JCRS (JOURNAL OF COMMUNITY RESEARCH AND SERVICE)
Vol. 8 No. 1, April 2024
ISSN (print): 2549-1849 ISSN (online): 2549-3434
Available online at https://jurnal.unimed.ac.id/2012/index.php/jcrs

# Development of Student Worksheets with *Canva* App-Assisted *Problem Based Learning Models* to Improve Skills Mathematical Literacy of Junior High School Students

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**Abstract**. The purpose of this study is (1) to determine the validity, practicality and effectiveness of Student Worksheets with the developed PBL Model (2) To find out how Student Worksheets (LKPD) with the Problem Based Learning (PBL) model assisted by Canva can improve the mathematical literacy skills of grade VIII students of SMPS Al washliyah 8 Medan. This research method is research development (Research and Development) using the ADDIE model. The subject of this study is a grade VIII student of SMP Al washliyah 8 medan for the 2023/2024 academic year. The learning LKPD developed has met the criteria of validity, practicality and effectiveness. Reviewed for validity, the average value of total LKPD validation was 4.42 (very valid), then the total validity of RPP was 4.47 (very valid) and as well as mathematical literacy ability tests, student response questionnaires and practical questionnaires were declared valid. Judging from practicality: the average value of practicality from trial I from teachers was 82% (practical) and student responses were 81.83% (practical). In trial II from teachers by 95% (practical) and student responses 86.83 (practical). Judging from effectiveness, with the student worksheet (LKPD) developed, the average score increased from test I of 71.43 to 89.28 in trial II.

***Keywords:*** Student Worksheet (LKPD), *Problem Based Learning*, Canva, Mathematical Literacy Ability.

**Article history**: Received: Mar 2024; Revised: Apr 2024; Accepted: Apr 2024; Available online: Apr 2024
**How to cite this article**: Nurazizah, Simamora, Y., Putri, J.H. (2024). Development of Student Worksheets with Canva App-Assisted Problem Based Learning Models to Improve Skills Mathematical Literacy of Junior High School Students. *Journal of Community Research and Service,*8(1).

## 1. Introduction

Education is always sustainable and does not end in order to produce sustainable quality centered on the cultural values of the nation and Pancasila. [1]. Learning and learning are interconnected and inseparable educational process. Learning and learning is education where there is interaction between teachers and students. Teaching and learning activities are held to achieve certain goals beforehand. By utilizing all teaching interests, teachers consciously plan their classroom activities systematically. Learning is a change in behavior caused by the interaction of a person and his environment. Behavior change on learning outcomes is synonymous with consistent, functional, positive, active, and purposeful. According to experts in education and psychology, this process occurs in various conditions. Learning is the process of student interaction with teachers, learning materials, learning strategies, delivery methods, and learning resources in the learning environment [2].

Mathematics as the most important branch of science for other disciplines in addition to contributing to technological progress. Students, from elementary school to college, should be taught mathematics [4]. Mathematics still scares students. Mathematics is still considered difficult by students, because of students' distrust of mathematics learning. However, self-confidence is essential for student success in maths. With confidence, students achieve success in mathematics [5].

The results of the above test were carried out at SMP Al-Washliyah 8 Medan, 24 students who took the test saw students' answers, there were still some who were unable to answer part a where the indicators

were formulate, there *were* students who were not able to meet what was known and asked. Answer b where the indicator applies consequences, facts, procedures, and mathematical reasoning (*employe*), there are some students where students are not able to write formulas or facts and there are also some students who write formulas or facts but are still wrong. Most students have not been able to answer part c questions where the indicators understand, use, and assess mathematical results (*interprete*), most students are not able to solve the question of how much it costs, besides that students are not able to evaluate the results and draw conclusions. Researchers also found that there is still a lack of mathematical literacy skills of grade VIII-3 students.

According to [6] Good teaching materials must be available as needed to help students learn. Valid, practical, and effective teaching materials are to meet student needs, easy to use, and definitely support student learning outcomes. However, from the data I got, at SMP Al Washliyah 8 Medan the school has facilitated learning resources in the form of package books, but the teacher has not been creative in utilizing the facilities provided by the school.

By looking at real problems, the problem-based learning model helps students become independent, grow their skills and inquiry, and support their confidence (Simamora, Simamora, et al., 2023).

