ANALYSIS OF THE COMPATIBILITY OF LKPD WITH THE PBL MODEL

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ABSTRACT

The purpose of this development research is to describe the suitability of the LKPD with the Problem Based Learning model. The research method used in this LKPD analysis is descriptive-analytical method. Data collection in this study was carried out by analyzing the LKPD designed by teachers in elementary schools and then analyzed using the PBL model suitability instrument. Based on the results of the analysis that has been carried out using the questionnaire instrument, it can be seen that the Grade 4 Mathematics LKPD in Fractional Materials has reached 100% conformity so that it can be said that the LKPD is in accordance with the learning model. LKPD Mathematics Class 5 Semester 1 has not met the suitability criteria, which is 60%, so the LKPD is not in accordance with the learning model. LKPD Grade 4 Mathematics for Circular Build Flat material has met the percentage of 100 %, so it can be seen that the LKPD developed is in accordance with the learning model.

Keywords : LKPD, Problem Based Learning, Mathematics

INTRODUTION

Learning is a conscious process to gain an understanding of an object. This process can be done continuously and continuously. As the discovery of a concept continues to be directly studied and developed. Learning can be said to be good if it involves students actively in learning to gain their own knowledge and connect it to the real context of students ' daily lives (Ariati, Rosnita, & Halidjah, nd) . Learning is also a process that requires learning resources as a support for successful learning (Wahdan Wilsa, 2019) .

The meaning of learning can actually be obtained through a constructivist process. Where this process involves students or students experiencing the learning process in a real and direct manner according to the context in the surrounding environment. The meaning of learning is also based on the existing educational pillars, namely *Learning to Know* , *Learning to do* , *Learning to be* , *Learning life together* , *Learning how to learn, Learning Throughout Life* (Suwarno, 2009). The six pillars of education can help students and teachers explore themselves in developing knowledge according to their learning characteristics and interests.

Meaningful learning certainly involves students actively. The interaction that occurs is also two-way. So there is a reciprocal relationship in the learning process. The reciprocal relationship between students and teachers can strengthen the role of each learning component, especially between students and teachers. This is in accordance with the learning theory proposed by Edwadg Le Torndike whose main characteristic of learning is connectionism, which is about stimulus and response. If the teacher provides the right stimulus, students will also respond reflectively to the stimulus presented in the learning process.

The presence of the stimulus presented by the teacher is expected to stimulate students to generate self-motivation to continue learning. As well as the purpose of education, namely long life education which has the understanding "education is everything in life that affects the formation of individual thinking and acting". Natural education is a view that the nature of life with its space and environment that contains various kinds of objects and gives birth to experiences is a place of education for humans (Soyomukti, 2015).

The educational component consists of educational objectives , students, tools, and the environment. The components of education synergize to form a unified system that has a certain pattern in creating a close and sustainable relationship. For example, an object that we often encounter in everyday life is a flashlight, a flashlight has parts that are connected to each other so that it can light up, these parts are lights, batteries, switches, elements. If one of the components in the flashlight is not present, the flashlight cannot turn on. That is like the components of education that influence and support each other .

The educational component will be maximized in the learning process if the teacher's role is carried out optimally in teaching students. Teachers as educational facilitators can design interesting learning by implementing innovations in learning. The innovations carried out can be in the form of choosing the right strategy or approach, choosing a learning model that is

appropriate to the characteristics of student learning, using the right method in training students' skills, selecting media that is in accordance with student learning interests, and the evaluation tools used. So that teachers have a fundamental role in creating a conducive learning environment for students.

The selection of learning models that can activate students in the learning process can be done by identifying the learning needs of students in achieving the learning objectives to be achieved. The learning model allows students to carry out learning activities and learning will be *student* centered . Learning models can be divided into various kinds, for example contextual, cooperative, problem-based, and discovery-based learning models.

