



THE EFFECTIVENESS OF PROJECT-BASED LEARNING (PBL) FOR ENGINEERING STUDENTS IN ESP CLASS

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Abstrak. Mengajar Bahasa Inggris untuk Tujuan Khusus atau English for Specific Purpose (ESP) untuk mahasiswa non-Jurusan Bahasa Inggris merupakan hal yang menantang namun menarik karena guru dituntut untuk lebih kreatif dalam membuat strategi belajar mengajar. Penggunaan bahasa Inggris bagi mahasiswa Teknik diperlukan guna mendukung kemampuan hard skill dan soft skill mereka. Di kelas ESP, mahasiswa belajar tentang keterampilan kosakata terkait ilmu Keteknikan dan keterampilan lain seperti menulis, membaca, berbicara, dan menyimak. Keterampilan tersebut dipelajari secara bersamaan melalui beberapa kegiatan pembelajaran dengan menggunakan strategi pengajaran yang sesuai seperti Project Based Learning (PBL). PBL didirikan sebagai pendekatan dalam teori pendidikan dengan metode yang berpusat pada siswa. Dalam PBL, para siswa diberi kesempatan untuk mengeksplorasi kemampuan mereka, membangun kepercayaan diri, dan meningkatkan motivasi dalam mempersiapkan diri mereka untuk menghadapi dunia kerja. Penelitian ini menggunakan kajian pustaka sebagai bukti pendukung untuk mengukur efisiensi PBL dalam pengajaran mahasiswa Teknik Sipil semester 1 di tahun akademik 2021/2022. Jurnal, buku, dan prosiding melalui komputer serta database elektronik digunakan sebagai dasar pengumpulan data. Hasil penelitian menemukan bahwa PBL merupakan pendekatan yang efektif dan menarik yang cocok untuk mengajar Mahasiswa Teknik dibandingkan dengan pendekatan tradisional dan berbasis perkuliahan. Selain itu, kegiatan dengan menggunakan pendekatan PBL dinilai tepat untuk mendapatkan pengetahuan luas tentang konsep Teknik Sipil melalui kegiatan pembelajaran yang menarik yang dapat meningkatkan kepercayaan diri serta motivasi siswa untuk menghadapi proyek dunia nyata di masa depan.

Abstract. Teaching English for Specific Purpose (ESP) for non-English Department students is challenging yet exciting since the teacher is required to be more creative in creating a teaching and learning strategy. The use of English for Engineering students is necessary to support the capability of their hard and soft skills. In ESP class, the students learn about vocabulary skills in terms of Engineering and other skills such as writing, reading, speaking,

and listening. Those skills are learned correspondingly through some learning activities using applicable teaching strategies such as Project Based Learning (PBL). PBL is introduced as an educational approach focused on the student-centered method. In PBL, the students are given opportunities to explore their capabilities, build their confidence, and improve their motivation to prepare themselves for real work life. This research used a literature review as supportive evidence to measure the efficiency of PBL for teaching Civil Engineering students in semester 1 of the 2021/2022 academic year. Journals, books, and proceeding through computer and electronic databases are used as the basis for data collection. The result found that PBL is an effective and interesting approach that is suitable for teaching Engineering Students compared to traditional and lecture-based approaches. Moreover, PBL is appropriate to gain extensive knowledge of Civil Engineering concepts through intriguing learning activity that enhances the student's confidence and motivation for real-world projects in the future.

INTRODUCTION

English for Specific Purpose (ESP) plays a significant role for non-English department students due to their need of facing real work life. According to Hayland (2022), ESP has been widely adopted in many countries to better address the communicative needs of learners as students increasingly find themselves having to read, and often write, their subject papers in English. As stated by Fitria (2020) English is widespread, and it is becoming more and more important to learn English for Specific Purposes (ESP). The most important learner's purpose for learning English is to communicate a set of professional skills and to perform specific job-related functions.

In ESP class, students are required to learn about several terms related to their major interest in the university to enrich their vocabulary. Besides, they also learn about grammatical rules which are

integratively studied in four basic skills: listening, reading, writing, and speaking. According to Saragih (2014), ESP itself is a program that prepares learners to use English in academics (students of different fields), professionals (people of different professions such as doctors, engineers, and nurses), and workplace (technicians for example) settings. Indeed, according to Williams (2014), the goal of ESP is for learners can achieve competence in a specific domain of English and an essentially practical goal coming within the wider field of applied linguistics.

The materials for ESP classes are designed to fulfill the student's needs based on the scope of their major interest in learning. From the point of view of the teacher, teaching ESP is challenging yet interesting since the teacher is required to be creative and innovative in deciding the teaching materials to create a pleasurable teaching and learning atmosphere. This circumstance is believed to give greater

motivation to the students to learn about the materials although some students feel that English is difficult. Another way to build the students' interest in learning English is by creating a supportive teaching strategy that gives them an opportunity to explore their ability in the language. The teaching strategy which is applicable in ESP class must meet some criteria, such as expanding the student's knowledge related to their major interests, increasing students' confidence, building students' motivation, and giving benefits for their future. According to Jackson (2012), Project-based learning involves students in an extended process of inquiry in response to a real-world problem. Inquiry is key for PBL, students seek information and knowledge, starting by posing questions, problems, or scenarios. Students will identify and research issues and questions to develop their knowledge or solutions. PBL provides a way to learn deeply and respond real world. Students can think, solve the problem, and interact with friends or others. This method can apply to find a new way for real learning systematically with the teacher as a facilitator (Indarti, 2016; Purnasari & Sadewo, 2019).