Problem-Based Learning is a learning method intended to teach students critical thinking and problem-solving skills using real problems.So in accordance with this there is in the word of Allah in accordance with the problems faced in learning, where every time there is difficulty there must be ease, namely: (QS Al-Inshirah: 5-8)

﴿ ۙ فَاِنَّ مَعَ الْعُسْرِ يُسْرًا ۙ اِنَّ مَعَ الْعُسْرِ يُسْرًا ۗ فَاِذَا فَرَغْتَ فَانْصَبْ ۙ وَاِلٰى رَبِّكَ فَارْغَبْ ﴾

It means: "Then with difficulties there is ease, indeed with difficulties there is ease. So when you have finished (of one business), keep working hard (for another), and only in your Lord do you hope." (QS Al-Inshirah: 5-8)

In the teaching and learning process, media or applications are very important, but most teachers find it difficult to use learning media, especially digital-based even though technology is now in the era of revolution 4.0 which has demanded the need for digitization in the process that can cause a decrease in student interest in mathematics. Examples of learning media that can be used are Canva. Online design programs that facilitate various tools such as presentations, resume posters, pamphlets, brochures, graphics, infographics, banners, bookmarks, bulletins, and more are called Canva [7].

The author found the students not to have good mathematical skills. Teachers also do not do anything innovative to use school facilities. Teachers use old models, are not varied, and do not use media. Therefore, designing or developing LKPD can help students be more structured in completing learning.

The objectives of this study are: 1) Seeing the validity, practicality and effectiveness of developing student worksheets *(LKPD) with a Problem Based Learning (PBL) model ; and 2) Understanding how Student Worksheets (LKPD) with* the Problem Based Learning *(PBL) model assisted by Canva can grow the mathematical literacy skills of grade VIII students of SMPS Al washliyah 8 Medan.*

Meanwhile, the benefits include: 1) For students as an effort to improve mathematical literacy skills through the development of LKPD; 2) For teachers as information material regarding the development of Student Worksheets (LKPD) with a *Problem Based Learning* (PBL) model using mathematical literacy problem solving learning; 3) As a source of school ideas to improve the quality of learning and help schools establish positive relationships with students; 4) For researchers as information and guidance to carry out teaching tasks as future teaching candidates

## 2. Literature Review

### 2.1. Understanding Learning

Learning is very important in order to stay alive and develop in the life of the state community. Without learning, humans find it difficult to adapt to the demands of life, livelihood, and change. What is recommended [8] Learning is the process of constantly developing attitudes, abilities, knowledge, and skills to prepare for the future. Learning activities are the process of students acquiring various skills and attitudes to be good. The success of achieving goals depends on the learning system received by students [9].

Planning, designing, or designing as a basis for learning, students interact with the teacher, but also use various resources to achieve learning objectives. (Ratnasari, 2019) Learning is a teaching and learning process that affects student success. Mathematics is a compulsory subject for all students. It helps students learn to think critically, analytically, logically, and systematically. (Mulyati &; Evendi, 2020). Therefore,

mathematics learning is a process of teacher interaction with students that relates thinking patterns and logic processors in the learning environment. Teachers use various methods to manage mathematics programs to grow and develop most effectively, so that students can use them.

**2.2. Student Worksheets**

In the 2013 curriculum, Student Worksheets (LKS) were renamed to Student Worksheets (LKPD). According to (Elok Pawestri1) LKPD (LKS) is a teaching material containing sheets of material paper, summaries, and instructions. LKS also includes basic goals and competencies that students must achieve. According to (Kholifahtus et al., 2022) LKPD is teaching material consisting of sheets containing material, summaries, and instructions for the implementation of tasks to help students carry out learning activities.

To achieve the learning objectives of LKPD is important in the process of teaching activities. Due to the fact that LKPD is a way to help and facilitate the teaching and learning process, which allows effective interaction between students and educators. LKPD also has the potential to increase student activity and learning achievement. Student Worksheets (LKPD), also known as LKS, as learning resources and teaching aids.

From those mentioned above, student worksheets (LKPD) are learning resources consisting of task sheets, instructions for doing tasks, and learning evaluations designed to meet the basic competencies that students must achieve. LKPD is also a student learning tool, facilitating the understanding of information, the learning process is more enjoyable, and provides various learning options.