The selection of learning models to be applied to learning activities is expected to stimulate students to be more active. The syntax attached to the model will organize students to carry out learning procedures in a systematic and directed manner. Several studies also show the effect of using learning models when applied to learning. The results of research that show the usefulness of the learning model are: learning using the Problem Solving learning model can improve student learning achievement (Putra, 2018) , learning with the Problem Based Learning model can improve learning outcomes in mathematics subjects with flat wake materials (Eismawati, Koeswanti, & Radia, 2019) , there are differences in students' mathematical understanding abilities before and after learning using a contextual learning model (Santoso, 2017) , blended learning methods or models can increase the effectiveness of learning to improve student learning outcomes (Wahyudin, 2020) . Based on research that has been done, it can be seen that the use of learning models can improve student achievement in terms of attitudes, knowledge, and skills.

Based on the results of observations made on September 21, 2022, it can be seen that: 1) Students do conventional learning, namely listening to the teacher's explanation then doing practice questions, 2) students' daily scores have not reached the minimum expected learning completeness criteria, which is only 65% of students. who have fulfilled the classical KBM, 3) Students have difficulty discussing and studying in groups because of the communication aspect that has not been effective, 4) there are students who play and talk alone during learning, 5) Students are not confident in conveying their work in front of the class. .

Based on the results of interviews conducted on September 22, 2022, it can be seen that: 1) teachers still use the lecture method as much as 80% when learning, 2) teachers still prioritize

values on cognitive aspects during learning, 3) learning activities are mostly done classically and minimally. group activities and discussions, 4) Teachers talk more in front of the class than students, 5) Teachers dominate learning so that learning is more teacher-centered.

The educational component consists of educational objectives, students, tools, and the environment. The components in education are interconnected and influence each other. The components of education synergize to form a unified system that has a certain pattern in creating a close and sustainable relationship. For example, an object that we often encounter in everyday life is a flashlight, a flashlight has parts that are connected to each other so that it can light up, these parts are lights, batteries, switches, elements. If one of the components in the flashlight is not present, the flashlight cannot turn on. That is like the components of education that influence and support each other .

A tool is a device or component that is needed in a system. Fun educational tools related to reinforcement, reward, punishment, sanction, reward. Positive educational tools are used to make children happy when they have done a good job and do not conflict with the rules and norms . Then the child will get praise and can also be in the form of gifts. While negative educational tools are related to the provision of punishment, reproach, sanctions, and rewards for actions taken by children that are deemed not good because they are not in accordance with the rules and norms .

Teaching materials in the form of LKPD are learning tools used to facilitate learning, facilitate learning development according to the characteristics of students, and teach students to perform sequential and systematic procedures. The development of LKPD teaching materials is certainly adjusted to the level of students' cognitive development.

Jean Piaget has a schema of children's cognitive development. Cognitive development schemes are used to classify children's cognitive development according to their level of development. The child's cognitive development scheme is divided into four stages, namely the *sensorimotor stage* (lasts from birth to 2 years of age); *pre-operational* stage (around 2-7 years of age); *concrete operational* stage (around 7-11 years old); and the *formal operational stage* (from age 11 onwards). Furthermore, Piaget explained that the differences in children's cognitive stages are caused by four factors, namely: maturity, individual experience, social transmission, direction and internal self-regulation (Suyono, 2015).

In addition, Bruner's theory emphasizes the concept of finding which is called discovery learning. This theory has a grouping based on the stage of children's intellectual development, namely enactive (*enactive*); iconic (*iconic*); and symbolic (*symbolic*). The three phases of Bruner's process are called *scaffolding* , which means mentoring students independently. Learning is emphasized on a process not a product. So that the process of experiencing and building knowledge is obtained by students themselves through direct and contextual learning experiences.

Constructivism theory places more emphasis on the concept of building and constructing knowledge that is already owned. So that new knowledge is born because there is a realistic human construction that forms schemas, categories, schemas and structures of knowledge. Through PBL-oriented worksheets, students are expected to be able to construct their own knowledge according to the characteristics of constructivism theory.

Learning theory also connects teachers in designing media, choosing learning models, and teaching materials used. The selection of learning models is certainly adjusted to the learning needs of students. The intended learning needs are related to the learning objectives to be achieved. So it requires an appropriate and relevant learning model for its application.

