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Designing Project-Based Learning in Research Proposal Writing: Its Effect, Problems, and Scaffolding Utilized

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Abstract

Project Based Learning (PBL) is highly important to be suited to the student's needs as a guide in writing research proposals. The objectives of the study were to (1) describe the PBL design based on the students' needs, (2) identify the problems encountered during the project writing, (3) describe the scaffolding utilized, and (4) analyze the effect of PBL implementation on the quality of students' research proposal. The research used mixed methods in the form of a research and development design using the ADDIE model (which consists of steps of analyzing needs, designing the product of PBL, developing, and implementing it, and conducting evaluation). The participants were 20 respondents during the needs analysis, two lecturers, and three intact classes of 69 students during PBL implementation. Data were collected through questionnaires, interviews, a document study, and an experiment. A needs analysis was conducted using the Organizational Element Model (OEM), from which

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the PBL was developed. The data were analyzed using qualitative and quantitative analyses. The findings revealed that the PBL designed based on students' needs has characteristics such as it is in the form of a framework and has systematic stages of teaching, being technology friendly, and being supported with various scaffoldings. The problems encountered concerned both grammar and content. The implementation of the PBL framework was found to have a significant effect on students' research proposal writing in Research Method Course and develop their independence and learning autonomy.

Keywords: Project-Based Learning, research proposal writing, research proposal.

1. INTRODUCTION

Project-Based Learning (PBL) is extensively recognized and utilized in education, and it is one model that regulates learning using projects. In other words, PBL is one form of learning that governs instructions via project-based activities. In most cases, projects comprise complex assignments based on challenging essential questions or problems that require students to engage in design, problem-solving, decision-making, or investigative activities over an extended time, culminating in a final product or presentation (Almulla, 2020; Mikulec and Miller, 2011). When students complete their projects, they individually reflect on their experiences of the project-based learning process. PBL can utilize thinking skills and problem-solving abilities and increase students' creativity in pursuing the project (Guo et al., 2020).

PBL focuses on developing higher-order thinking skills to increase the quality of the learning process and outcomes (Choi et al., 2019; Kızılkapan & Bektaş, 2017). Through PBL, students participate in communication focusing on completing authentic activities assigned in project work, allowing them to use language in a reasonably natural setting (Yuliani & Lengkanawati, 2017). The nature of PBL, which allows students to practice communication, collaboration, critical thinking, creativity, and problem-solving skills over the content of the subjects, makes it an appropriate approach to teaching how to write a research proposal for university students and pre-service teachers.

Competency in writing a research proposal and research report plays a crucial part in higher education, which builds a graduate's competence to have scientific knowledge and expertise as a partial requirement before finishing a university degree in Indonesia, and competency needed as a teacher. This statement is consistent with the Indonesian Ministry of Education and Culture policy, which states that the top priority in higher education over the next five years will be developing excellent human resources for future leaders. Quality human resources need to possess the core competencies of 6C, such as communication, collaboration, creative thinking, critical thinking, computational logic, and compassion (Nurwardani, 2020). Consequently, teaching and learning must be able to prepare students to possess the 6C (Khalil, 2019). It is also a priority for the graduates to become agents of their learning to carry out learning autonomy, be self-regulated, have high reasoning ability, and solve problems. These can be practiced well through a project of writing a research proposal.

In learning, scaffolding refers to providing temporary assistance for completing a task that learners would otherwise be unable to finish. This assistance can take several forms, including modelling and questioning for various subjects (e.g., science and social studies) at various ages (Belland et al., 2013; Gülbahar & Tinmaz, 2006; Little, 2019; Radford et al., 2013; van de Pol et al., 2010). PBL sometimes contains complex tasks; therefore, the instructor should provide scaffolding activities to assist students in establishing learning goals. In the context of classroom interaction, the term scaffolding refers to the temporary assistance or support that teachers provide for their students to help them complete a task or develop new understandings so that they can later complete similar tasks on their own (Belland et al., 2013; Gülbahar & Tinmaz, 2006; van de Pol et al., 2010). In this research, the fundamental principles of scaffoldings previously mentioned are used as references on how to offer scaffoldings to help students succeed with their project of writing research proposals.

1.1 Problem of the Study

The preliminary research conducted through interviews with university lecturers and students in Bali and Lombok showed that there was no PBL guideline for teaching a Research Method Course with an intended learning outcome of writing a research proposal. Most students found it challenging to write research proposals. Therefore, it is crucial to design a PBL framework that can guide lecturers to teach and assist the students in their proposal writing projects. The framework comprises essential teaching steps, and can be further developed based on the settings and their creativity.

Following the assumption that students will be able to become agents of their learning and possess the 6C outlined previously, the application of PBL supported by constructivism seems to be highly significant for use in teaching students to write a research proposal. The constructivist view of learning reflects how individuals make meaning of their experiences (Taber, 2011b) which involve many problem-solving activities. This idea is predicated on the notion that problem-solving is concerned with assisting individuals to think, learn, and grow (Ummah et al., 2019). In this project-based learning, the learning process revolves around students working in groups, cooperating, observing, investigating based on open-ended questions, and using their knowledge to create products (Suswanto et al., 2019).

