Project-Based Learning Design for Teaching ESP at Engineering Department of Politeknik Negeri Jakarta

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ABSTRACT

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Nowadays, English teachers must be creative to engage students to be more active and critical. Along with technology development, teachers are at ease with their jobs. This mini research aims to make a teaching-learning model of English subject for Specific Purposes (ESP) based on a project (PjBL) for being used in some departments of engineering at Politeknik Negeri Jakarta (PNJ), namely: Civil Engineering Department, Electrical and Electronic Department, IT Engineering Department and Mechanical Department. Such a model has not been made yet before. This research used the descriptive qualitative method. The data was taken from the questionnaires and interviews. The data was analyzed and the design of PjBL and a job sheet as well were made. The outcome of this research is a kind of teaching-learning model design which will hopefully be going be used as a standard for English teachers of engineering for ESP teachers at Politeknik Negeri Jakarta.

INTRODUCTION

Project-based learning (PjBL) has been strongly suggested by the Ministry of Education and Culture of Indonesia where students are given more time and space to explore more knowledge and skills. Nowadays, students have the freedom to get more experiences outside the formal classroom (Grant, 2002). Furthermore, according to Grant, this kind of activity in which students may be trained to think both actively and creatively. Teachers just do a monitoring activity on what progress of the students' project being done (Wrigley, 2003).

Moreover, PjBL is a kind of model which can challenge both teachers and students to create critical thinking and build collaborations among them (Harris & Allen, 2022). This is what the sort of 21st-century educational system is about. Along with this statement, the 21st-century educational systems have many academic and social benefits (Nollmeyer & Torres, 2022). They

say that students will be actively engaged in the teaching-learning process to achieve the goal. They can also share their knowledge and experiences (Kokotsaki, et al, 2006). PjBL also explores students' curiosity about something (Guo, et, al, 2020).

Meanwhile, such models were frequently found at the secondary level (senior high school). One researcher from Indonesia has been using this model design for teaching students in senior high schools (Windari, 2017) and another Indonesian teacher had used this model for teaching reading skills (Fitria, 2016). Others are also actively using such models in teaching many kinds of fields, such as Arabic language (Fitriani & Arifa, 2020), Geography (Deasy, et al, 2020). These practices are supported by Harris and Allen (2022) saying that learning model design based on project (PjBL) is very crucial to assist teachers' duty to build the students' creativity. Among the research above mentioned, there is no such design for vocational students at the tertiary level.

Since there is not yet a standard for teaching-learning model design based on project (PjBL) in vocational higher institutions (especially at Jakarta State Polytechnic), this study was conducted. Teachers of English do not have guidelines for such assignments for the student. Therefore, PNJ needs to create PjBL model design for teaching ESP in the Engineering Department.

METHODS

This research used a descriptive qualitative method. This method would explain how the process worked and resulted in the description of what we wanted to achieve (Miyarso, 2004). It would also focus on the details of what, when where and why an experiment or research was conducted.

The procedures of the research began with surveys and interviews. This activity aimed to know how English teachers did their teaching-learning process. There were about 10 English teachers in Engineering Department as respondents who were asked to fill out the questionnaires given in google forms, however, only 8 were sent back. This was because one teacher was already retired, and another teacher was hospitalized. This process continued by giving some interviews to them. Indeed, they gave assignments, but it was not structured. It meant that there were no guidelines to do PjBL.

The learning strategy should follow as stated in the chart below which says that there are three learning goals: key knowledge, understanding and success goals. Based on these goals, teachers must equip students with sufficient knowledge and skills. The seven steps, consist of: (1) formulating the expected learning outcome, (2) understanding the concept of the teaching materials, (3) skills training, (4) designing the project theme, (5) making the project proposal, (6) executing the tasks of projects and (7) presentation of the project report.
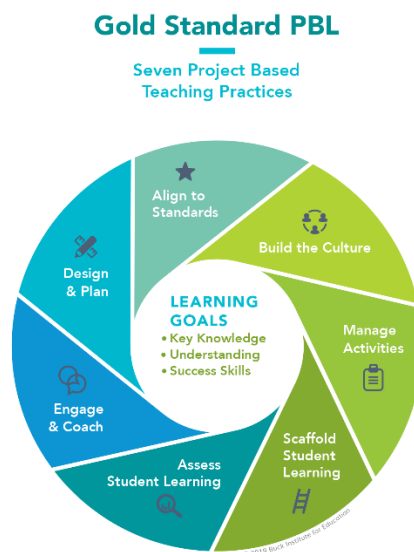
Chart 1:   Learning Strategy of PjBL
            (taken from Buck Institute of Technology-2019)

Following this was to see the results of the questionnaires. The results were classified and analyzed by the team. Then it was discussed together with those respondents in person in a kind of FGD (Focus Group Discussion). This was conducted to know how they did and implemented the syllabus in the classroom. Furthermore, to discuss how it should be to make a learning model design based on a project (PjBL model) for engineering students. The result of FGD was the learning strategy of PjBL which can be seen in the flowchart below. This flowchart explains that the strategy starts with the formulation of the goals of the project. Teachers must determine the goals first to know where the students will be headed to.