Research on the development of printed and electronic LKPD is widely used as a reference. As for research on LKPD to produce LKPD relevant in learning. The research that has been done is as follows.

First, research conducted by (Septian, Irianto, & Andriani, 2019) . The results showed that the resulting LKPD can be used as teaching materials, the assessment on the LKPD obtained a very good category with a score of 95%, student responses were also very good with a score of 93%, student achievement also increased. The second is research conducted by (Pranata, Frima, & Egok, 2021) . This research produces LKPD that has valid, practical, and effective criteria, has a potential effect, and is relevant to use. Third, research conducted by (Maiyuni & Dewi Maharani, 2016) shows the results of the validity of the student worksheet by users showing a score of 84.42%. The resulting test data were obtained from lecturers and teachers using a validity questionnaire. Fourth, research conducted by (Ati & Setiawan, 2020) which states that mathematics learning in fifth grade students is more effective using problem based learning models than problem solving learning models. Fifth, Research by (Permata, Roza, & Maimunah, 2021) can be seen that there is a match between LKPD and the learning model.

Based on the five studies that have been conducted. It can be concluded that: 1) The selection of LKPD as teaching materials can help the learning process more effectively, 2) Development of relevant LKPD for use by students according to the material and needs, 3) The use of LKS is appropriate to be applied in accordance with the validity of users in the field, 4) Utilization of LKPD Problem Based Learning is more effective to facilitate students' critical thinking skills, 5) The development of LKPD has met the development criteria that integrates certain learning models.

Based on the exposure to the data presented, the researcher will design a study entitled **"Analysis of the Conformity of LKPD With Problem Based Learning Models "**

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LKPD as teaching materials

Student worksheets (LKPD) are tools used to assist the learning process. LKPD has an important role in applying a learning design. This is due to the ease of use in learning. In addition , LKPD has the following functions. 1) can be used to solve problems according to the instructions contained in it, 2) help students understand concepts independently, 3) be used as a tool to convey the teacher's message in the learning process, 4) make it easier for teachers to achieve the expected learning goals (Pentury, Festiyed, Hamdi, & Yurnetti, 2019) .

LKPD is a printed teaching material in the form of a sheet of paper containing teaching material that is packaged in a procedure that students need to do through the activities presented. The message presented pays attention to the graphic elements of the material hierarchy, as well as effectiveness and efficiency in the selection of questions (Effendi, Herpratiwi, & Sutiarso, 2021) . LKPD as a teaching material has a systematic according to its type and development. The use of LKPD in learning can make students manage learning materials both individually and in groups (Aditama, Zainuddin, & Bintartik, 2019) . LKPD is an instrument used by teachers in the learning process in the classroom (Firdaus & Wilujeng, 2018) .

***Problem Based Learning* Model**

Problem based learning learning model is a learning model that has steps and procedures to solve problems through high-level thinking processes. The PBL model is a paradigm that changes the learning mindset from teacher-centered to student-centered. Students not only learn concepts but do learning in a real context. (Effendi et al., 2021) . The PBL model raises a

problem to be identified so that in the process students can obtain information, knowledge, and skills by integrating the knowledge they already have with new knowledge that is being sought for a solution (Fauzia & Fauzia, 2018) . So it can be concluded that the problem-based learning model is learning that presents a problem at the time of orientation, then students construct the old knowledge they have with new knowledge that is found through problem solving that is carried out in real terms according to the context experienced by students. So that the acquisition of the concept is obtained based on the procedures carried out.

LKPD Oriented Learning Model Problem Based Learning

LKPD preparation is carried out using the procedures and steps contained in printed teaching materials. Regarding the selection of teaching materials, there are three principles that serve as guidelines. First, the principle of relevance. This means that the selected teaching materials should be related to the achievement of core competencies and basic competencies. Second, the principle of consistency. This means that the selected teaching materials have a constant value. So between the basic competencies that must be mastered by students and the teaching materials provided have harmony and similarities. Third, the principle of sufficiency. This means that when choosing teaching materials, adequate ones should be sought to help students master the basic competencies that are mastered.