LKPD is a learning guideline that requires students to actively participate in learning. LKPD clearly has a specific purpose. According to (Pawestri &; Zulfiati, 2020) Delivering student worksheets is useful as a trial or demonstration guide and cognitive aspect development exercises.

The purpose of preparing LKPD according to (Pawestri &; Zulfiati, 2020) among others: a) Provide teaching materials that are easy for students to understand; b) Provide assignments so that students master the material; c) Teach people self-learning; d) Help teachers assign assignments. In conclusion, LKPD has the main function and purpose, namely learning media to maximize the learning process for the delivery of learning objectives in the classroom. With LKPD, students have the opportunity to participate more actively in the learning process assisted by assignment sheets in LKPD.

According to (Pawestri &; Zulfiati, 2020) LKPD is also useful for: a. Provide concrete experiences to students; b. Increase the variety of learning models in the classroom; c. Fostering student interest; d. Increase learning potential; e. Use time well.

Based on the information above, it was decided that LKPD helps teachers and students in the learning process. The most significant benefit is that teachers are easier to distribute subject matter and students more easily understand the material.

Elements of LKPD according to (Pawestri &; Zulfiati, 2020) Among others, namely, including work instructions, simple and short instructions, there are questions that students must answer, student answer rooms, and easy-to-understand pictures. Elements of LKPD in General:

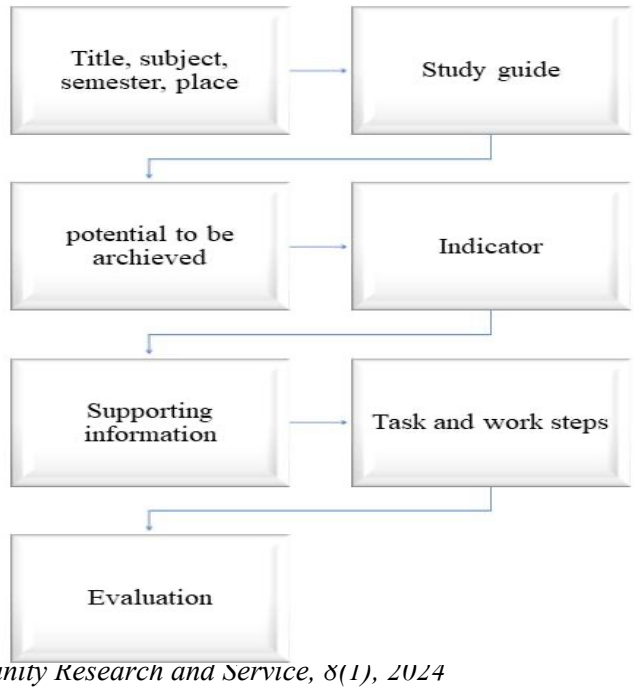

**Figure 2**. Elements of LKPD

LKPD is considered eligible if there are conditions met. According to (Pawestri &; Zulfiati, 2020) LKPD requirements are:

1. Didactic requirements: For slow or clever students, learning to use LKPD is universal. LKPD further suppresses the process of concept discovery, and diverse stimuli pass through various media and student activities. LKPD also brings to life abilities, social, moral, emotional and aesthetic communication.
2. Construction requirements related to LKPD, language acquisition, sentence structure, vocabulary, level of difficulty and clarity.
3. Technical requirements indicate writing, drawings, appearance in LKPD.

So, the requirements for the preparation of LKPD are:

1. Didactic conditions, conditions of primacy of the discovery of ideas and universal use.
2. Construction requirements, Indonesian writing rules, e.g. sentence structure, vocabulary, etc..
3. Technical requirements, requirements related to the appearance of LKPD and creativity, such as image placement, font selection, etc.


**Figure 3.** *Preparation of LKPD*

### 2.3. Student Worksheet Problem Based Learning (PBL) Learning Model

Putri (2022) stated that the selection of learning methods or models must be adjusted to the material, student conditions, era and goals to be achieved. *Problem Based Learning* (PBL) is one of the learning models to help students gain skills in this era of globalization. Through this model, real problems are presented to students at the beginning of learning, worked through investigation, and problem-solving approaches are applied. It is concluded that problem-based learning (PBL) has the ability to teach students to solve real problems during learning (Hotimah, 2020).