In Engineering class, English is necessary due to their need to face real work life. Many Engineering terms use English since the theories of Engineering derives from a technical term in philosophy in Ancient Greek. Engineering students

need English to understand the theory, the design, and many engineering tools to support their knowledge. Therefore, it is necessary to find the most appropriate teaching strategy for them. Project Based Learning (PBL) is established as a teaching strategy that focused on the students' centered method. It is a teaching strategy that involves the students being active and creative learners. In PBL, the students are given the learning autonomy to decide as the start step then design the project and present it to the class as the final aim.

According to the research proposed by Jones et.al (2018), there are four major advantages to using project-based learning as a teaching method in engineering education. For starters, just like in a traditional classroom setting where manufactured issues are used, Project Based Learning encourages students to participate in addressing complicated, ill-defined real-world situations where multiple answers are expected. Second, project-based learning allows students to collaborate on ill-defined real-world issues, fostering critical thinking and collaboration skills. Third, project-based learning allows students to work on real-world problems, allowing them to develop skills that will help them succeed in their careers. Incorporating real-world scenarios into Project Based Learning motivates students to engage in active learning and promotes long-term information recall. Finally,

Project-Based Learning promotes the integration of theory and practice by demonstrating how perspectives can be used to discover solutions to ill-defined real-world situations. As stated by Kapusuz and others in the research of Terron Lopez, et al (2017), argue that project-based learning is a more effective approach for integrating institutional curricula and workplace skill requirements. Project-based learning (PBL) provides opportunities for students to build these qualities, as well as more deeply learn traditional academic content and understand how it applies to the real world (Larmer, 2015). Project-based learning not only positive learning outcomes but also helped the students to improve their cognition, work ethics, and interpersonal skills (Kettanun, 2015). Why PBL used as a teaching method is valuable in teaching writing because it effectively helps students improve communication and collaboration skills (Bell in Moyer, 2013). PBL also utilizes the communicative approach to language instruction in which students use the language to engage in meaningful tasks (Chamness & Mikulec in Moyer, 2013). Similarly, Masrom & Yusof (2013) argue that PBL is a method of language teaching which is designed to help students learn key academic content and practice variety of skills such as collaboration, communication, critical thinking, creating a high quality of authentic products and

presentations. Project Based Learning is a particular type of inquiry-based learning where the context of learning is provided through authentic questions and problems within real-world practices (Al-Balushi & Al-Aamri, 2014) that lead to meaningful learning experiences (Wurdinger, Haar, Hugg & Bezon, 2007).

Wu et al (2016), stated that PBL is a proactive learning methodology that has grown in popularity in engineering education (EE) due to its positive impact on student learning and engagement. The learner is central to project-based learning rather than employing a rigorous lesson plan that steers a student along a predefined route of learning objectives, project-based learning allows for an in-depth exploration of a subject. The technique has been described as one of the most successful engineering teaching methods in the literature. This method of instruction helps students develop their intellect, abilities, and perspectives (Swamy, 2022). Along with Swamy (2022), Fischer et.al (2019), described that Project-based learning is a broad method of teaching and learning in which students investigate real-world issues. While professors provide guidance to students throughout their project work, students become effective learners and participate in hands-on activities. As a result, project-based learning and teaching require a shift in perspective and role for both learners and lecturers.

This research is conducted to describe the effectiveness of the PBL method for teaching Civil Engineering students in semester one of the 2021/2022 academic year in ESP class. In short, this research described five steps of PBL applied in ESP class for Engineering students, first, establish content and skill goals, second, plan the scope of the project, third, design the instructional activities, fourth, develop the formats for the final product, and fifth, assess the project. At the end of the semester, the students are required to present their project in front of the class, this moment is used to measure the students' confidence and collaboration on meaningful projects that require critical thinking, creativity, and communication to solve complex problems.

RESEARCH METHOD

Ary, Jacobs, Sorensen, & Razavieh (2010), states that research design is the researchers' plan of how to proceed to gain an understanding of some groups or some phenomenon in their natural setting. In this research, the researchers used a literature review as supportive evidence to describe the appropriate PBL method for teaching Civil Engineering students. The process involves researching, reading, analyzing, evaluating, and summarizing scholarly literature. It includes locating relevant information sources and tools, such as; e-books, technical publications, review

articles, and online databases through the open-access website, as well as determining the appropriate amount and depth of data. The scope of this research is limited to the PBL application in ESP classes for Engineering students, however, the implementation steps of PBL in this research might be applied widely in other classes.