A substantial amount of research has been undertaken on PBL in Indonesian education settings in the context of English as a foreign language (Artini et al., 2018; Haniah et al., 2021; Rozal et al., 2021; Syakur et al., 2020; Yuliansyah & Ayu, 2021). However, none of those studies investigated the use of online PBL for research proposal writing preceded by needs analysis, despite the results reconfirming that project-based learning had sound and significant effects on students' accomplishments. A study dealing with writing research proposals by Kheryadi (2018) mainly focused on students' problems in writing the introduction of a research proposal. It did not cover problems in dealing with other aspects of research. A similar study by Susanti and Mahaputri (2022) revealed that university students encountered problems with all research elements, not only writing the introduction. The data were collected solely by using a questionnaire with Likert-type options. Despite the similar focus of research, the data collection instrument only relied on a questionnaire, so the trustworthiness needs further exploration. Realizing the problems faced by the students, the usage of scaffolding needs to be empowered and essential for further

investigation. Work on the effectiveness of scaffolding in supporting students in writing that is available in the literature reveals that scaffolding helps students in their writing (Dewi & Iswandari, 2017; Vonna et al., 2015). Although many studies confirmed the scaffolding's effectiveness in improving students' writing achievement, no studies investigated its usage in writing research proposals for students majoring in English in Indonesia who are required to write in English as a foreign language.

1.2 Learning to Write a Research Proposal through Project-Based Learning

A research proposal is a plan of action showing the researcher's thoughts. It is written in a formal and detailed description of the intention to conduct research (Nte & Awi, 2006). Writing a research proposal for a thesis requires adopting a scientific and organized writing process. It seeks to discover, establish, and advance particular knowledge. Additionally, it assesses and plans anything deliberately intended to persuade the readers and get them to accept the researcher's solution (Gay et al., 2012). Writing a research proposal is sometimes taught as a separate course or as an entailment of other courses, such as the Research Methods class. Some students admit that proposal writing is very challenging and often requires much time to finish the proposal. Students often have problems with the aspects of the research proposal, such as in writing an introduction, literature review, methodology, and other components (Susanti & Mahaputri, 2022).

Project-Based Learning (PBL) is a powerful teaching and learning method based on constructivist learning theory. The constructivist viewpoint on the nature of learning examines how individuals generate meaning from life events (Taber, 2011a, 2011b). According to Alzahrani and Woollard (2013), the basic tenet of this theory is that problem-solving assists individuals in their capacity for thought, learning, and overall development. The theory of constructivism postulates that students' ideas of what constitutes knowledge are the product of a quest for meaning that compels students to actively participate in developing unique interpretations of their own experiences (Applefield et al., 2000).

As a learning strategy, PBL focuses on activities that attempt to produce learning outcomes through project work. It is a technique and approach for gaining 21st-century skills (Bell, 2010). It is gaining popularity in education and enables students to actively engage in problem-solving (Kızıkcapan & Bektaş, 2017). Mikulec and Miller (2011) define a project as a series of interrelated tasks based on challenges that students face, are completed over a predetermined period, and result in real-world outcomes such as presentations, exhibits, and other examples of students' performance.

Larmer (2014) outlines 6 phases of PBL: (1) Establishing core questions; (2) Creating project plans; (3) Creating activity schedules; (4) Monitoring student work and project progress; (5) Evaluating project success, and (6) Reflection. These six phases are the bases of implementation in this study. Conceptually, PBL is a method rooted in constructivist theory, which emphasizes the creation of the project as the outcome of learning and has a specific syntax to follow.

1.3 Research Questions

Scaffolding strategies are essential to help students achieve their learning outcomes. The importance of scaffolding acknowledged by experts, the effectiveness

of utilizing PBL, and the gaps left un-explored in previous research have inspired researchers in this study to utilize PBL in combination with scaffolding in the Research Method Course so that students are expected to gain better competence in research and write a research proposal more effectively. Accordingly, the research questions are:

1. What are the characteristics of the PBL designed based on students' needs?
2. What are the students' difficulties in writing the research proposal during PBL implementation?
3. What kinds of scaffolding techniques in PBL can assist students in completing their research proposals?
4. Is there any significant effect of implementing needs analysis in PBL on the quality of the student's research proposal?

After reviewing the previous concepts and empirical studies, this research confirms its novelty by filling the gap that the PBL was designed using needs analysis and provided with scaffolding to solve the problems encountered by the students. All the concepts reviewed led the research in answering the research questions with a clear theoretical basis. With this focus, the PBL is expected to significantly impact and contribute to the improvement of the quality of the students' research proposals. At the same time, the PBL framework designed in this study can also be used as a reference in teaching a Research Method Course for students majoring in English in Indonesia.

