Development of Project-Based Learning Modules to Enhance Creative Thinking Among Kindergarten Education Students at The Faculty of Education in Unimed

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Abstract: The objective of this research is as follows: (1) to develop a Project-Based Learning module for the Learning Planning course in the Kindergarten Education program at the Faculty of Education (FIP) Unimed; (2) to determine the feasibility of the project-based learning module for the Learning Planning course based on expert assessments; (3) to assess the effectiveness of the project-based learning module in enhancing students' creative thinking. This research is a Research and Development study following the Four-D model for development, with four stages: Develop, define, design, and spread or disseminate. The study was conducted in the Kindergarten Education program at the Faculty of Education (FIP) Unimed, with a sample of 2 educational technology experts and 16 fourth-semester Kindergarten Education students for product testing in a small class. The research was carried out from February to August 2023. The validation results indicate that the learning module is valid (80.12), meaning that the module is suitable for use. The module's trial conducted in a small class showed an increase in the number of students with creative thinking skills after the learning process.

Keyword: Project-Based Learning Modules, Learning Planning, Creative Thinking, Kindergarten Education.

1 Introduction

The Learning Planning for Early Childhood Education course is one of the compulsory courses that students in the Kindergarten Education program must take in the fourth semester. In essence, this course provides theoretical materials about the concept of lesson planning and practical aspects of designing lessons in accordance with the evolving curriculum in early childhood education institutions. The teaching materials used in the lectures should be systematically organized and accompanied by structured exercises, such as analyzing the basic competencies to be achieved by young children, formulating learning objectives, developing instructional materials, designing learning models and approaches, creating teaching media, and developing assessment instruments. Therefore, this course is not only theoretical, but students also tend to engage in exercises, working both in groups and individually. They participate in discussions to identify issues related to the development of lesson plans in early childhood education institutions and find solutions to specific problems, particularly in

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developing designs and lesson plans for early childhood education. Similarly, developing critical thinking, creative thinking, and innovative skills in designing lessons for early childhood education, should be done using varied teaching models such as inquiry-based learning, problem-based learning, and project-based learning. Through these learning activities, students will need broader and deeper thinking skills, which will train their critical and creative thinking abilities.

As is known, an integral aspect of educational enhancement in Indonesia revolves around boosting students' creative learning. The significance of creativity has been a key focus in discussions about elevating the standard of education. Presently, creativity is universally acknowledged as a skill embedded in both the learning process and its outcomes. The core of creativity involves generating improvements or novel elements [3] In this context, "new" signifies the outcome of refining, supplementing, altering, and repositioning existing elements to evolve into something superior. Creative thinking encompasses the entire thought process or cognitive process systematically undertaken to create something new or relatively different from what already exists, either entirely novel or a combination of existing elements. Creative thinking is a key competency and skill that must be cultivated to embrace the 4.0 industrial revolution and the concept of 21st-century education. If teachers use this concept as the basis for instructional development, the quality of human resources will undoubtedly improve. Creative thinking is one recommended approach to solving problems. Through creative thinking, individuals can perceive issues from various perspectives and perceptions, ultimately generating more alternative problem-solving strategies. Creative elements are indeed crucial in the thinking process to solve problems. The more creative a person is, the more alternative solutions they can propose, as outlined by Guilford [4], who identifies the characteristics of creative thinking as follows:

a. Fluency of Thought: This is the capacity to swiftly produce a large number of ideas from one's thinking. Thinking fluency places more of an emphasis on quantity than quality.
b. Flexibility of Thought: This refers to the capacity to generate a range of concepts, solutions, or queries that differ and can examine an issue from many angles. It entails looking for alternatives or distinct fields as well as having the flexibility to apply multiple strategies or modes of thinking.
c. Elaboration: To make an object, concept, or situation more interesting, one must be able to develop ideas and add or clarify specifics.
d. Originality: is the ability to produce ideas or the aptitude to think of unique ideas.

