval Architecture. After defining the topics included in the module, the FGD also discussed about module's composition which is related to the guideline of module based on the regulation of P4MP State Polytechnic of Bengkalis. The module is divided into five parts such as module identity, components of module, module material, summary, and evaluation.

The last steps in this design phase are collecting, creating, and discussing the problems as the implementation of Problem Based Learning in this module. In PBL learning method, problem is the heart of lesson which function as a content, contextualized learning environment, stimulator of thinking/reasoning, organizer of knowledge, and motivator of learning (Hung, 2006). It means that the significant role in determining the achievement of PBL is the problems. PBL is chosen as part in evaluation since PBL is the integration of real-world problem solving, employment of critical thinking, promotion of self-directed active learning (Lytovchenko et al., 2022; Moallem et al., 2019).

Development

After designing the ESP module, the next step is module development in which the module was developed in accordance with the guidance in writing a module in Politenik Negeri Bengkalis. The first part of the module is module identity which consists of name of institution, department or study program, course code, course name, meeting, module number, number of pages, and the validity. The second part is module component which divided into module title, basic competence of the module for each chapter, topic and sub topics in each topic, outcome indicators, and references.

B. Components of Module

1. Module Title

MODULE 1
TYPE§ OF SHIPS

2. Basic Competence

Students are able to differentiate types of ships and their uses.

3. Topic and Sub-topics

Types of ships

- a. Basic types of ships
- b. Characteristics of various ships
- c. Functions of various ships

4. Outcome Indicators

- a. Students are able to describe the basic types of ships
- b. Students are able to define the characteristics of various ships
- c. Students are able to explain the functions of various ships

Figure 2. Components of the Module

The third part of the module is module material which is the core of the module served the lesson. This chapter discussed about the types of ships which divided into three sub topics; basic types of ships, characteristics of various ships, and functions of various ships. These sub topics are in accordance with the students for Naval Architecture needs in achieving the learning outcomes. The next part of this module is summary which included the conclusion of the learning material discussed.

The last part of the module is evaluation. The evaluation for this module is designed by using Problem Based Learning which is offered a real-world problem and should practice real-world data to unravel it. Students collectively generate objectives for their autonomous learning, explore procedures that might be appropriate for their realization, create new ideas, evaluate, and apply them in practice. The teacher serves as a facilitator which encourages students to take responsibility for their own learning and engages them in active enquiry in the teaching and learning process which is suitable for adult learners. (Ansarian & Mohammadi, 2018; Lytovchenko et al., 2018).

E. Evaluation

Problem Solving

Direction: Create a group consist of four people. Read a case below then discuss it in the group. Present the result of your discussion in front of the class.

Case Study

A multinational shipping company received an order to deliver goods such as clothing, foods, bulk asphalts, oil and gas, public transportations, and agricultural equipment to islands in eastern Indonesia.

Questions:

1. Write down the formulation of the problem of the case above! (In a question form)
2. What hypothesis can be made based on the formulation of the problem?
3. How to solve the problems regarding the understanding of the types of ships, their characteristics and functions?

Figure 3. Evaluation Part in the Module

It is shown in Figure 3 that the students are given a case study and they have to solve the problem in a group. The questions served as guidelines for the students to compile the steps in solving the problems. In PBL, students are given ill-structured condition in which they assume as the owner of the situation. They identify the real problem and acquire whatever is necessary to arrive at feasible resolution through examination (Azman & Shin, 2012). By implementing PBL in the learning process, the students obtain meaningful learning. The benefits of PBL itself are it increases learning motivation, supports learning to relevant real world, promotes higher-order thinking, encourages “how to learn” learning, engages student in similar real -world situation , and assesses learning that demonstrate understanding (Azman & Shin, 2012; Moallem et al., 2019; Mohammadi, 2017; Nurfajriah et al., 2022)

Implementation

In this phase, the module was employed and tried out in the teaching and learning process for Naval Architecture’s students to find out its usefulness. The students were given the printed material and also the soft file to help students accessing the material easier. The students were divided into several groups and asked to solve the problems given in the module after explaining the material.

Evaluation

In the last phase of this design was evaluation which was employed to find out the students’ responses toward the ESP module based on Problem Based Learning that has been constructed. The responses were collected through questionnaires which were distributed through google form to the students. The responses were utilized

to evaluate and advance this PBL module which was in accordance with the learning outcomes of English for Naval Architecture curricula.

CONCLUSION

Teaching materials are crucial in the teaching and learning process. The teaching material in the form of module of English for naval architecture using problem-based learning can expose students to real world problems. The topic of the module is the ESP (English for Specific Purposes) topic. There are some parts of the module: the first part of the module is module identity; the second part is module component; the third part is module material; and the last part is evaluation. In the evaluation part, problem-based learning is used. This module is expected to contribute to the improvement of naval architecture students' ability in English and further prepare them for their future work and career.