2. METHODS

The study employed a mixed method of Research and Development study using the ADDIE model (Kurt, 2018) to answer the first research question. This model comprises 5 steps: **A**nalysing students' needs, **D**esigning the PBL framework, **D**eveloping the PBL framework, **I**mplementing the product, and **E**valuating the product's quality and effectiveness. The needs analysis utilized a questionnaire, interview, and document analysis. It was designed based on Organizational Element Model (OEM) by Gupta et al. (2007) for needs analysis which is presented in Table 1.

Table 1. OEM Model.

	Context	Input	Process	Product
The expected conditions				
Current conditions				

Using the OEM model, a blueprint of the instrument was developed. The blueprint is displayed in Table 2.

Table 2. Blueprint of instruments for needs analysis.

Variable	Indicators	Items about the current condition	Items about the expected condition	Source of data
Context	Availability of regulation as a basis	1.1	1.1	The questionnaire, document analysis, interview
	Availability of guidelines for PBL	1.2	1.2	
Input	Readiness of the lecturers	2.1	2.1	
	Readiness of the students	2.2	2.2	

Table 2 continued...

Process	Planning	3.1; 3.2; 3.3	3.1;3.2;3.3	The questionnaire, document analysis
	Implementation	3.4;3.5 (1.,2.,3.,4.,5.,6.,7.,8.); 3.6.,3.7.,3.8	3.4;3.5 (1.,2.,3.,4.,5.,6.,7.,8); 3.6.,3.7., 3.8	The questionnaire, observation
	Assessment	3.9;3.10;3.11.;3.12.	3.9;3.10;3.11.;3.12.	The questionnaire, document analysis, interview
Product	Students' achievement	4.1	4.1	The questionnaire, document analysis, interview
	6C skills	4.2	4.2	
	21 st -century skills	4.3	4.3	

The questionnaire needed for identifying needs for PBL consisted of 28 closed-ended questions that were elaborated based on the blueprint in Table 2 and provided with an open-ended questions to collect additional data or information that might not be included in the closed statements. The questionnaire was validated by two experts that must meet the criteria that they hold a doctorate, teach research methods courses, and have experience using PBL. The results of the experts' judgment showed that the questionnaire has highly valid, with an index of 1.0 using the Gregory Formula (Gregory, 2000). The respondents to the questionnaire were 20 lecturers in the English Language Education Department from six universities in Bali and Lombok Island, Indonesia. All respondents teach English at those universities and are familiar with PBL. The selection of the six universities was based on the criteria that they are state universities with a minimum of B accreditation results, and have an English Language Education Department.

The subjects of the study were three classes of 69 sixth-semester students and two lecturers. The lecturers were chosen using a purposive sampling technique based on the criteria that they teach Research Methods Courses, hold a doctorate, and had the experience of using PBL technology and a learning management system (LMS), while the students were chosen randomly in intact classes where they belong, using the criteria that they were attending Research Methods Course and were willing to be participants in the research.

To answer the second research question, the researchers used interviews and a list of questions to explore students' problems. Besides using interviews, the data collection also utilized classroom observations towards implementing the designed PBL for one semester to answer the third research question, and evaluated its effect at the end of the semester to answer the fourth research question. The evaluation of the quality of the proposal was based on a rubric comprising every aspect of the proposal (see Appendix).

Triangulation was conducted in which the data were collected from several sources such as questionnaires, interviews, document studies, and observation. These data were analyzed both qualitatively and quantitatively using descriptive statistics and supported with inferential statistical analysis in measuring the results of the implementation.

3. RESULTS

3.1 The Characteristics of PBL Designed for Teaching Research Method Course

The product of this study comprises two primary parts: conceptual material about the nature of PBL and examples of activities completed with templates for each teaching step. Table 3 presents the characteristics of the PBL framework.

Table 3. The findings about the characteristics of PBL designed for teaching the Research Method course.

No	Steps	Time	Remark
1.	Class orientation	1 st week	Every student submitted a proposal draft as a baseline for his initial understanding of the research.
2.	Asking an essential question: How is research carried out? What is the title of the research you read? What steps of research must be implemented?	1 st week	Students were also recommended to explore examples of research reports/articles.
3.	Scheduling: Orientation: first week.	1 st week	Conducted online through Zoom meetings, and all documents (syllabus, lesson plan, Assignment Plans, Contract, and learning sources) are posted in the LMS.
	Exploring the concept of research, the title of own research, deciding the steps of research.	2 nd -3 rd week	Classroom Zoom for a short explanation; self-independent study and optional consultations either in person or via WhatsApp.
	Exploring the theories and empirical studies to be used for individual research.	4 th week	Self-independent study and optional consultation.
	Deciding the research design of my research.	5-6 th week	Learning through examples, videos, and e-books in the LMS, classroom clarification, and discussion.
	Identifying population and techniques for selecting samples.	7 th week	Classroom discussion and self-independent study, watching videos and e-books provided in the LMS.
	Identifying the instruments and analyzing the kinds of instruments used for own research, and analyzing how to guarantee the reliability and validity of the instruments.	8 th -9 th week	Classroom discussion and self-independent study, optional consultation.
	Exploring resources for deciding the process of data collection of own research.	10 th week	The self-independent study, discussion, and presentations.
	Discussing the process of data analysis.	11 th week	The self-independent study, classroom discussion/presentations.
	Discussing proposal writing.	12 th -14 th week	Independent study, applying self-assessment for self-monitoring.
	Final project: Research Proposal	15 th week	Finalizing the proposal draft.