After teachers set goals, teachers start to design what the students must do. This design must relate to what they have studied or learnt during the semester. Teachers should start with these questions related to the topics being taught. Some of the questions are: what have the students learnt for the first four weeks? Do they understand? Do they know how to make an electrical bell? What language unit will be used, etc.? Teachers must explore more about the kind of engineering and language skills that students have. By doing these, teachers will also know students' needs. Engineering skills and language skills must be interconnected, so they will be skilful in both fields. Teachers have to make students understand the language unit being used, for example, it uses passive voice when making reports.

After making some basic questions related to the topic, teachers will give certain periods (let's say: 2 weeks). During this period, teachers will do monitoring and teachers will give comments or feedback on what students have done. The following week, students will come with the project and explain what they have done and teachers give scores to students and evaluations. In this meeting, students may make arguments if there is a question or problem raised. By doing this, students' critical thinking and collaboration are built. The learning model of PjBL below shows how procedures must be followed as the guidelines. The model below was made with the topic of Tools and Properties. It can be seen as follows:

No.	Steps of PjBL	Details
TOOLS & PROPERTIES		
1.	Basic questions	Mention the tools and instruments in the laboratory and workshop.
		Mention the parts of each tool and instruments
		Describe the materials of the tool parts
		Describe the function of the tool instrument
		Describe the properties of the materials of the tool parts.
		Language unit:
		Tools
		Properties of material
		Degrees of comparison
		Passive voice
2.	Project Planning design	Giving assignments to students
		Asking the students to make ppt, and video which should be uploaded to e-learning or other media (channel youtube)
3.	Project Timeline	Week 13:
		Giving Project
		Explaining language unit
		The project includes paper, ppt, and video
		Week 14:
		The lecturer monitors the project
		Students may ask questions if they have problems
		See the progress
		Week 15:
		Evaluation
		Giving scores and comments
4.	Monitoring and evaluation	Week 15: Monitoring and evaluation

Table 1:   Model Design of PjBL

If the above table is the procedures that teachers should follow when designing the learning model design for teaching ESP. By following this, teachers will be guided systematically, and students will understand clearly the task they have to do. Students also have the freedom to manage their time in completing their tasks.

The activities above are along with the design model in the 21st century proposed by George Lucas Foundation (2005) which can be seen as follows:

Framework 21st Century skills	IP-21CSS	Aspects
Creativity, Thinking and Innovation	4Cs	-Thinking creatively -Work Creatively -Innovation Implementation
Critical Thinking and Problem Solving	4Cs	-Effective thought -Systemically thinking -Problem-solving
Communication and Collaboration	4Cs	-Make clear communication -Make good collaboration with others
Information, Media, and Technology Skills	ICTs	-Access and evaluate information -Use and manage information -Analysis and produce media -Technology application effectively
Life and Career Skills	Character Building	-Perform a Good Scientific Attitude -Show the acceptance of the public moral value

Table 2:   Design Model in the 21st century

The table above explains that the teaching model in the 21st century should include the 4Cs (Creativity, Critical, Communication and Collaboration). Not only that, but it should also include ICTs (Information. Media, and Technology skills), character building and social values. Of course, this is not easy for teachers to teach students all the elements to be potential human resources who are qualified. By giving PjBL, these elements will be implemented automatically in students' thinking processes and will become a habit.

RESULTS AND DISCUSSION

Based on the data of the questionnaires, it says that ESP is given to the students in semesters 3 and 4 for 3 (three) hours per week. This varies because every department has its policy to determine it. After all, it depends on their needs. There is the uniqueness of lectures' mapping during the semester. Sometimes the classes are blocked with some lectures at the workshops for half of the semester. The rest of the semester is for English subjects. So English subject is not treated as the main subject, it is only a supporting subject.

