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Implementation of Innovative Learning for Teacher Professional Education in the Eastern Region of Indonesia

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ABSTRACT

Innovative learning in the 21st century requires students to have the ability to think critically, creatively, and communicatively and be able to collaborate. For this purpose, research has been carried out on Professional Teacher Education (PPG) students at Manado State University. The research aims to implement the Problem-Based Learning (PBL) and Project Based Learning (PjBL) learning models through Field Experience Program (PPL) activities. The study was conducted on a sample of 36 elementary school teachers with a total sample of 252 students in the Eastern Region of Indonesia, including the provinces of Papua, Maluku, East Nusa Tenggara, West Nusa Tenggara, Central Sulawesi, Southeast Sulawesi and North Sulawesi. Experimental research method with the application of the PBL and PjBL models. Data was obtained from online workshop interviews and the Learning Management System (LMS) owned by the Directorate of Teacher Professional Education, Directorate General of Teachers and Education Personnel of the Republic of Indonesia. The data is processed from the Learning Implementation Plan (RPP) documents and Teaching Modules created by the teacher then reviewing the Teaching Materials, Student Worksheets, Assessment Instruments, and Learning Media. Student learning outcomes are taken from the pre-test and post-test formative scores. The results of the data analysis showed that there was a significant increase in learning outcomes from an average Pre-Test score of 52.2 and after the learning process, the average Post-Test score increased to 84.5. This happened because the PBL and PjBL learning models had been implemented which reached 98.8%.

The above learning outcomes occurred because innovative learning elements were implemented, namely 87.7% of learning based on Higher Ordered Thinking Skills, 80% of learning using Group Worksheets, 20% using Individual Worksheets, 67% of learning using Technological Pedagogical Content Knowledge (TPACK) 33% of lessons use TPACK accompanied by Student Books and Teaching Aids. Based on the research results above, the use of PBL and PjBL in learning is a necessity. The PBL and PjBL learning models trigger and encourage students to become more creative in learning by prioritizing collaborative learning and being able to communicate experiences and learning results obtained through analytical and critical thinking.

Keywords: critical thinking, Innovative Learning, PjBL

INTRODUCTION

The 21st-century phenomenon is marked by a shift in the need for human resource expertise. Skills that only rely on handwork and/or manually, which are classified as low-level skills, will be replaced with high-level skills that rely on creativity which is characterized by the habit of creating/producing products, global communication capabilities based on IoT (internet of things) and widespread use of MOOCs (massive open online course) in the learning process. This high level of expertise is characterized by a person's high level of creativity. Initial research studies related to the Revised Bloom's Taxonomy (TBR) applied in physics learning, found that the use of representations such as pictures, diagrams, illustrations, and video shows with music, symbols, and schemes requires high concentration. The research findings show that abstract concepts expressed in symbols, illustrations, schemes, pictures, etc. are not simply formulated in the verbs to remember (C1-recall) or identify (C1-identify). In research on LOTS (Lower Order Thinking Skill) and HOTS (High Order Thinking Skill), students are given tests that only consist of picture illustrations and answers in the form of picture illustrations. Even though students classify the test into the LOTS category according to the TBR cognitive dimension, the average pre-test result is above 90% wrong and the post-test average above 40% is still wrong, which should be if it is classified as LOTS then the level of achievement of the correct number of learning outcomes very high. According to the two-dimensional TBR study, at the factual and conceptual knowledge dimension level, the concepts studied can still be classified as LOTS, but at the procedural and metacognitive knowledge dimension level the concepts studied tend to require higher abstraction and this can become HOTS (Gleason, 2018), (Handoko, 2018). Why does this happen? Creativity is closely related to a person's ability to abstract. Abstraction abilities are highly individual. Abstraction abilities can be developed by conditioning the learning environment through a learning process that triggers and stimulates a balance of right and left brain activity. Based on the problem background mentioned above, the specific aim of the research is to produce an integrated PBL-PjBL-TPS learning model in multiple representation (MR) based physics learning. The results of research related to MR-based physics learning show that it has a positive effect on student learning outcomes (Penprase, 2018). Thus, the use of MR in physics learning through the integrated PBL-PjBL-TPS model can not only improve student learning performance but especially can improve abstraction abilities which can simultaneously increase students' creativity abilities. This research is in line with DRTPM's research focus in the social humanities-arts-culture-education field

on the topic of educational technology and learning (Lembaga Penelitian dan Pengabdian Masyarakat Unima, 2021). This research is also in line with the LPPM Unima strategic program contained in the 2021-2025 Strategic Plan with a focus on research in the fields of social humanities-education-arts and culture, namely conducting studies and developing learning quality systems through developing adaptive and universal learning models, developing learning media, and developing learning outcomes assessment instrument model/assessment instrument development (DRPM, 2021).