Table 3 continued...

4.	Monitoring	Along the semester	Formative informal assessments on every element of the proposal.
5.	Assessing the establishment of the Project Based Learning	15 th	Students upload the final version of the proposal.
6.	Reflection	16 th	Classroom discussion and reflection as the ending procedure of a semester teaching-learning process.

This PBL was implemented in a Moodle-based learning management system as one of the LMSs used for the classroom, and it was paired with synchronous learning via the Zoom program.

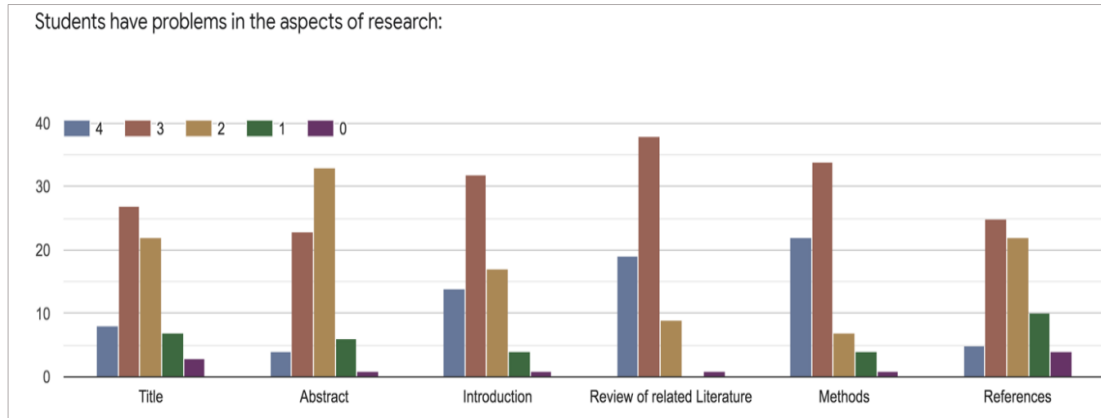
3.2 Problems as Perceived by the Students

An interview and a list of open-ended questions were used to collect data on students' perceived problems. The findings are presented in Table 4.

Table 4. The problems faced by students in studying Research Methods using PBL.

Kinds of problems perceived by the students	Excerpt of students' responses
Title	"It is difficult for me to find a title that has a unique value for my proposal". "I often have difficulty in deciding the title or making a good title research because I cannot determine suitable words for making a title".
Abstract	"I'm having difficulty in finding several important and main points in making the abstract". "It's still difficult to design words and adjust so that the abstract is not too long".
Introduction	"In making the introduction, the thing that makes it difficult is determining the gap from one paragraph to another so that they are interconnected. Besides that, another difficulty is where we have to cover all things related to the research topic".
Review of Related Literature	"The difficulty that I face when writing a review of related literature is when looking for references and when paraphrasing and also determining what will be included in the literature review".
Reference	"Accurate and reliable references are difficult to obtain for free, writing references in a good and correct format is also not well understood".

There were two categories of problems found: those with grammar accuracy and those with an understanding of the research content (see Figure 1). Students also demonstrated a lack of skill in writing research values and focus because they lacked critical thinking skills, such as how to review previous research and identify gaps in the current research. The difficulties also dealt with writing citations in the body text. Several students also still found difficulties in deciding the study's design and the instruments.



4 (always), 3 (often), 2 (sometimes), 1 (rarely), 0 (never)

Figure 1. Problems encountered by students when writing research proposals.

These problems were in line with the data of the problems perceived by the students as collected through interviews. However, with the various scaffoldings provided during the process, the students finally finished their proposals.

3.3 Scaffolding Implemented in PBL

Based on the monitoring results and the student's responses to their problems, some scaffolding activities were provided, as listed in Table 5.

Table 5. Scaffolding utilized.