Based on several research findings, it is indicated that creative work will take over in the future. This is due to routine and repetitive tasks being taken over by robots and other automation processes [5]. Regarding creativity, Munandar [8] asserts that creativity is highly important to cultivate because: a). Individuals who can create and express themselves fulfill an essential need in individual activities; b). Problem-solving can be addressed through various alternative possibilities, which is a manifestation of creativity; c). Engaging in balanced creativity can bring satisfaction to an individual; d). The quality of someone's life can be enhanced, in part, by being creative. Furthermore, Susanto [4] found that the characteristics of creative students can be seen from 2 aspects, namely: a) Cognitive aspect; The capacity for divergent or creative thought is a prerequisite for creativity and is shown by the presence of specific talents including original, flexible, and fluent thought, as well as judgment and detailing skills. A person's attachment to these qualities increases with his level of creativity. b) Affective Aspect: A person's attitudes and sentiments, which are typified by a variety of distinct feelings like: respect, self-confidence, openness to new experiences, imagination and

fantasy, curiosity, and courage to take chances, are more closely associated with creative traits.

Various methods can be employed to enhance students' creative thinking abilities, and one of them is by implementing the Project-Based Learning (PjBL) model. PjBL is a learning model that provides students with the opportunity to deepen their knowledge while developing skills through problem-solving and investigation activities. The PjBL learning model not only focuses on the end result but emphasizes the process of how students can solve problems and ultimately produce a product. Project based learning involves utilizing real-world problems as the starting point to acquire and integrate fresh knowledge through hands-on experiences [6]. Furthermore, according to Grant [2], project-based learning is an understudy focused approach to education that entails in-depth research on a particular subject. Using a research-based approach to important, concrete, and pertinent themes and questions, students actively participate in their education. The following are the objectives of project-based learning: a) to help students gain new knowledge and skills; b) to improve their problem-solving skills in project work; c) to encourage students to take an active role in solving challenging project problems that result in tangible products, like goods or services; d) to help students develop and improve their skills in managing the materials, tools, and resources needed to complete tasks and projects; and e) to improve student collaboration, particularly in project-based group learning. A case study conducted by Grant & Tamim [2] concluded that PjBL can support, facilitate, and enhance the quality and process of learning, while also enriching students' learning creativity. Other benefits of project-based learning, according to research by Yalcin et al [4] include: 1) creating a varied learning atmosphere, 2) avoiding the typical boredom in school environments, and 3) making the learning environment more interesting, enjoyable, stimulating, and pride-inducing for students.Steps to the Project Based Education Model.

a. Start With the Essential Question
   Essential questions are the first step in the learning process since they might assign pupils to complete an activity. Select subjects that are in line with actual events and begin with a thorough analysis.
b. Create the Project's Plan
   Teachers and students collaborate on the planning process. Students are meant to experience a sense of "ownership" over the project in this way. The game's rules, activities that can help with answering important questions, incorporating a variety of potential topics, and being aware of the resources and tools available to help finish the project are all included in planning.
c. Create a Schedule
   Teachers and understudies cooperatively set up a timetable of exercises to finish the undertaking. At this stage, activities include: a) establishing a timetable for the project's completion, (b) making a deadline for completing the project, (c) bringing students to plan new ways, (d) guiding students when they make ways that are not related to project, and (e) ask students to make an explanation (reason) about choosing a method.
d. Track the Students' Development and the Project's Advancement
   While the students are working on the project, the teacher has to keep an eye on their activities. Students are assisted in every procedure as part of the monitoring process. Put another way, educators serve as mentors for the activities of their students. A rubric that can document all significant activities was developed in order to streamline the monitoring process.

e. Evaluate the Result
   Appraisals are utilized to assist educators with checking how well norms are being met, evaluate every understudy's turn of events, give knowledge into the perception that every understudy has achieved, and support educators in creating new learning methodologies.
f. Summarize the Experience
   Teachers and students evaluate the lessons learned at the conclusion of the procedure.