Learning model *Problem Based Learning* (PBL) is a learner-centered learning model. It involves learners and real-world problems asking them to solve those problems. (Meilasari et al., 2020). According to Duch, *Problem Based Learning* (PBL) is defined as a challenger to students "learning how to learn", working in groups to end reality problems, useful in binding students' interest in the lesson. According to Arends, *Problem Based Learning* (PBL) is a method by which students encounter real problems so that

they can develop knowledge, independence, confidence, and inquiry skills. According to Glazer, *Problem Based Learning* It is a teaching approach that students take on complex problems in real situations.

From several meanings of *Problem Based Learning decided*, Problem Based Learning *is a learning model that starts by directing students to real world problems, as well as innovative learning that can provide students with active learning.*

The *Problem Based Learning model* is characterized by students having to learn problems in the real world. The *Problem Based Learning* model expects skilled students beyond memorized knowledge. This includes problem-solving, critical thinking, group work, communicating with others, and processing information.

The implementation of the *Problem Based Learning* model consists of 5, namely:

1. The first stage: orientation of learners to problems. At this stage, the teacher explains the learning objectives, proposes mandatory logistics, encourages students to actively participate in solving problems, and gives problems.
2. The second stage, organizing learners. The teacher divides students into groups to help them determine, organize problem-related learning tasks.
3. The third stage guides individual and group investigations. The teacher invites students to experiment and investigate in order to obtain explanations and solve problems.
4. The fourth stage, develop and present results. Teachers help students plan, create reports, documentation, or models, and help them share assignments with each other.
5. The fifth stage is analyzing and evaluating the process and results of problem solving. Teachers help students reflect, assess the process and results of research.

These five stages can be concluded in full through Table 1

**Table 1**. PBL Model Stages

| Learning Stage | Teacher Activities |
|---|---|
| Stage 1: Orientation of learners to the problem | The teacher explains the learning objectives, provides mandatory logistics, uses phenomena, demonstrations, or stories to foster problems, and invites students to actively participate in solving problems. |
| Stage 2 Organizing Students | The teacher divides students into groups to help them determine, organize problem-related learning tasks. |
| Stage 3 Guide individual and group investigations | The teacher invites students to experiment and investigate in order to obtain explanations and solve problems. |
| Stage 4: Develop and present results | Teachers help students plan, create reports, documentation, or models, and help them share assignments with each other. |
| Stage 5 Analyze and evaluate the process and results of problem solving | Teachers help students reflect, assess the process and results of research. |

The PBL model is a student-centered learning model. When students become the main subject of learning, students must adapt. Teachers also need to prepare themselves for PBL. According to Arends (Ardianti et al., 2022), the process of engaging students into study groups and confronting challenging problems. Here are some simple but important approaches educators take to cope with the transition.

1. Write down the main procedure of gathering a group on the board. Visual cues make it easy for students to move to groups.
2. Ask two or three students to reinterpret the direction. Students rephrase directions to pay attention to each other and provide feedback to educators on whether or not directions are understandable.
3. Identify and locate each team. There will be areas that are not filled by students. Students usually gather in places that are reached. In order for small groups to work together, educators must clearly designate the part of the room each team occupies and ask them to do so.
4. Advantages and disadvantages of PBL

*Problem Based Learning* has advantages, including:

1. Provoke students' abilities, give students satisfaction to seek new knowledge.
2. Increase student encouragement and learning activities.
3. Help students apply what they know to the real world.

4. Help students gain new knowledge and take responsibility for what is learned. In addition, using PBM can encourage students to assess themselves about the learning process and its results.
5. Increase students' ability to think critically and adapt to new information.
6. Provide opportunities for students to use their knowledge in real situations
7. Increase the desire of students to continue learning even though formal education ends.
8. Make it easier for students to understand the concepts taught to solve real-world problems.

Besides the advantages, *problem-based learning* also has disadvantages, namely:

1. Students do not try the problem they are taught if they are not interested or believe the problem is difficult to solve.
2. Some students believe that if they do not receive problem-solving materials, they are lazy to study them.

Of the several advantages and disadvantages of *the problem-based* learning model, teachers must not only be the main subject of living the learning atmosphere, but also involve students to improve their critical thinking skills. While it is true that not all subject matter can be given to the form of a problem that can be solved, working with students can foster interest in the lesson.