Scaffolding	Description	Purpose
Providing guideline questions	The essential questions guide students on what to learn and find the information independently.	Students develop their capacity for independence via practice in self-directed and problem-based learning while promoting autonomous learning.
Providing an example	The lecturers provide an example of a research outline on critical vital elements of a research proposal.	This technique allows students to learn by example and develop new knowledge about writing the research proposal.
Class orientations and scaffolding discussion	The lecturers delivered class orientations on similar errors and problems detected through monitoring processes, which were complemented by student-led discussions to find solutions.	The goal is to identify the difficulties at one stage to solve the problem immediately so that it is easier for the students to understand the following research stages.
Providing opportunities for personal consultations	Individual student consultations are permitted if deemed essential.	Some students find it more beneficial to have in-depth consultations regarding their problems.
Coaching via WhatsApp-based consultations	Students are supplied with individualized support, a continuous procedure that facilitates the development of a particular feature of a research proposal.	The support is tailored to the student's issues and difficulties, making them feel at ease and motivated.

Table 5 continued...

Implementing self-assessment as a self-monitoring process	The students self-assess their proposals using the self-assessment instrument provided by the lecturers.	Self-assessment takes the form of leading questions, which are designed to guide students through the process of engaging in self-reflection. The reflections were simultaneously aimed at evaluating the proposals based on which they were constructing their new knowledge.
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Table 5 illustrates that the scaffolding is multifaceted, adjustable to the needs of the students, and continued until the fulfilment of the research proposals as the ultimate result of PBL. Table 6 displays the example of scaffolding used.

Table 6. Examples of scaffolding.

Title of your research	Model of teaching English to young learners at an inclusive school
Research questions	What kind of inclusive education was conducted at SD 2 Bengkala in North Bali, and how was the inclusive education system used to teach English? How did the teacher teach English to students with special needs at SD 2 Bengkala? What were the English achievements of the special-needs students taught in the inclusive school at SD 2 Bengkala? What were the challenges faced by the teachers in teaching them English?
Theories and empirical studies	Inclusive education and its type Methods of Teaching English in inclusive schools Special needs students, types, and characteristics Assessment and its types used for special needs students
Methods	Design: Qualitative research design Data collection: In-depth observation; interview, a document study, performance assessment Data analysis: primarily descriptive qualitative analysis supported by descriptive statistics

In addition to providing students with a model to emulate, self-assessment questionnaires were also provided, as shown in Table 7.

Table 7. A self-assessment instrument as scaffolding.

Element of your assignment	Leading questions for assisting students to carry out self-assessment/self-reflection
Title of your research	Is the title clear? Is it researchable? Is the focus/keyword (s) clear? Is the title direct, accurate, appropriate, attractive, precise, unique, and not misleading?
Research questions	Are the questions clear and do not create misunderstanding? Is the question focused, clearly stating what the researcher needs to do? Are the questions able to fill a research gap? Are they researchable and feasible?
Purpose of the research	Are they in line with the research questions? Are the verbs of actions utilized to represent the level of depth of analysis you carry out?
Rationale	Have you provided sufficient introductory paragraphs to start your rationale? Have you clearly explained the gap and novelty of the research that your study will address? Have you explained why it is essential to address the gap?

Table 7 continued...

Significance of your research	Is the research meaningful to the targeted samples/populations and related stakeholders? Is the research giving any meaningful significance and contribution?
Review of related literature	Have you provided a good review of the literature about the focus of the research? Is the empirical review critically discussed, showing advanced thinking and knowledge? Is the review accurate, comprehensive, and rigorous? Have you maintained originality?
Steps of conducting your research	Is the design chosen appropriately to answer the research questions? Are the steps written appropriately in the context of the design you choose? Are all aspects of the methods sufficiently described?

The interview showed that scaffolding in the form of leading questions was beneficial in identifying the difficulties faced in each proposal aspect. The students admitted that scaffolding served as a guideline for what should be included in the proposal.

3.4 The Effect of Implementing the Needs Analysis based PBL on the Quality of the Students' Research Proposal

To measure the effectiveness of the PBL implementation on the quality of the student's research proposal submitted at the end of the semester, the lecturers rated the final proposal draft (post-test) and compared them with the proposal draft outlined in the first session at the beginning of the semester (pre-test), as shown in Table 8.

Table 8. The results of the descriptive analysis.

		1 st group pre-test	1 st group post-test	2 nd group pre-test	2 nd group post-test	3 rd group pre-test	3 rd group post-test
N	Valid	21	21	27	27	28	28
	Missing	0	0	0	0	0	0
Mean		60.8571	80.8524	62.0000	83.5500	60.8929	82.8518
Std. deviation		2.85106	3.61108	2.80110	3.96700	4.91663	5.42729
Variance		8.129	13.040	7.846	15.737	24.173	29.455
Range		9.00	12.80	7.00	15.00	15.00	19.50
Minimum		56.00	74.15	58.00	74.55	50.00	69.10
Maximum		65.00	86.95	65.00	89.55	65.00	88.60

By looking at the mean score, the post-test scores of the three classes were higher than the pre-test scores. For further inferential analysis, the normality distribution of data was conducted using a Shapiro-Wilk analysis of normality. The results are presented in Table 9.

Table 9. Normality distribution of data.