LITERATURE REVIEW

Public Management Theories

Research on the use of the PBL learning model has been carried out and shows the results of increasing student learning activities, especially related to communication skills, and other research suggests that there is no difference in learning outcomes when using the two models above separately (Cook, 2006), (Kuo et al., 2017). The results of this research are in line with other PBL studies which suggest that PBL techniques can increase student engagement by enabling the sharing of knowledge and information through discussions. Thus, the PBL approach is highly recommended for use in education by students and should be encouraged to be implemented in universities (Olympiou et al., 2013). Learning techniques using the PBL model and the learning model between PjBL can show the results that there are significant differences in learning independence between students who are taught with the PjBL learning model assisted by teaching modules and TPS assisted by teaching modules and there are no significant differences in learning outcomes in the realm of knowledge between students who taught using the PjBL learning model assisted by teaching modules and TPS assisted by teaching modules and there were no significant differences in learning outcomes in the skills domain between students taught using the PjBL learning model assisted by teaching modules and TPS assisted by teaching modules (Waldrip et al., 2013). The research results above show that because there is no difference in the use of the PBL and TPS models, the PjBP and TPS models, the use of the integrated PBL-PjBL model can be combined compactly and can then be implemented in the 21st-century innovative learning process. Problem-based learning (PBL) consists of 5 learning phases, namely the first phase, student orientation towards the problem; the second phase, the teacher organizes the students; the third phase, the teacher guides students to carry out investigations individually or in groups; fourth phase, students develop and present their work; In the fifth phase, the teacher and students carry out analysis and evaluate the results of the work presentation (Savinainen at al., 2015). Project-based Based Learning (PjBL) has become an alternative learning model for the 21st century because of several advantages following the orientation of 21st-century skills development. PjBL is an innovative approach that teaches various strategies for achieving 21st-century success, helps students develop 21st-century skills, increases responsibility, and trains problem-solving, self-direction, communication, and creativity. The PjBL model is suitable for various levels of education. PjBL can be categorized into (a) structured projects, (b) topic-related projects, and (c) open-ended projects. Project-based learning essentially places students as active learning subjects, encourages initiative and exploration processes, provides opportunities to apply what is learned, and opportunities to present or communicate and evaluate their performance. PjBL is a learning model that is based on constructivist learning theory, namely by applying the principles of (1) involving students in real activities, (2) social

negotiation in the learning process, (3) collaborative and multiperspective assessment, (4) determining support goals and regulates the learning process, and (5) encouragement reflects what and how something is learned. The characteristic of PjBL learning is the production of a product as a form of learning outcome (Rau & Matthews, 2017), (Sirait et al., 2018), (Mesic et al., 2017), (Opfermann et al., 2017), (Nguyen et al., 2011), (Mayer, 2009).

METHODS

Experimental research method with the application of the PBL and PjBL models. The research was conducted on a sample of 36 elementary school teachers with a total sample of 252 students in the Eastern Region of Indonesia, including the provinces of Papua, Maluku, East Nusa Tenggara, West Nusa Tenggara, Central Sulawesi, Southeast Sulawesi and North Sulawesi. Data was obtained from online workshop interviews via the Learning Management System (LMS) owned by the Directorate of Teacher Professional Education, Directorate General of Teachers, and Education Personnel of the Republic of Indonesia. The data is processed from the Learning Implementation Plan (RPP) documents and Teaching Modules created by the teacher then reviewing the Teaching Materials, Student Worksheets, Assessment Instruments, and Learning Media. Student learning outcomes are taken from the pre-test and post-test formative scores.