**2.4. Canva app**

Learning media is very important in education and teaching and learning processes because it contributes significantly to student growth in schools (Simamora, Saragih, et al., 2023). With Canva, you can create a variety of tools, such as presentations, posters, resumes, brochures, flyers, graphics, info graphics, banners, flyers, certificates, invitation cards, business cards, postcards, logos, labels, bookmarks, newsletters, CD covers, book covers, templates, photo edits, mini videos on YouTube, stories on Twitter, and Facebook covers (Tanjung &; Faiza, 2019). Therefore, Canva is an online platform used to create learning tools. (R et al., 2020). Here are some of Canva's Stages (R et al., 2020):

1. Log in to your canva account. You'll need to go to www.canva.com website with your previous account, or by email, Google, or Facebook.
2. To start the design, select a template. The main page view appears after you log in correctly. In the following image, we select the "create a design" menu. Then, select the visual presentation template you want to use.
3. Third, there are two ways to add text. The first step, keep using the text in the Canva template. The second step, select manually in the text menu.
4. Fourth, the addition of audio-visual content. In this case, the researcher raises a face while explaining the material in the learning media being worked on.
5. Once the design process is complete, the results are downloaded and saved offline. However, the design file can be saved automatically. To download, please select the "Download" menu in the upper right corner of the screen. The down arrow is also another option.

According to (R et al., 2020) The advantages of the Canva application are as follows:

1. Stores a variety of cool graphic designs, animations, templates, and page numbers.
2. Supporting teacher creativity in designing learning media because there are many drag-and-drop features and features.
3. Reduce the design time of practical learning media.
4. Students can use canva given by the teacher to explore the material.
5. Canva media slides have good image resolution and automatic print sizing
6. Can work with other teachers on media design and form a canva design team to share learning media.
7. Design learning media anywhere, from a laptop or mobile phone.
8. Canva can be taken from various formats, such as pdf and jpg, and can be used for offline presentations on other media such as PowerPoint.

**2.5. Mathematical Literacy**

Mathematical literacy of the two words "literacy" and "mathematics", which are combined into a new definition. The definition of literacy is now no longer limited to the ability to read and write, but is defined as the ability to solve problems by allowing and developing thinking skills, namely critiquing, analyzing, and evaluating data from multiliterate, multicultural, and multimedia contexts through the empowerment of multiintelligence. (Poernomo et al., 2021). According to (Hapsari, 2019) Mathematical literacy is a cognitive ability that students must have. Mathematical literacy is a comprehensive mathematical ability which formulates, applications, interprets mathematics in various contexts; reasoning; and relate mathematics to everyday life.

Seeing the world through mathematics is the main goal of mathematical literacy, so literacy positions mathematics as a higher-order thinking activity that requires problem-solving skills. (Umbara, Wahyudi,

Sufyani 2019). Based on the assessment of the literacy process delivered by PISA (Munawaroh &; Hakim, 2022) Indicators on mathematical literacy consist of:

1. Formulate problems mathematically,
2. Establish mathematical concepts, facts, processes, and reasoning,
3. Decipher and evaluate the results of mathematical processes, and
4. Assess problem solutions.

According to (umbara, wahyudi, sufyani 2019) there are 3 indicators to observe the mathematical literacy process in the following description:

1. Interpreting conditions mathematically (*formulate*)
2. Using concepts, facts, procedures, and mathematical reasoning (*employe*)
3. Define, use, and assess mathematical results *(interprete*)

**2.6. Circle**

According to (Rahman As'ari, et.al 2017) One simple close curve is a circle, which divides the area into inner and outer parts.

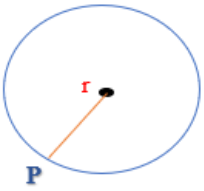


**Figure 4.** Circle

The name of the circle corresponds to the center point of the circle, as in the image above, where the dotted circle p is called the circle p. The distance of the points in the center of the circle is called the radius, which the letter r represents.