LKPD teaching materials is simpler than modules, but more complex than books. The structure of the LKPD teaching materials consists of six components, namely titles, study instructions, basic competencies, or subject matter, supporting information, tasks or work steps, and assessments. The development of teaching materials is needed to create interesting and contextual learning with the needs of students. According to Prastowo (2015: 50) analysis of teaching material needs is the first step used to compile teaching materials. There are three stages in conducting a needs analysis, namely: 1) an analysis of the curriculum; 2) analysis of learning resources; and 3) determining the type and title of teaching materials.

After analyzing the needs of teaching materials, the next step in developing teaching materials is compiling a map of teaching materials. According to Prastowo (2016: 288) the benefits of compiling a map of teaching materials are: 1) to find out the amount of teaching materials that need to be prepared in a certain period, both in terms of type and quantity; 2) to find out the sequence or order of teaching materials that are indispensable in determining writing priorities; 3) to determine the nature of teaching materials *dependent* or *independent.*

The preparation of PBL-oriented LKPD is teaching materials that are arranged according to the steps of preparing printed teaching materials which in the structure of their contents there is a PBL model syntax. The syntax, namely PBL has 5 phases, namely meeting problems, analyzing learning problems, discovery and reporting , presentation and reflection of solutions, overview, integration and evaluation (Oon-Seng, 2003) . The Problem - Based Learning (PBL) model has a procedure consisting of (1) the teacher presents the problem to the students; (2) Students identify the given problem; (3) Students seek information to solve problems from various sources; (4) They choose the most appropriate solution in the process of solving the problem; (5) The teacher evaluates the work (Saputra, Joyoatmojo, Wardani, & Sangka, 2019) .

METHOD

The research method used in this LKPD analysis is descriptive-analytical method, which is a method used to examine the status of an object, certain conditions, or an event in the present which aims to make a description, provide a factual and accurate picture of the object under investigation. (Ardina & Sa'dijah, 2016) . The analytical method is used to reveal the suitability of using the model in the LKPD which is linked to the indicators and descriptors that have been prepared.

This study uses a document study of the LKPD which was produced by 3 teachers who are following the Pre-service PPG. The research data collection uses the document analysis method. Data collection in this study was carried out by analyzing the LKPD designed by teachers in elementary schools and then analyzed using the PBL model suitability instrument.

Qualitative research examines the perspective of participants with multiple strategies, interactive strategies, such as direct observation, participatory observation, in-depth interviews, documents, complementary techniques such as photographs, recordings, etc. (Sukmadinata, 2017). Sources of data in this study are divided into 2 primary data and secondary data. The primary data in this research is LKPD. The secondary data in this study were the results of observations, interviews, and journal studies.

The instrument analyzed is the LKPD document. The instrument used is a checklist instrument to answer the suitability between LKPD and the learning model. The analysis of the suitability of the LKPD to the learning model refers to the questionnaire rubric. The scoring rubric consists of 5 syntaxes that exist in PBL. can be seen in the following table.

Table 1 Research Instrument Data

LKPD	PBL Syntax	In accordance	It is not in accordance with	Information
	Student orientation on problems			
	Organizing students to study			
	Guiding individual or group investigations, developing and presenting work, and analyzing and evaluating problem solving processes			
	Develop and present the work			
	Analyze and evaluate			
	Amount			
	Percentage			

Next. The analytical instrument and steps for calculating the percentage of conformity are presented as follows:

Table 2 Creativity Assessment Criteria

No	Kriteria	Katagori
1	90 % - 100 %	Sangat baik (A)
2	80 % - 89 %	Baik (B)
3	70 % - 79 %	Cukup (C)
4	60 % - 69 %	Kurang valid (D)
5	< 59 %	Tidak baik (E)

Adaptation from (Arifin, 2016)

$$Persentase\ nilai\ kreativitas\ (\%) = \frac{jumlah\ skor\ yang\ diperoleh}{jumlah\ skor\ maksimal}\ x\ 100\%$$