The research implementation procedure follows the following scheme in Figure 1:

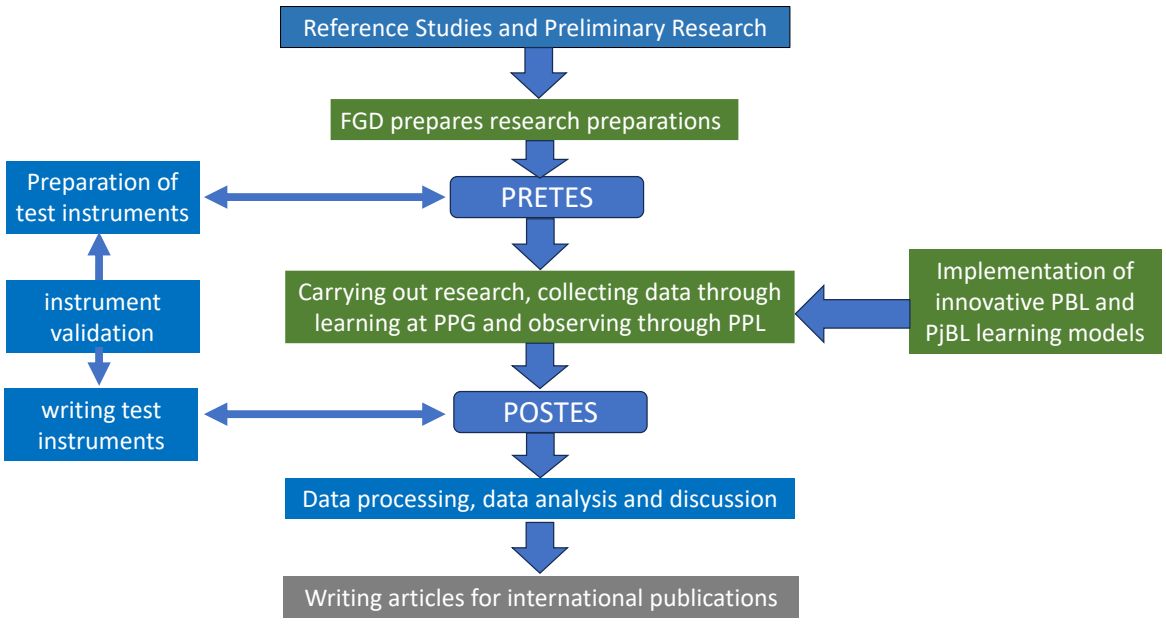

Figure 1. Research flow diagram

From Figure 1, regarding the research flow diagram, the research stages consist of 4 stages, namely: (1) the initial research stage, (2) the preparation stage for conducting research, (3) the research implementation stage, and (4) stage of making publication reports and writing monographs. The

research implementation stage consists of three important parts, namely, the Pre-test, implementation of learning in schools where PPL uses integrated PBL and PjBL learning models. Then a post-test was carried out. For the implementation of the Pre-test and Post-test, the instruments created were validated. The test items are arranged referring to the HOTS (higher-order thinking skills) grid (Vygotski & Lev Semenovich, 1978). The final stage is the creation of published articles.

RESULTS AND DISCUSSION

The results of the learning process achievements measured through the Pretest and Posttest instruments are shown in the following statistical analysis in Figure 2.

Statistics

		Prestes	Postes
N	Valid	252	252
	Missing	0	0
Mean		52.2143	84.0476
Median		55.0000	85.0000
Mode		50.00	100.00
Std. Deviation		20.31234	16.51287
Skewness		-.285	-1.440
Std. Error of Skewness		.153	.153
Sum		13158.00	21180.00

Figure 2. Statistics on scores resulting from the learning process

Based on the data shown in Figure 2, a significant increase in scores was obtained from an average pre-test score of 52.21 to an average post-test score of 84.05. The distribution of data obtained is shown in the following histogram image:

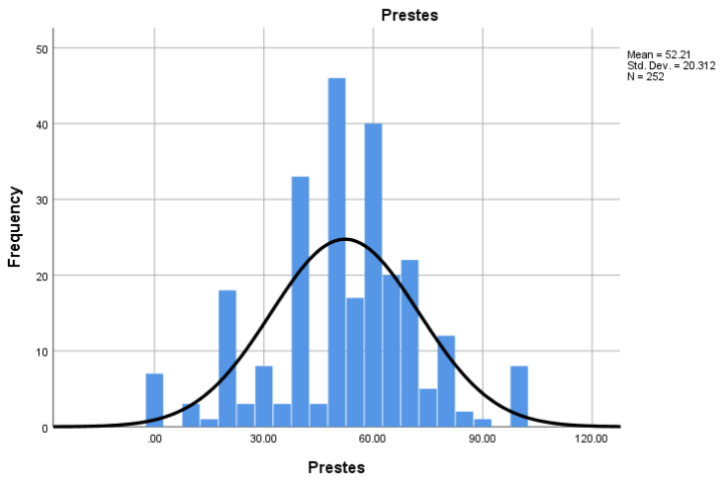

Figure 3. Histogram of distribution of pretest scores

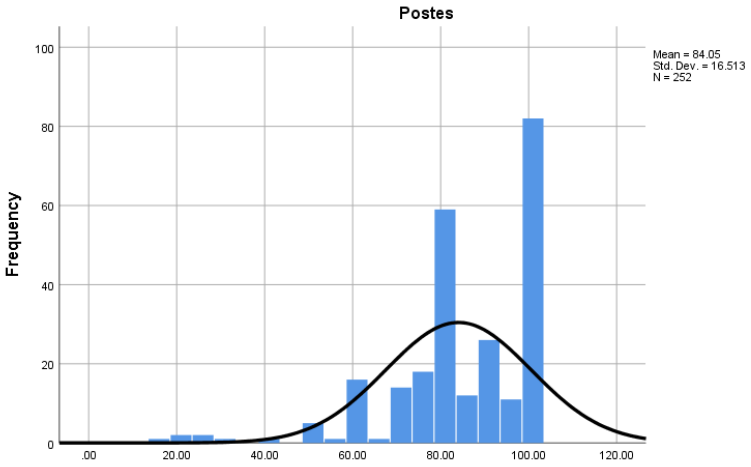

Figure 4. Histogram of post-test score distribution

The results of research related to implementing the Problem-Based Learning (PBL) and Project Based Learning (PjBL) learning models through Field Experience Program (PPL) activities are described in Table 1 Elements of Innovative Learning below:

Table 1. Elements of Innovative Learning

Lesson Plan	Learning Implementation Plan according to K-13	87%
	Teaching Modules according to the Independent Curriculum	69%
Learning objectives	Higher Ordered Thinking Skill (HOTS)	87,7%
	Lower Ordered Thinking Skill (LOTS)	12,3%
Learning model	Problem Based Learning (PBL)	74,9%
	Project Based Learning (PjBL)	25,1%
Aspects of 21st Century Skills	Critical Thinking, Creativity, Collaboration, Communnicaton (4C)	88,9%
Learning steps	According to the Learning Model	93,5%
	Not appropriate to the learning model	6,5%
Worksheet	Group	80%
	Individual	20%
Instructional Media	Technological Pedagogical and Content Knowledge (TPACK)	67%
	TPACK, Teaching Aids and Student Books	33%
Assessment Instrument	According to Learning Objectives	87,3%
	Not Appropriate to Learning Objectives	12,7%

The results shown in Table 1 show that all aspects of innovative learning have been implemented. This is especially shown in the formulation of learning objectives, the use of learning models, strengthening students' skills in the 21st century, the use of TPACK-based learning media, and the application of HOTS (higher-order thinking skills) based assessment instruments.

These results are in line with research conducted by Bee Leng Chua (2023), stating findings from the study suggested that, (i) preservice teachers' pre-PBL metacognitive self-regulation played a pivotal

role in determining preservice teachers' perceived importance of the key processes in enhancing their PBL experience; (ii) the key PBL scaffolding and connecting processes were salient predictors of preservice teachers' subsequent post-PBL learning strategies; and (iii) the key PBL processes played a mediating role in relating preservice teachers' pre-PBL learning strategies to their corresponding post-PBL factors. Implications for using path analysis for Problem-based Learning research will be discussed (Chua, 2023).

CONCLUSION

Innovative learning at various levels of education, especially at the elementary school level, has become a necessity. The results revealed in this research show that it is very important for teachers to formulate learning objectives which become a reference in learning steps. The next finding is that the simultaneous use of learning models, strengthening students' skills in the 21st century, the use of TPACK-based learning media and the application of HOTS (higher-order thinking skills) based assessment instruments are the keys to success in making the student center active learning. Proof of the success of the innovative learning aspects mentioned above is shown by the significant increase in learning outcome scores from pre-test to post-test.

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