**2.6. LKPD Quality**

In the development of LKPD, quality is evaluated such as assessing validity, practicality and effectiveness. This is because the resulting LKPD is said to be good if it meets the following criteria: (1) valid; (2) practical; and (3) effective. This is considered a criterion for determining the quality to be developed. It's a valid, practical, and effective component:

1. The validity of the instrument used is a validation sheet. Data collection techniques through validity tests and asking for the assessment of material experts (lecturers and teachers) and media experts.
2. Practicality. Teaching materials must also be realistic. In language, "practical" means "easy to use in practice". Practical definition according to Nieveen (2007: 26) "*High-quality interventions also have end-users (teachers and learners, for example) who find the materials easy to use and perceive as useful, allowing them to use them in a way that largely aligns with the intentions of the developers. Our term for these interventions is practical."* The statement means practical, for example the ability of teachers or users of the material (teaching materials) made. Furthermore, Van den Akker (Rochmad, 2012) explained practicality in development research related to: *"Practically speaking, it refers to how many users (other experts) find the intervention appealing and useful in "normal" circumstances.".* The concept of practitioner refers to how effectively the intervention can be used and preferred by users or other experts under normal conditions, while according to Aufa (2016: 237), learning tools are said to be practical if shown to be usable and included in the good or very good category according to the assessment of experts and practitioners. Based on the information above, the study assessed the level of practicality of teaching materials through (1) assessment sheets and expert practicality on the practicality of LKPD and problem-based learning models; (2) Student Response Questionnaire Sheet to LKPD for Mathematics learning.
3. Effectiveness. In Nieveen's work (Rochmad, 2012) When it comes to developing learning materials, Nieveen measures the effectiveness of programs based on students' appreciation of the program and students' willingness to continue using it. In subject field development research, the following elements are used as determining indicators of effective model implementation: (1) Final test of students' mathematical literacy ability.

# 3. Method

### 3.1. Place and Time of Research

The research was carried out in Class VIII of SMP Al Washliyah 8 Medan, Medan Amplas, North Sumatra and the research time was during the even semester of the 2023/2024 learning year.

### 3.2. Research Tools and Materials

In this development, the following data collection tools were used to assess the LKPD that had been created: Mathematical Literacy Ability Test; Respond to students; and LKPD practicality questionnaire/

### 3.3. Research Design

The design of this research is Planning the development of teaching materials in the form of LKPD.

### 3.4. Procedure.

This research includes research *and development*. This research is modeled ADDIE (*Analysis-Design-Implement-Evaluate*). This model was developed by (Hamzah, M.A. 2019). Researchers use this model because the development model of Dr. Amir Hamzah, M.A. provides information about LKPD developed clearly and in detail. The stages of this development model consist of 5 stages: *Analysis,* design*,* development*,* implementation*, and* evaluation*.*

LKPD in this study was tested for feasibility through trials on small groups of grade VIII-3 students of SMP Al Washliyah 8 Medan in Medan Amplas District, Medan City Regency. This was held to see the reaction of participants after LKPD was used during learning.

1. *Analysis*

   The task of this stage, assesses whether the learning objectives require the creation of teaching materials. Some of the analyses carried out include (Cahyadi, 2019):

   a Performance analysis
   Major learning problems begin to emerge at this point.

   b Student analysis
   Student analysis is an examination of student characteristics based on their knowledge, skills, and development. The purpose of this analysis is to review the diverse ability levels of students. The results of the analysis of students' mathematical literacy skills as a basis for making teaching materials. Some of the things that need to be obtained include:
   1) Characteristics of students related to learning
   2) Students' knowledge and abilities about the lesson
   3) Development of teaching materials is needed to improve students' thinking skills and competencies

   c Analysis of facts, concepts, principles and procedures of learning materials
   Material analysis is a technique for determining material relevant to the development of teaching materials in the classroom, through the methodology of literature study. It includes facts, concepts, principles, and procedures. The purpose of analyzing facts, concepts, principles, and methods of learning material is to look at the main parts of the material that is taught and arranged systematically.

   d Analysis of learning objectives
   The step that determines the abilities students need is the analysis of teaching objectives. The points collected are: Learning objectives that have been determined and achieved

   As a result, this stage is the basis for making new learning materials.