RESULTS

Analysis of Student Worksheets

(LKPD) in learning mathematics involves aspects of the suitability of the contents of the LKPD with the PBM or PBL models used in learning and its relation to problem solving. The steps or stages of PBM or PBL that should be contained in the LKPD are (1) Orientation of

students to problems, (2) Organizing students to learn, (3) Guiding individual and group investigations, (4) Developing and presenting results works, (5) Analyzing and evaluate the problem solving process. The presentation of the LKPD is said to be in accordance with the PBL or PBM model if all the steps in the LKPD are fulfilled and in accordance with the stages in the PBM or PBL model. If there is one learning step that is not appropriate or is not presented and implemented in the LKPD, the LKPD is said to be not in accordance with the learning model. To achieve 100% conformity, each stage in the LKPD has a weight of 20% , this is because there are five steps used in the PBM or PBL model, so to achieve 100% conformity each stage is given a weight of 20%. The following are the results of the PBM or PBL model LKPD analysis:

Table 3 Analysis of Grade 4 Mathematics LKPD (Nita Retno Wahyuningati)

LKPD Type	PBL Syntax	In accordance	It is not in accordance with	Information
LKPD Mathematics Grade 4	**Student orientation on problems**			Students pay attention to the narrative text presented to be identified
	Organizing students to study			Students analyze pictures to match them with the desired command
	Guiding individual or group investigations, developing and presenting work, and analyzing and evaluating problem solving processes			Students are presented with problems and then look for solutions
	Develop and present the work			Students compose a booklet
	Analyze and evaluate			Students are given the opportunity to provide suggestions and comments related to the learning carried out. In addition, students can also write down any material that has been studied and mastered after learning is complete
	Amount	5		
	Percentage	100%		

Table 4 Analysis of LKPD Mathematics for Grade 5 Semester 1 (Fitriyah Rachmawati)

LKPD Type	PBL Syntax	In accordance	It is not in accordance with	Information
LKPD Mathematics grade 5 Semester 1	**Student orientation on problems**	□		Implicit activity in observing aspect
	Organizing students to study		□	There are no organizing activities yet
	Guiding individual or group investigations, developing and presenting work, and analyzing and evaluating problem solving processes	□		Activities are carried out through discussion and fun trying
	Develop and present the work		□	It has not been seen that the activities present either in the form of simulations, demonstrations, and simulations
	Analyze and evaluate	□		It appears in the conclusion activity
	Amount	4		
	Percentage	60%		

Table 5 Analysis of LKPD Grade 4 Mathematics (Sofyan Budi Setyantoro)

LKPD Type	PBL Syntax	In accordance	It is not in accordance with	Information
LKPD Grade 4 Mathematics	**Student orientation on problems**	□		Students are presented with problems
	Organizing students to study	□		Students observe the video
	Guiding individual or group investigations, developing and presenting work, and analyzing and evaluating problem solving processes	□		Performing an analysis of factual problems
	Develop and present the work	□		Students compose a booklet
	Analyze and evaluate	□		Students are given the opportunity to provide related suggestions and comments learning done. In addition, students can also write any material

LKPD Type	PBL Syntax	In accordance	It is not in accordance with	Information
				that has been learned and mastered after learning is complete
	Amount	5		
	Percentage	100%		

DISCUSSION

In general, the results of the analysis of the three mathematics lesson plans can be presented in the following table.

Table 5 Analysis of the Suitability of Mathematics Lesson Plan

PBL Syntax	LKPD Type	Conformity Percentage	LKPD presentation
Student orientation on problems	**LKPD Mathematics Class 4 Fractions**	100%	In accordance
Organizing students to study	**LKPD Mathematics Class 5 Semester 1**	60%	Not appropriate
Guiding individual or group investigations, developing and presenting work, and analyzing and evaluating problem solving processes	**LKPD Grade 4 Mathematics Materials Circumference of Flat Shapes**	100%	In accordance
Develop and present the work			
Analyze and evaluate			
Total Percentage		260%	
Average Percentage		86.67%	

The table above is the result of the analysis of 3 RPP PPG students for the 2018 batch of Elementary School Teacher Education (PGSD) Programs in the University of Muhammadiyah Malang. The explanation can be presented through the following explanation.