Group	Shapiro-Wilk
1 st Group pre-test	.007
1 st Group post-test	.471
2 nd Group pre-test	.000
2 nd Group post-test	.221
3 rd Group pre-test	.000
3 rd Group post-test	.002

The data are normally distributed if the Sig value shows $>.05$. From Table 9, it can be seen that the Shapiro-Wilk values for all groups were not above 0.05. It can be said that the data were not normally distributed. When they were not normally distributed, a non-parametric test was used to identify the mean scores between groups and whether or not they were significant. The Paired Sample Wilcoxon Signed Rank Test results are presented in Table 10.

Table 10. Paired sample Wilcoxon Signed Rank test.

Results	1st Group	2nd Group	3rd Group
Total N	21	27	28
Test Statistic	231.000	0	406.000
Standard Error	28.766	83.5500	43.910
Standardized Test Statistic	4.015	3.96700	4.623
Asymptotic Sig. (2-sided test)	.000	15.737	.000

A significant mean difference is indicated if the value of Asymptotic Sig. (2-tailed) is lower than $.05$. From the result, it can be seen that value of Sig. (2-tailed) was $.000$ for all groups which was lower than $.05$. This indicated that the groups had a significant mean difference. Thus, it can be concluded that there was a significant mean difference between the pre-test and post-test. An effect size test was also conducted to identify the magnitude of the effect. The results of the effect size test of Cohen's d are presented in Table 11.

Table 11. Effect size test.

Group	Cohen's d
1 st Group	6.146
2 nd Group	6.275
3 rd Group	1.039

The result of the effect size test confirmed that the value of Cohen's d for the 1st Group is 6.146, the 2nd Group is 6.275, and the 3rd Group 1.039. This indicated that the effect was categorized as large. Besides analyzing the effects of the PBL quantitatively, the effects were also observed qualitatively during the teaching and learning processes. The observed improvements were noticeable and summarized as indicated in Table 12.

Table 12. The effects of the PBL Implementation.

The implementation of PBL	Observed improvements
The teaching-learning processes were conducted in 16 sessions using the steps of PBL. They provided different kinds of scaffoldings using mixed learning modes (asynchronous, synchronous, and personal, and WhatsApp based-consultations).	Knowledge exploration skill
	Communication skill
	Self-directness
	Collaboration
	Problem-solving skills
	Creativity
	Learning autonomy

The students were provided with several opportunities to practice their 6C abilities as they worked their way through the process of learning through project-based activities. The students naturally adopted problem-solving skills, exercised creativity, and implemented learning autonomy.

4. DISCUSSION

4.1 The Characteristics of the PBL Designed Based on Students' Needs

The answer to the first research question deals with the characteristics of PBL produced. The PBL designed for teaching research proposal writing in Research Method Course in this study shows prominent characteristics that suit students' needs. The framework has systematic steps of teaching provided scaffoldings and technology. It reconfirms that the applied ADDIE model (Kurt, 2018) is appropriate for developing the framework. The strength of the model lies in its systematic steps, which are flexible. The flexibility of the PBL framework resides in the lecturers' freedom to use the framework in various modes and the lecturers' ability to add extra activities based on the students' needs. The strength of this framework is estimated from the accuracy of choosing the needs analysis of the OEM model used in this study, and in line with what is recommended by Gupta et al. (2007). The model provides a systematic template comparing the existing situation and the expected one by considering the aspect of context, input, process, product, and outcome, which aimed more at improving the quality of the course, not used to prove certain treatments.

The strength of the PBL framework is that the students can produce a research proposal in the demanded time frame. Individualized assistance is one of the characteristics of the PBL, which successfully helps students finish the product, reconfirms the claim that PBL necessitates the delivery of a solution-based, time-restricted product (Hadkaew & Liewkongstaporn, 2014). Students' competence in making research proposals is strongly formed because PBL provides opportunities to explore information from the beginning of the meeting. They built experiences by exploring, analyzing, reviewing, and drawing conclusions about their new knowledge based on those experiences. In line with the role of adult learners to become agents of their learning, through the framework of the project the students carried out, they constructed their understanding and knowledge of the research proposal through direct experiences and reflection on those experiences. Students assume responsibility for their learning through inquiry and collaborate to create projects demonstrating their comprehension (Bell, 2010). More importantly, PBL also enhances students' critical thinking and enables pupils to develop their meaning by applying what they have learned through critical thinking (Guo et al., 2020).

The framework also provides the lecturers to examine students' competencies by conducting a process assessment. Process assessment is defined as an investigation that monitors the implementation of various plans that have been prepared in the form of documents, implementation, and assessments (Stufflebeam & Zhang, 2017). The complex task establishments indicate the competencies established at the end of the course along the process in one semester. Utilizing crucial inquiries in the form of essential questions at the beginning stage assists students in comprehending how to look for information to identify the fundamental notions of research. These questions aid students in determining what the research is all about. This inquiry process is the skeleton that directs the search for this extensive information. The questions also guide students' autonomy in deciding what to review, investigate, and make conclusions about. In this initial step, the student's competencies to search for information based on the essential questions determines his or her ability to comprehend the research concept and write a successful proposal outline. Therefore, the questions and process

of explorations and engagements conducted have been able to help students determine their research questions from which the development of fundamental research understanding is developed. In other words, the quality of the research questions created by the students has been evident in fostering students' knowledge of the research's fundamental complex structure. As [Han et al. \(2015\)](#) pointed out that projects mainly consist of complex tasks based on challenging questions or problems which engage students in design or ideas, problem-solving, decision-making, or investigative activities and give students autonomy to work over a long time, ending with a product or presentation.