Another factor that can enhance students' creative thinking abilities in learning is the instructional materials or modules used by teachers/instructors in teaching. Various forms of instructional materials can be used by teachers in teaching, and one of them is the module. A module is a self-contained learning package that includes a series of learning experiences systematically designed to help learners achieve learning objectives. By using modules, students can independently study a subject according to their needs and knowledge levels. Kiong et al [7] mentioned in their research that using modules can be an alternative approach for students in solving learning problems. Similarly, Novitayani [9] concluded in her research that the use of modules can assist the learning process in enhancing students' learning creativity. The research findings of Nur Kholis et al [10] also concluded that Project-Based Learning Physics Modules can improve students' learning creativity. Considering the nature of the Learning Planning course, which involves exercises and the production of a product, and in the effort to enhance students' creative thinking abilities, the module to be developed will apply the Project-Based Learning (PjBL) model. The developed module will cover two main topics, both taught through the project-based learning model: 1) designing a learning model in kindergarten education (PAUD), and 2) designing a learning tool in the Merdeka Curriculum for kindergarten education (PAUD).

2 Research Method

The research method used is research and development (R&D). In the field of education and learning, especially, research and development focus on the area of design, whether it be design models, instructional design, and media and process products [11]. In this study, the developed product is a Project-Based Learning (PjBL) module for the Learning Planning course at Kindergarten Education, the Faculty of Education (FIP), Unimed. The model used as the basis for developing the PjBL-based Learning Planning module is an adaptation of the 4-D (Four-D) model proposed by Thiagarajan et al. [12], which includes the processes of defining, designing, developing, and disseminating. The research design used is a one-group pretest and posttest, involving a group of subjects (16 students) who underwent a pre-test before receiving treatment and a post-test after treatment to determine the results of the treatment. Data collection methods used in this research include testing and observation techniques. The testing technique is aimed at assessing students' knowledge aspects and takes the form of essay tests. The observation technique is used to obtain data on students' learning attitudes and creativity when completing projects or during lectures without projects, as well as the products resulting from the projects undertaken by students. The instruments are developed based on indicators and sub-indicators of students' creative thinking, and the scale used is: Excellent (4), Good (3), Fair (2), and Poor (1). Data analysis is conducted using the percentage of average values obtained by students.

Table 1. Indicators and Sub-Indicators of Student's Creative Thinking

No	Indicators of Innovative Thought	Sub-Indicators of Innovative Thought
A	Flexibility	1. Generating diverse ideas, answers, or questions. 2. Able to see different perspectives on a problem. 3. Seeking many alternatives in problem-solving. 4. Searching for numerous reference sources to understand a specific subject.
B	Fluency of Thinking	1. Generating many ideas, answers, and solutions to problems. 2. Independent in problem-solving.
C	Elaboration	1. Responding to questions with enthusiasm, actively, and passionately completing tasks. 2. Enjoy finding practical ways or methods to learn. 3. Critical in reviewing work. 4. Willing to accept and undertake new and challenging tasks.
D	Originality	1. Capable of producing new and unique expressions. 2. Thinking of unconventional ways to express opinions. 3. Daring to express opinions based on owned ideas. 4. Possessing strong perseverance to complete tasks.

3 Results And Discussion

This development research is conducted with reference to the Four-D model, which consists of 4 stages: Define, Design, Develop, and Disseminate.

3.1 Define Stage (Definition)

This stage is the phase to identify existing problems in learning and serves as the basis for designing a product, namely the module. Based on the analysis of students and lecturers, it was found that: (1) students do not have specific teaching materials or materials aligned with the main content in the Semester Learning Plan (RPS) prepared by the lecturer of this course. Students study lecture materials from literature books and the internet. Teaching materials should be systematically organized according to the student's graduate competencies in this course to facilitate their learning in line with the established objectives. Meanwhile, summary books and internet materials are used as reading sources for students to develop the content in the main book; (2) Learning conducted so far tends to focus only on theoretical studies, with very little practice or application. Considering the nature of the Learning Planning course, students should be trained to develop a learning plan and instructional design, practice

developing learning objectives, practice developing teaching materials in a learning design, and so on. Especially with the curriculum change from Curriculum 2013 to Merdeka Curriculum, which requires students to be able to develop a Learning Plan in the Merdeka Curriculum; (3) The target of the research is fourth-semester students, and based on observations of students in the research class, it turns out that only 20% of students have creative thinking skills. In general, students are less able to ask questions, less critical, and less willing to provide responses or ideas during learning activities; (4) Considering the curriculum development in early childhood education institutions from Curriculum 2013 to Merdeka Curriculum, and by maximizing Problem and Project-Based Learning (PBjL), the lecturer of this course must update the learning materials and strategies so that students' creative thinking abilities can develop optimally.