The first phase of student orientation on the problem. In this phase the learning activity is entitled "Let's read". This activity aims to bring students to be ready to learn and recognize learning problems, especially about fractions that are presented contextually so that children will build mathematical concepts. This is because PBL can expand and improve as an independent learner by cultivating curiosity in learning and the ability to determine their needs as a learner. (Delisle, 1937)

Second, the phase of Organizing students to learn. In this phase, students are presented with let's learn activities. In this phase students are directed to learn to use the media that will be used in the learning process both individually and in groups. The role of the media is very important in the formation of concepts and student learning activities.

The three stages guide individual and group investigations. At this stage students are presented with the " Let's investigate" activity. In this activity students are invited to learn about fractions used in real contexts or in everyday life accompanied by solving mathematical problems. Math problem solving can.

Fourth, the phase of developing and presenting the work. In this phase, let's communicate activities are presented. Communicating activities are presented in writing, this is because in this study the world is being hit by an epidemic which is a pandemic, namely the corona or covid-19 so that presentation activities are diverted in the form of presenting portfolio work. The presentation of the portfolio can be in the form of a simple booklet or poster to determine the level of students' understanding and the activities carried out by students in learning using LKS.

The five phases of analyzing and evaluating are presented in the form of a “let's reflect” activity. This activity is carried out to reflect on students' understanding after learning by doing LKS. Activities are presented in the form of math problems about fractions involving the media of a fractional folding board presented in the form of pictures and questions. Evaluation and reflection activities are carried out to deepen students' understanding of the fraction concept. So that students are able to construct their knowledge.

CONCLUSION

Based on the results of the analysis, it can be concluded that the LKPD Mathematics Class 4 Fractional Materials has reached 100% conformity so that it can be said that the LKPD is in accordance with the learning model. LKPD Mathematics Class 5 Semester 1 has not met the suitability criteria, which is 60%, so the LKPD is not in accordance with the learning model. LKPD Grade 4 Mathematics for Circular Build Flat material has met the percentage of 100 %, so it can be seen that the LKPD developed is in accordance with the learning model.

SUGGESTION

Based on the procedures that have been carried out, the researcher suggests that the preparation of the LKPD needs to be adjusted to the learning model that has been chosen so that the development of the LKPD can be relevant to be applied in learning according to the class and subject being taught.

Aditama, HS, Zainuddin, M., & Bintartik, L. (2019). Development of Hots-Based Worksheets on Mathematics Learning Materials Volume Building Class V Sdn Sentul 1. *Elementary School Boarding School , 27* (2), 66–72.

Ardina, FR, & Sa'dijah, C. (2016). Analysis of Student Worksheets in Improving Students' Writing Mathematical Communication. *Journal of Education: Theory, Research, And Development , 1* (2), 171–180. Retrieved from http://journal.um.ac.id/index.php/jptpp/article/view/6119

Ariati, D., Rosnita, AG, & Halidjah, S. (nd). *DEVELOPMENT OF PROJECT BASED LEARNING-BASED IPA LKS TO IMPROVE SCIENTIFIC WORK SKILLS FOR CLASS IV* .

Arifin, Z. (2016). *Learning Evaluation* (Pipih Latifah, ed.). Bandung: PT. Rosdakarya Youth.

Ati, TP, & Setiawan, Y. (2020). The Effectiveness of Problem Based Learning-Problem Solving on Critical Thinking Ability in Mathematics Learning for Class V Students. *Scholar's Journal: Journal of Mathematics Education , 4* (1), 294–303. https://doi.org/10.31004/CENDEKIA.V4I1.209

Effendi, R., Herpratiwi, H., & Sutiarso, S. (2021). Development of Problem Based Learning-Based Mathematics LKPD in Elementary Schools. *Journal of Basicedu , 5* (2), 920–929. https://doi.org/10.31004/basicedu.v5i2.846

Eismawati, E., Koeswanti, HD, & Radia, EH (2019). Improving Mathematics Learning Outcomes Through Problem Based Learning (PBL) 4th Grade Elementary School Students. *Journal of Mercutika: Journal of Mathematics Research and Mathematics Education , 3* (2), 71–78. Retrieved from http://ejurnal.mercubuana-yogya.ac.id/index.php/mercutika/article/view/694