In the explorative and collaborative learning process, the framework also allows students to have the opportunity to exercise the 6C skills. They practiced collaboration and problem-solving with classmates, exercised creativity by constructing study topics with intriguing titles, applying critical thinking patterns to establish a research framework, and employing computational logic to find solutions. This is in line with the claim of [Jalinus et al. \(2017\)](#) and [Mahasneh and Alwan \(2018\)](#) that PBL increases students' scientific abilities, such as problem-solving, debating, questioning, and drawing conclusions. Another noticeable effect is also found in the students' responsibility. Using the timeline in the PBL framework implemented and a close monitoring process on the student's progress also enhanced students' responsibility. According to [Baysura et al. \(2016\)](#), PBL helps promote student character by being responsible for themes chosen by students, both in groups and individually. Teachers, as facilitators, can assist in addressing students' needs.

Another additional finding observed is the student's motivation to finish their proposal on time. The interview results revealed that the atmosphere of learning processes with abundant sources of scaffolding provided made them feel convenient and motivated to finish the project on time. This is in line with the previous researcher ([Lam et al., 2010](#)), who claimed that the significance of student motivation is ensured by project-based assignments when students can control their surroundings effectively, comprehend tasks or learning, and trust in their learning outcomes ([Gómez-Pablos et al., 2017](#)).

4.2 The Students' Difficulties in Writing the Research Proposal during PBL Implementation

The finding of the second research question deals with the problems faced by the students. The PBL framework is flexible in a way that it provides opportunities to identify the problems faced by the students during the process of their research proposal writing ([Kurt, 2018](#)). Even though the students in this study could understand the fundamental research concepts during the first few sessions, they still experienced problems regarding the course content-related issues and the usage of grammar accuracy. Students' clarifications reveal that a lack of familiarity with academic writing conventions is one of the primary causes of the students' problems. Writing a research proposal necessitates a thorough understanding of academic writing conventions; it is prepared in a formal style with a thorough description of the intended research ([Nte & Awi, 2006](#)). If a researcher is not familiar with these conventions, they may make mistakes in grammar and content. Another reason is inadequate time management. Writing a study proposal takes time, and researchers may feel pressed to complete the document as soon as possible. Rushing through the writing process can

result in grammatical and content errors. To solve the problems in grammar and content, the lecturers carefully plan and organize their time for helping students and providing feedback, as those can serve as scaffolding for students in revising their research proposals. With various kinds of scaffolding provided through several kinds of learning modes, the students' problems can be slowly solved and students can go to the next stage and improve their proposal quality (Gibbons, 2002).

4.3 The Kinds of Scaffolding Techniques in PBL that Assisted Students in Completing Research Proposals

The third research question provides an answer about the scaffolding utilization in research proposal writing. Guidance with issues relating to the subject matter was provided in the form of customized scaffolding tailored to the individual student's requirements. They could better comprehend how to build the outlines of their proposals with the assistance of scaffolding activities and authentic examples. Although the problems with the students' proper use of grammar were helped by offering instructive remarks on the sources of the errors committed by the students, the problems nonetheless persisted, especially on subject-verb agreements. With various scaffoldings, the students could finish the proposal and submit them to the e-learning for evaluation.

The commitment of lecturers who provide various types of assistance according to the actual needs was also a meaningful scaffold for the students. When the lecturers' teaching processes are based on their genuine assessment and understanding of students' learning, they can start to adapt to their practice, leading to fundamental differences in outcomes (Gibbons, 2002). The students' initiatives to ask for the opportunity of personal consultations and raise various questions to the lecturers indicated that students have practiced not only the 6C skills but also more importantly, their understanding of the basic concept of research has been increased. The students' activeness in consulting their problems, exploring, and seeking solutions assisted them in relating the theory and practice. Through PBL, students can investigate the relationship between theory and practice and thoroughly understand the lessons (Beckett & Slater, 2018).

The lecturers' use of self-assessment questions as scaffolding has prompted students to review every area of their research in depth. The leading questions are supplied as self-direction for evaluating the proposal content and determining what needs to be improved. This is in line with other findings by Vonna et al. (2015). The opportunity to engage in research activities through project-based learning and providing them with extensive scaffoldings adapted to their needs enabled students to produce a quality research proposal and pass the course satisfactorily. With actual activities carried out by students, the competencies formed are meaningful and long-term (Markham, 2011).