As it is mentioned earlier, English subject is mostly given 3 hours/week in every department, therefore. English teachers must be tactful to manage their time to achieve the goal which has been set up in the syllabus. In practice, English teachers may think this is too hard to catch up. Therefore, they have various strategies to finish all materials on time during one semester. What they mostly do is give assignments outside the classroom. They give students one or two weeks to complete the assignment. The assignments mostly are to make a video or make a presentation on a certain topic. These can be seen through data from the respondents. The activities done by students can be seen in table 3:

Names	Activity	Implementation
Respondent1	group/individual	presentation
Respondent 2	group/individual	video/poster
Respondent 3	group/individual	presentation
Respondent 4	group/Individual	presentation
Respondent 5	group/individual	presentation
Respondent 6	group/individual	video/poster
Respondent 7	group/individual	presentation
Respondent 8	group/individual	video/poster

Table 3:   Class activities

Table 3 explains how most activities have been done during one semester. Teachers must train students' skills and manage their time very well at the same time. What most teachers do is give students a project. They will collaborate in a team and explore their knowledge as well as their skills. As seen in table 3, teachers asked the students to work whether in groups or individually. It depends on the difficulties of the project. Then students are asked to do the project and present it the following week or they can upload the video on YouTube or personal social media, such as Facebook (FB) or Instagram (Ig). This kind of activity will give them space and time to be more creative.

This process will make students more enthusiastic about what the next project will be. Not only that, but students will also share their experiences when they were doing the project. They will discuss and share problems and solutions. The summary of those activities can be seen in table 4. The learning model of PjBL below shows how procedures must be followed as the guidelines. The model below was made with the topic of Tools and Properties. It can be seen as follows:

TOOLS & PROPERTIES		
No.	Steps of PjBL	Details
1.	Basic questions	- Mention the tools and instruments in the laboratory and workshop. - Mention the parts of each tool and instruments - Describe the materials of the tool parts - Describe the function of the tool instrument - Describe the properties of the materials of the tool parts.
		Language unit: - Tools - Properties of material - Degrees of comparison - Passive voice
2.	Project Planning design	- Giving assignments to students - Asking the students to make ppt, and video which should be uploaded to e-learning or other media (channel youtube)

3.	Project Timeline	a. Week 13:
		  - Giving Project
		  - Explaining language unit
		  - The project includes paper, ppt, and video
		b. Week 14:
		  - The lecturer monitors the project
		  - Students may ask questions if they have problems
		  - See the progress
		
		c. Week 15:
		  - Evaluation
		  - Giving scores and comments

4.	Evaluation	Week 15: Evaluation

Table 4:   Model Design of PjBL

The above table is the procedures that teachers should follow when designing the learning model design for teaching ESP. By following this, teachers will be guided systematically, and students will understand clearly the task they have to do. Students also have the freedom to manage their time in completing their tasks.

It also explains the implementations and how the project must be done. Students must follow the timeline that teachers have given. By using this timeline, students will be taught to be strict on schedule and discipline. Table 3 is also an example of a project (how to make an electrical bell). Students had already studied this in their workshop and teachers just dig up what they have done by explaining in English.

In addition, teachers may use the job sheet when students are making the project. This form is used to monitor how far the project is going. The job sheet must be filled out by students about how the project is done. Below is the example of the job sheet as the complementary of the model design of PjBL:

Title	Design and build an electric bell
Aim	To implement the theories of numbers and shapes being learnt in weeks 2-5
Week	6th-8th week
Topic/s	1. Describing Numbers 2. Describing Shapes and angles
Language Unit	1. Describing Functions 2. Describing Formulae 3. Simple Present Tense
Class	EC3 D
Name of Group (group of 3)	Group 2
Tools and Materials being used	1. 2. 3.

	4.
	5.
Procedures	1.
	2.
	3.
	4.
Result	An electric bell with various shapes
Description of result	1.
	2.
	3.
	4.
Notes from teachers	1. A group must design their specific bell with various shapes and measurement
	2. Do not copy from others
	3. Every member of the group must collaborate
	4. Each group must present the result

Table 4:   Job Sheet

The job sheet above guides the students on how they should make the project assigned. Teachers have already given the rules on how they must do it. They are not allowed to violate those rules written in the job sheet. If it happens, teachers will give the punishment, such as the score being cancelled, or the students being suspended. Other things that are stated in the job sheet are the information on why and how students implement the theories that they have learnt in the classroom. They will understand more by doing the project.

Furthermore, students will give more time and space to explore their capabilities, not only their knowledge of engineering but also the English language. They will learn more by practising what they have understood and solving the solutions to problems they are facing in the making process. Teachers just monitor what students are doing and give suggestions if they need them. This is a kind of creative teaching-learning where teachers and students are not having burdens in learning and doing something.

CONCLUSION

By using the learning model design above-mentioned, English teachers are expected to have guidance and this may ease their burdens to make their students think actively and critically. It is also suggested that this model would be a standard to teach ESP and give students assignments based on the project at PNJ. It is hoped that the PNJ graduates would become the best human resources who are smart, resilient, and have the good character that the industry needs. This is not easy indeed; however, it could be built step by step by working hard.

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