Fauzia, H., & Fauzia, HA (2018). APPLICATION OF PROBLEM BASED LEARNING MODEL TO INCREASE MATHEMATICS LEARNING OUTCOMES FOR SD. *Primary: Journal of Primary School Teacher Education , 7* (1), 40–47. https://doi.org/10.33578/jpfkip.v7i1.5338

Firdaus, M., & Wilujeng, I. (2018). The development of guided inquiry worksheets to improve critical thinking skills and student learning outcomes. *Journal of Science Education Innovation , 4* (1), 26–40. https://doi.org/10.21831/JIPI.V4I1.5574

Maiyuni, S., & Dewi Maharani, A. (2016). Validity of Student Worksheets (LKS) Based on Problem Based Learning on Diversity Materials on Biodiversity Materials for High School Biodiversity. *Journal of the Rainbow , 8* (2). https://doi.org/10.22202/jp.2016.v8i2.1553

Oon-Seng, T. (2003). *Problem-Based Innovation Learning Using Problems to Power Learning in the 21st Century* . Retrieved from http://www.cengagelearningasia.com

Pentury, H., Festiyed, Hamdi, & Yurnetti. (2019). Making Student Worksheets (LKPD) Based on the Discovery Learning Model on Wave Materials Assisted by Android Applications for Class XI SMA/MA Physics Education Students, Faculty of Mathematics and Natural Sciences, Padang State University 2). *Physics Education , 12* (4), 617–624. Retrieved from

http://ejournal.unp.ac.id/students/index.php/pfis/article/view/7144

Permata, ID, Roza, Y., & Maimunah, M. (2021). Conformity Analysis between LKPD and Learning Model. *NATURALISTIC: Journal of Educational Research and Learning* , *5* (2), 764–773. https://doi.org/10.35568/NATURALISTIC.V5I2.1043

Pranata, DP, Frima, A., & Egok, AS (2021). Development of Problem Based Learning-Based Mathematics Worksheets on Elementary School Flat Shape Materials. *Journal of Basicedu* , *5* (4), 2284–2301.

Putra, NLJ (2018). Efforts to Improve Civics Learning Achievement on Positive Attitudes towards Norms through Problem Solving Learning Models. *Journal of Educational Sciences (JIP) STKIP Kusuma Negara* , *9* (2), 49–64. Retrieved from http://jurnal.stkipkusumanegara.ac.id/index.php/jip/article/view/13

Santoso, E. (2017). USING CONTEXTUAL LEARNING MODEL TO IMPROVE MATHEMATICS UNDERSTANDING ABILITY OF ELEMENTARY SCHOOL STUDENTS. *Journal of Pendas Cakrawala* , *3* (1). https://doi.org/10.31949/JCP.V3I1.407

Saputra, MD, Joyoatmojo, S., Wardani, DK, & Sangka, KB (2019). Developing Critical-Thinking Skills through the Collaboration of Jigsaw Model with Problem-Based Learning Model. In *International Journal of Instruction* (Vol. 12). Retrieved from www.e-iji.net

Septian, R., Irianto, S., & Andriani, A. (2019). Development of Student Worksheets (Lkpd) Mathematics Based on Realistic Mathematics Education Models. *Journal of Educatio FKIP UNMA* , *5* (1), 59–67. https://doi.org/10.31949/educatio.v5i1.56

Wahdan Wilsa, A. (2019). Differences in Student Learning Outcomes Using Interactive Multimedia with Textbooks in Biology Learning in Senior High School. *Mangifera Edu* , *4* (1), 62–70. https://doi.org/10.31943/MANGIFERAEDU.V4I1.42

Wahyudin, A. (2020). Blended Learning Model (Flipped Classroom Model) to Increase the Effectiveness of Social Science Learning During the Covid19 Pandemic. In *Journal: Perspective* (Vol. 1). Retrieved from Research Articles website: http://thejournalish.com/ojs/index.php/elektropandang/article/view/53