2. *Design*

   a. Planning the development of teaching materials includes design stages, which include the following activities:
      1) The preparation of contextual learning teaching materials is based on core competencies and basic competencies to select subject matter. It also looks at facts, concepts, principles, procedures, time allocation, indicators, and student assessment tools.
      2) Designing scenarios for teaching and learning activities with a learning approach
      3) Selection of teaching materials and initial planning of learning tools based on subject competencies

4) Develop learning materials and evaluation tools with a learning approach *Development*

3. A product is developed with the help of experts during the development stage. The goal is to create a transformed LKPD by bringing experts to previous learning tools. Outline the following research and development objectives:
   a. Validation Phase
      Experts are used to realize the product during the development stage. The goal is to change LKPD by involving experts to previous learning tools.
   b. Product Revisions
      The weaknesses of LKPD are known after validation of material experts and media experts. Its weaknesses are accompanied by criticism and recommendations, as the basis for the revision of the LKPD designed.
   c. Development Test
      Development tests are held to collect direct input from students about LKPD developed through responses, reactions, and comments. Small group trials are needed to see how students react to LKPD. Where class VIII at SMP A Washiyah 8 Medan consists of three classes, but in the trial, classes VIII2 and VIII3 from SMP Al Washiyah 8 Medan in Medan Amplas District, Medan City Regency, were randomly selected. Students were given questionnaires about LKPD which were tested during the trial.
   4. *Implementation*
      The learning system that is made is applied, meaning that everything that has been developed according to its function is good. Learning aims:
      a. Guiding students to acquire competencies
      b. Ensure problem solving that addresses gaps in student learning outcomes.
      c. Ensure students must be knowledgeable, skilled, and behave as necessary at the end of the program.
   5. Evaluation (evaluation/feedback)
      Evaluation is the process of evaluating the success of the learning system. This stage is called formative evaluation because it aims to revise. To assess learning, evaluations are conducted, including:
      a. Overall student learning participation;
      b. Growth of student competence as a result of program involvement;
      c. School advantages as a result of increasing student competence after joining the program
      d. Data Analysis. Data analysis. It consists of:
         1) LKPD validity
            The following analysis is used to validate mathematical LKPD. Descriptive statistical analysis decides the validity of LKPD based on the average score of each validated LKPD. The LKPD is then amended corrections and recommendations from validators.
         2) Practicality of LKPD
            The developed LKPD is said to be practical if the average score of the questionnaire from the answers of students who obtain teaching with the developed LKPD is at least 76% in the practical category
         3) Effectiveness of LKPD

Mathematical literacy proficiency tests are given at the end of each learning meeting to measure students' mastery and completeness of material. Students are considered complete individually if they achieve the smallest score of ≥75, a classical completion rate of 85%. (Noah, 2014). The success indicator of the study is said to be successful if the percentage of classical students reaches 85%. If trial I does not achieve classical completeness, it will be continued in trial II and if trial II fails classical completeness which is determined to continue to the next trial until the ability test can be said to be effective because it has reached classical completeness of 85%.

## 4. Findings

This research is a Research and Development (R&D) Development research, so the creation of this development research is an LKPD modeled roblem based learning Indonesia with valid, practical, and effective criteria. The LKPD has a PBL model which intends to grow students' Mathematical Literacy skills.

For this purpose, first examine the development of LKPD with the ADDIE development model developed by (Hamzah, M.A.2019) which includes five stages in developing a product that is Analysis, Design, Implement, and evaluate. The reason for taking the ADDIE development model is because the peak stages of the ADDIE development model are divided into detail and systematics.

In this development process, activities such as initial observation and field trials (implementation of classroom learning) are carried out with LKPD that has been compiled and developed. The development phase is described operationally in Chapter III, followed by the dissemination of analysis and research results. The dissemination of analysis and research results obtained at each stage of development is presented below.

### 4.1. Analysis Stage

Analysis is the first stage of research. At this stage, analysis is carried out on students, performance, facts, concepts, principles, learning material methods, and learning objectives. The result is as follows:

1. Performance Analysis

Performance analysis was obtained from the results of interviews on February 13, 2023. Researchers interviewed one of the mathematics teachers at SMP al Washliyah 8 Medan and got the following information: 1) many students hate mathematics because of the lack of mathematics teaching material facilities, 2) the lack of student interest in learning mathematics, 3) the ability of students to be mathematically literate in circle material is still low, 4) there are no relevant student worksheets (LKPD) that can involve students to improve mathematical literacy skills, 5) the learning model used by teachers does not vary and the problem-based learning model is not applied to the subject matter of the circle, and 5) there is no learning media in the form of Canva.