REFERENCES

- Ali, S. S. (2019). Problem Based Learning: A Student-Centered Approach. *English Language Teaching*, 12(5), 73–78.
- Ansarian, L., & Mohammadi, F. S. (2018). *Problem-Based Learning in Action: Review of Empirical Studies*.
- Azman, N., & Shin, L. (2012). Problem-based Learning in English for a Second Language Classroom: Students' Perspectives. *International Journal of Learning*, 18, 109–126. <https://doi.org/10.18848/1447-9494/CGP/v18i06/47648>
- Giannarou, E. K. (2021). Learner Needs Analysis in an ESP Class. *Open Journal of Modern Linguistics*, 11(2), Article 2. <https://doi.org/10.4236/ojml.2021.112015>
- Handayani, S. (2016). *Pentingnya Kemampuan Berbahasa Inggris Sebagai Dalam Menyongsong Asean*. 3.
- Haryono, E. P., Taju, D. R. J., Tombokan, F. F., & Lonan, T. P. (2021). Needs Analysis dalam Konteks ESP (English for Specific Purpose): Analisis Kebutuhan Pembelajaran Bahasa Inggris Mahasiswa Teknik Sipil. *Jurnal Teknik Sipil Terapan*, 2(3), Article 3. <https://doi.org/10.47600/jtst.v2i3.254>
- Hermawati, D. A. (2015). Analisis Kebutuhan (need Analysis) untuk Pembelajaran Bahasa Inggris Khusus (ESP) Pada Kelas Manajemen Agroindustri. *Jurnal Ilmiah Inovasi*, 15(2), Article 2. <https://doi.org/10.25047/jii.v15i2.45>
- Hung, W. (2006). The 3C3R Model: A Conceptual Framework for Designing Problems in PBL. *Interdisciplinary Journal of Problem-Based Learning*, 1(1). <https://doi.org/10.7771/1541-5015.1006>
- Indriani, L. (2022). Meningkatkan Keaktifan dan Hasil Belajar Siswa Dengan Model Problem Based Learning pada Pelajaran Bahasa Inggris. *Edukasiana: Jurnal Inovasi Pendidikan*, 1(1), Article 1. <https://doi.org/10.56916/ejip.v1i1.4>
- Lytovchenko, I., Ogienko, O., Kriukova, Y., Meleshko, I., Yamshinska, N., Voronina, H., & Kutsenok, N. (2022). Online Problem-Based Learning:

- Possibilities for Engineering Vocabulary Acquisition in ESP Course at Technical University. *International Journal of Information and Education Technology*, 12(9), 905–911. <https://doi.org/10.18178/ijiet.2022.12.9.1700>
- Lytovchenko, I., Ogienko, O., Sbruieva, A., & Sotska, H. (2018). Teaching English for Specific Purposes to Adult Learners at University: Methods That Work. *Advanced Education*, 5(10), 69–75. <https://doi.org/10.20535/2410-8286.149741>
- Moallem, M., Hung, W., & Dabbagh, N. (2019). *The Wiley Handbook of Problem-Based Learning*. John Wiley & Sons.
- Mohammadi, F. S. (2017). The Effect of Authentic Problem-Based Vocabulary Tasks on Vocabulary Learning of EFL Learners. *International Journal of Education and Literacy Studies*, 5(3), 35–40. <https://doi.org/10.7575//aiac.ijels.v.5n.3p.35>
- Nurfajriah, N., Tabroni, I., Faujiah, N., Nurjannah, R., & Putri, T. (2022). Problem Based Learning (PBL): Concrete Steps to Improve Students' Communication Skills. *International Journal of Integrative Sciences*, 1(1), Article 1. <https://doi.org/10.55927/ijis.v1i1.2973>
- Pattimura, S., Maimunah, M., & Hutapea, N. M. (2020). Pengembangan Perangkat Pembelajaran Matematika Menggunakan Pembelajaran Berbasis Masalah Untuk Memfasilitasi Pemahaman Matematis Peserta Didik. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 4(2), Article 2. <https://doi.org/10.31004/cendekia.v4i2.286>
- Pentón Herrera, L. J., & McNair, R. L. (2021). Restorative and community-building practices as social justice for English learners. *TESOL Journal*, 12(1), e00523. <https://doi.org/10.1002/tesj.523>
- Peterson, C. (2003). Bringing ADDIE to Life: Instructional Design at Its Best. *Journal of Educational Multimedia and Hypermedia*, 12(3), 227–241.
- Syahira, S. (2022). Penggunaan Video Youtube Sebagai Media Pengajaran Pada Mata Kuliah Speaking Untuk Meningkatkan Kemampuan Berbicara Mahasiswa Bahasa Inggris Di STKIP Muhammadiyah Manokwari. *Jurnal Perspektif Pendidikan*, 16(1), Article 1. <https://doi.org/10.31540/jpp.v16i1.1799>
- Syukur, B. A., & Nugraha, D. (2019). Analisis Kebutuhan Bahasa Inggris Pada Mahasiswa Program Studi Keperawatan. *Jurnal Kesehatan Kusuma Husada*, 151–158. <https://doi.org/10.34035/jk.v10i2.376>
- Tiranant, P., Khumsat, T., Ngamnikorn, T., & Wiboolyasarin, W. (2022). Beliefs about Native-Speaking Teachers in Grammar and Pronunciation Instruction: Views and Voices from Second Language Learners. *International Journal of Language Studies*, 16, 45–72.
- Yulientinah, D. S., Juwita, R., & Resdiana, W. (2020). Identifikasi Analisis Kebutuhan Pembelajaran Bahasa Inggris (Non Program Studi Bahasa Inggris) Pada Mata Kuliah Bahasa Inggris Khusus/ English For Specific Purposes (ESP) Di Program Studi D4 Akuntansi Keuangan Politeknik Pos Indonesia. *Competitive*, 15(1), Article 1. <https://doi.org/10.36618/competitive.v15i1.625>