Based on the analysis of the needs of students and lecturers in achieving the learning objectives of the course through the use of the Learning Planning module, especially in developing students' creative thinking abilities, the tasks that students will undertake are: 1) In groups, students will undertake a project to develop a learning design in Kindergarten education (PAUD) according to the selected instructional design model, and students will simulate the developed learning design; 2) Individual tasks that students will perform include practicing developing competencies into learning objectives, practicing developing teaching materials on a theme, and practicing developing assessment instruments; 3) The final task for students is to collaboratively create a learning module for the Merdeka Curriculum in early childhood education. Based on the analysis of the needs of learners in the Learning Planning course, the project-based teaching material to be developed in the Learning Planning module includes: 1) Planning Learning Programs and Learning Design in Early Childhood Education; 2) Approaches and Learning Models in Early Childhood Education; and 3) Designing teaching modules for the Merdeka Curriculum in Kindergarten Education. Based on the analysis of the graduates' achievements in Kindergarten Education, the Faculty of Education study program, and the learning outcomes of the Learning Planning course, the objectives of developing a project-based learning module to enhance students' creative thinking are: 1) Students are able to design learning programs and learning designs in early childhood education; 2) Students are able to design learning based on instructional models in early childhood education; and 3) Students design simple learning modules for the Merdeka Curriculum in early childhood education.

3.2 Design Stage (Designing)

This stage aims to design a Project-Based Learning module for the Learning Planning course to enhance students' creative thinking at Kindergarten Education, the Faculty of Education, Unimed. The design stage involves selecting content and format. The teaching material in the learning module consists of two main parts: material taught without using projects and material taught through the application of the project-based learning model. The material taught through projects includes: a) Planning Learning Programs and Learning Designs in Kindergarten Education (PAUD). This content is related to the planning of learning programs, including annual, semester, weekly, and daily programs. In Learning Design, it covers the definition and criteria of learning design and various learning design models; b) Approaches and Learning Models in Kindergarten Education. This content includes STEAM,

TPACK, Scientific, and specific learning models in kindergarten, such as group, center, area, and corner; c) Development of teaching modules in the Merdeka Curriculum.

The project-based learning module for the Learning Planning course is developed as teaching material intended for Kindergarten Education students. This instructional material is written on A4 paper (quarto), with top and bottom margins of 2.5 cm, a left margin of 3 cm, and a right margin of 2 cm. It uses Times New Roman font, size 12, and 1.5 spacing. The systematics of the developed module include course overview, introduction, learning materials, summary exercises, formative assessments, and bibliography. The first part, the course overview of Learning Planning, discusses the benefits of the course for students and other readers, provides a description of the course, and outlines the presentation sequence for each learning material. The second part, the introduction, outlines the learning objectives, the scope of the material to be studied, and specific instructions for studying the Learning Planning module. The third part is the learning material, which presents the content of each lesson according to the concepts selected during the concept selection phase. Each main topic (chapter) is further developed into sub-topics, followed by summaries, exercises, and formative assessment questions. For the topics where project-based learning will be applied, the exercise section explains the steps that students will take during the project-based learning activities.

3.3 Develop Stage (Developing)

This development stage aims to produce a project-based learning module for the Learning Planning course in PG PAUD that has been validated and received input from experts and has been piloted with PG PAUD students. The stages involved are:

A. Experts Validation

The development of the project-based learning module for the Learning Planning course was validated by 2 educational technology experts. The validated module is still in draft form. The results of the module validation can be seen in the following table:

Table 2. The Results of the Instructional Validity Test

NO	The Type of Modules	Score	Description
1	Validity of Content	85,5	Valid
2	Presentation of Suitability	85	Valid
3	Language	79	Valid
4	Grapichs	71	Sufficietly Valid
Average Score for All Aspects		80,12	Valid

The overall average of the validity test data processing results is deemed valid (80.12). However, in terms of language and graphics aspects, based on the feedback from experts, there are aspects that need improvement and additions to enhance the quality of the project-based learning module.