4.4 The Significant Effect of Implementing Needs Analysis in PBL on the Quality of the Student's Research Proposal

The findings of fourth research question describe the effect of the implementation of PBL in combination with various scaffolding strategies. It was found that this implementation has a significant strengthening effect on the quality of

students' research proposals. This supports the previous findings about the power of PBL in students' learning (Haniah et al., 2021; Rozal et al., 2021; Syakur et al., 2020; Yuliansyah & Ayu, 2021). Constructivism theory supports project-based learning activities and is congruent with the role of adult learners as agents of change. The central concept of constructivist theory is that people construct their understanding and knowledge of the world through direct experiences and reflection on those experiences. The constructivist view of learning reflects how individuals make meaning of their experiences (Taber, 2011a). According to Alzahrani and Woollard (2013), this idea is predicated on problem-solving, assisting individuals to think, learn, and grow.

The significant effect of PBL was reflected in students' success in writing research proposals. This is logically acceptable as the PBL framework has been designed based on the needs of the students, guided using various modes of learning, and facilitated using numerous scaffolds. The success of the scaffolding provided during the synchronous learning and through WhatsApp during the asynchronous activities stimulates students' active participation and engagement. These findings align with previous research by Uziak (2016), which claimed that PBL could assist students in being engaged, critical thinkers, and problem solvers in learning activities that involve discussing real-world issues. Pan et al. (2019) also strengthened the idea that PBL social learning dissemination enhances collaboration, communication, and negotiating skills.

Despite the online nature of teaching and learning, the course content was not the sole emphasis of instruction. Students' engagements, participation, and active interactions are facilitated by various scaffolding tailored to their individual needs. The focus was on two crucial aspects: how to best support students and what delivery technique to employ. Online education can be used for more than just accessibility, it improves connectivity, flexibility, and a range of interactions (Abrami et al., 2011; Ewing & Cooper, 2021).

The results implied that PBL with various scaffoldings was an appropriate model for teaching Research Method Course for English major students. The students not only successfully constructed their own experiences of learning and established the learning outcome as required by the course but were also able to develop themselves as the agents of their learning. Therefore, policymakers (including instructors of research method courses) must consider using PBL to facilitate students with experiential learning that aims to build competence as well as learning autonomy.

5. CONCLUSION

The PBL designed in this study shows that it was tailored to the student's needs and had systematic teaching steps with various scaffolding and technology use. During the proposal writing process, students faced several problems which dealt with writing the aspects of the proposal and language use. The students can finish their proposals with various scaffoldings implemented using the PBL systematic steps. Implementing the PBL framework in the Research Method Course has improved their competence in writing a research proposal. The t-test result reveals a significant difference in the scores of the research proposals before and after the PBL framework was implemented. This reveals that the PBL framework designed based on the actual needs

of the students is effective and worth to be used in Research Method courses in university education.

Despite its significant effect and strength, the study has a limitation in that it was not implemented using a control group and only toward undergraduate students in education universities which might influence the robustness of the PBL. For that reason, it is recommended that future research considers experimental design for more generalizable findings.

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Critique and synthesis

Below expectation	Meets expectation							
Lacks conceptual growth and clarity of thinking, contains irrelevant or inadequate literature	Adequate critique and synthesis of the reviewed literature							
0-59	60-64	65-69	71-75	76-80	81-85	86-90	91-95	96-100

Methods

Below expectation	Meets expectation							
9.1 Design is unclear or is inappropriate to the degree	Design is stated clearly, and is appropriate to the degree							
0-59	60-64	65-69	71-75	76-80	81-85	86-90	91-95	96-100

Below expectation	Meets expectation							
9.2 Subjects of research is unclear or inappropriate to the degree	Subjects are appropriate, numbers are sufficient and the reasons for choosing are stated clearly, and are appropriate to the degree							
0-59	60-64	65-69	71-75	76-80	81-85	86-90	91-95	96-100

Below expectation	Meets expectation							
9.3 Instruments of research are unclear or inappropriate to the degree	Instruments are appropriate, the types are sufficient and the reasons for choosing are stated clearly, and relevant to the research questions, reliable and valid							
0-59	60-64	65-69	71-75	76-80	81-85	86-90	91-95	96-100

Below expectation	Meets expectation							
9.4 The technique of data collection of research are unclear or inappropriate to the degree	Techniques of data collection are appropriate; the types are sufficient and relevant to the research questions							
0-59	60-64	65-69	71-75	76-80	81-85	86-90	91-95	96-100

Below expectation	Meets expectation							
9.5 The technique of data analysis of research are unclear or inappropriate to the degree	The technique of data analysis is relevant, appropriate, and sufficiently answering the research questions							
0-59	60-64	65-69	71-75	76-80	81-85	86-90	91-95	96-100

Total Scores:	Total score							
	= The score of 1+2+3+4+5+6+7+8+9.1+9.2+9.3+9.4+9.5							
Final Score = Total score is divided by 13								