RESULT AND DISCUSSION

This research was conducted during the odd semester of the academic year 2021/2022 in ESP Class for Civil Engineering students to describe the implementation of PBL. It has shown greater results that PBL is effective to be implemented in this class due to several factors: its flexibility, its method, and its length of duration. PBL is suitable for teaching Engineering students since it gave the students the opportunity to explore their knowledge and apply their language skills at the same time. In the presentation session, the students are allowed to share their ideas, comments, and suggestions for the better improvement of the presenters' projects in the future. This peer-review assessment is significant to build the students' awareness of future projects. Indeed, PBL is applicable to be implemented in another class besides ESP due to its flexibility as a part of a teaching strategy to increase the student's critical thinking. The learning materials must be

selected carefully to make students interested and engaged in their knowledge. Projects should be based on solvable problems. Students must also recognize the significance of the issue. If the assignment isn't "interesting," students won't put in the effort to come up with a solution. It's difficult to come up with tasks that pique the interest and enthusiasm of the entire class. (Swamy, 2022).

The Application of PBL for Engineering Students in ESP Class

Engineering Education (EE) involves many aspects to support the aim of learning including the foreign language of English. In EE, English plays a significant role due to its need to analyze Engineering terms, Engineering tools, and engineering design. A future Engineer is expected to be active and critical in thinking to find the best solutions to current issues. In order to fulfill the circumstance, Engineering students need to learn effectively using the appropriate method to develop their ability and enlarge their knowledge. Considering PBL in ESP class as a part to achieve this aim is the right decision since the students not only apply their language skills but also involve their knowledge to complete the task. Producing a miniature product becomes the final project that needs students' critical thinking, collaboration, and creativity to achieve their goals of learning. In this research, 30 students in the

first semesters are involved and they are divided into five groups of six students. Each group is given a different task as the final project to gain various points of view based on the student's knowledge. This PBL is taken during the whole of semester one which consists of 14 meetings and the rest of the 2 meetings are employed as the Middle Test and Final Test.

The Implementation Steps of PBL for Civil Engineering Students

Pritchard & Nasr (2004), emphasize that English is of particular importance for engineering and science students because it is the principal international language of science and is looked upon as an effective means for enabling those students to become familiar with professional texts written in English. Along with the theory, the researchers conducted this research to improve the Engineering students' knowledge and spoken English skills through the PBL method. The steps are described into three phases; early semester as the pre-teaching activities, during the semester as whilst activities, and the end semester as post-teaching activities as follows.

1. Early semester -2 meetings (pre-teaching activities)

In this phase, the teacher prepared the learning materials for teaching Engineering English to the Civil engineering students. Before starting to teach, the teacher divided

the students into some groups to make the learning process run effectively. Since all students are 30, the teacher divided them into five groups of six. Each group is allowed to discuss and choose the product that they plan to design. The teacher shared the video as an example of how to make a final product that consists of a sky crapper, bridge, harbor, bypass, or house. Each group chose one product then they are given an opportunity to establish the content and skill goals related to their chosen product. They are allowed to learn, discuss, and share their knowledge to gather their idea. Early collaboration group work is started in this phase to gain one final decision. Once, they are done making the decision, they plan the scope of their project to decide the limitation of the product.

2. During the semester-7 meetings (whilst teaching activities)

In this phase, the students started to involve the instructional activities, such as gathering the idea, finding the theory as the supporting literature, and discussing the steps of how to make the product. During these whilst activities, the teacher as the facilitator encouraged the students to understand the learning procedure to help them remain on the course. The students started to design the scaffolding of the prototype based on the product example they found on the internet. Then they developed it using their creativity to make

it different from common products. The students also discussed the problems in their group and learned how to solve them. When they were ready to design the prototype, they developed the formats for the final product. This phase has taken the longest duration around seven meetings since the students need to share, discuss, and decide the steps to prepare the prototype.

3. End of the semester- 5 meetings (post-teaching activities)

In this phase, the students were ready to present their work. They were suggested to have a conference first with their own group as the first peer review. In this step, the peer-response technique is implemented. Each group was given an opportunity to present their work in front of the class. This phase covered five meetings depending on the number of groups. Each group spent one meeting for presenting, sharing, and providing time for questions and answer (Q&A) session by the end of the presentation. In this session, the students might give responses, comments, or suggestions to the presented group as the peer-feedback. The teacher also shared the opinion, comments, questions, and suggestions as the teacher's feedback both in oral and written form. Each group was also given a self-assessment as a reflection of their work.

CONCLUSION

Based on the research analysis during the odd semester of the Academic Year 2001/2022, Project Based Learning gave a significant effect on the student's improvement during learning English as Specific Purpose for Engineering students. PBL helped the students to increase their confidence and motivation during the pre-activities, whilst-activities, and post-activities. Each phase allowed students to understand the learning materials well, apply and design the prototype, and then present it in front of the class. Thus, this research's result will benefit engineering graduates and give significant perspectives on PBL to other researchers.

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