B. Small Group Trial

One of the objectives of this research is to enhance the creative thinking of Kindergarten Education (PAUD) students through project-based learning in the Learning Planning course. In the module trial phase, a small group of 16 third-semester students in the academic year

2022/2023 participated. The instrument used to assess students' creativity is an observation sheet. Observations were conducted both before and after the project activity. Project-based learning was carried out three times during one semester, and it was conducted in groups. The Creative Thinking instrument was developed according to the criteria. The data on students' creative thinking abilities and the data processing can be found in the appendix. The results of the module trial and students' creative thinking abilities can be seen in the following table.

Table 3. The Achievement of Each Indicator of Students' Creative Thinking Before and After the Implementation of Project-Based Learning (PjBL)

NO	Indicators of Creative Thinking	Before BPjL		After BPjL	
		Total	**%**	**Total**	**%**
1	Fluency of Thinking	3 people	18,75	6 people	37,5
2	Flexibility	3 people	18,75	6 people	37,5
3	Elaboration	6 people	37,5	8 people	50
4	Originality	3 people	18,75	6 people	37,5

From the table above, it can be seen that before project-based learning, out of 16 students, only 3 students (18.75%) had fluency of thinking, flexibility of thinking, and originality. Meanwhile, 6 students (37.5%) had elaboration skills. After project-based learning, there was an improvement in students' creative thinking abilities, although the improvement occurred in only a few students.

Based on the analysis of the creative thinking scores of each student, there was an increase in the number of students in the categories of Very Good, Good, and Less Good. This can be seen in the following table:

Table 4. The Average Creative Thinking Abilities of Collage Students Before and After Project-Based Learning

NO	Students' Name	Before PBjL		After PBjL		Description
		Score	**Category**	**Score**	**Category**	
1	Vio	2,44	NG	3,00	G	Improved
2	Des	3,94	G	4,00	VG	Improved
3	Int	3,85	G	4,00	VG	Improved
4	Sas	2,75	NG	3,31	G	Improved
5	Nur	2,31	NG	2,44	NG	Not Improved
6	Rah	4,00	VG	4,00	VG	Improved
7	Rin	4,00	VG	4,00	VG	Improved
8	Her	2,88	NG	3,12	G	Improved
9	Sab	2,31	NG	3,00	G	Improved
10	Mis	2,38	NG	2,62	NG	Not Improved
11	Van	3,88	G	4,00	VG	Improved
12	Pris	2,62	NG	3,00	G	Improved
13	Lulk	4,00	VG	4,00	VG	Improved
14	Rez	2,50	NG	3,00	G	Improved
15	Sus	2,31	NG	2,56	NG	Not Improved
16	Han	3,00	G	3,12	G	Improved
Average Score for All Aspects		2,95		3,23		

From the above data, it can be seen that before project-based learning, students with Very Good creative thinking abilities were 3 people (18.75%), Good category 4 people (25%), and Less Good category 9 people (56%). After project-based learning, the creative thinking abilities of students were: Very Good category increased to 6 people (37.5%), the Good category 7 people (44%), and the Not Good category 3 people (18.75%). However, if viewed on average, the score category falls into the Good category, meaning that the improvement in students' creative thinking abilities is not too high. Therefore, learning by implementing the PjBL model can enhance students' creative thinking abilities.

4 Conclusions

The process of developing project-based learning modules for the Learning Planning course has been carried out according to the established procedures of the research and development model. The little gathering preliminary of the undertaking based learning module for the Getting the hang of Arranging course, aimed at enhancing students' creative thinking, has been conducted with 16 students. The results prove an increase in the number of students with creative thinking abilities before and after the project-based learning. Therefore, it is recommended that all course instructors develop teaching materials by implementing the project-based learning model. This approach allows students to engage in projects starting from identifying a problem, which helps to cultivate critical thinking skills and enhance students' creative thinking abilities.

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