2. Student Analysis

Student analysis activities aim to examine the characteristics of grade VIII students of SMP Al Washliyah 8 Medan as research subjects. At this stage, analysis was carried out on students of SMP Al Washliyah 8 Medan in terms of the development of students' cognitive abilities and academic abilities

In general, students of SMP AL-WASHLIYAH 8 MEDAN are aged 14-15 years. Therefore, students with Piaget's opinion (Trianto, 2009: 30) in this age range, the ability to think has reached the formal operational phase, meaning they have completed various hypotheses that may exist. They then strategize solutions based on that analysis. The results of interviews with mathematics teachers show that students need teacher help, therefore researchers develop an LKPD to help students complete learning.

Based on the results of the conservation carried out, it can be seen from the hasel of the mathematical literacy ability test that students received hetrogenic grade VIII student data. This is seen from the cognitive level is in the range of 20-80 scores. From the results of the test, judging from the first indicator, there are some students who do not answer what is known and asked from the question and some answer but it is still wrong, because students do not understand a question according to real life forms as well as the second and third indicators. Furthermore, the learning process is continued by explaining concepts or procedures with questions and answers, sample questions, and similar questions. Student worksheets are not varied and not interesting. This will affect student learning outcomes because students are bored and less active in learning. Therefore, researchers want to develop LKPD with a problem-based learning model to achieve their learning goals

### 4.2. Discussion

From the validation of the PBL model mathematics worksheet (LKPD) that was developed, it was obtained that the mathematics LKPD developed was valid or had a good degree of validity. Then, the mathematical LKPD with the PBL model developed is also said to be feasible according to the validity aspects of the LKPD. Furthermore, the results of validation of the learning implementation plan (RPP), mathematical literacy ability test, canva learning media, LKPD practicality questionnaire and student response questionnaire are valid, or have a good degree of validity. Therefore, the PBL model student worksheets developed along with lesson plans, canva learning media, mathematical literacy ability tests, LKPD practicality questionnaires and student response questionnaires have met the validity criteria.

From the validation results, LKPD with the developed PBL model can meet the demands of learning needs for the subject matter of the circle.

Based on the results of the trial, the LKPD developed has been examined in the practical category of LKPD with the PBL model and student responses. Based on the results of expert research (validators), all validators stated that the LKPD is feasible (valid) with a little revision. Similarly, through the practical test questionnaire given to teachers in trial I and trial II, stated the results that the LKPD developed included the practical category (practical value > 76%). Based on the analysis of trial results, it was obtained that the average percentage of response of trial students was positive. This means that students respond positively to LKPD with the PBL model developed. Student responses were given when the trial met the criteria that had been determined, trial one worth 83% and trial II worth 87%. LKPD with the PBL model developed has also had practical criteria.

Based on the results of trials I and II, the LKPD developed is categorized as effective in terms of the completeness of classical student learning.

From the analysis of the trial test, students' mathematical literacy skills are criterion for classical completeness. Because the material and problems in LKPD are developed according to the student's learning environment. By using LKPD in class, students will be easy to answer and understand questions on student worksheets with circle material.

LKPD with the developed PBL model can also help teachers and students complete classical learning. Thus, the use of LKPD with the developed PBL model has effective criteria.

From the results of the analysis of mathematical literacy ability tests in trials I and II, there was an increase in mathematical literacy ability from the average results of mathematical literacy ability tests obtained by students. The increase in students' literacy ability was also observed in each indicator of mathematical literacy ability. The highest increase in mathematical literacy ability lies in the interpretive indicator. The average increase in students' mathematical literacy ability tests was obtained by 72.88% in trial I to 80.56% in trial II. The highest increase in mathematical literacy indicators is obtained by interprete indicators, then compiled by employe and formulate indicators. Based on these things, it can be seen that the easiest indicator of mathematical literacy ability lies in the empoye daformulate indicator. This overall shows that the use of LKPD problem-based learning model developed has an impact on increasing students' mathematical literacy skills.

## 5. Conclusion

Based on the analysis and discussion in this study, there are the following conclusions:Student worksheets (LKPD) developed have criteria for validity, practicality and effectiveness. For validity criteria: the average value of LKPD validity is 4.42 (valid). For practicality criteria: the average practicality of LKPD in the development of trial I from teachers worth 82% (practical) and student response worth 81.83%, trial II Practicality of LKPD in teachers worth 95% and trial II students 86.74% (practical). For effectiveness criteria: from the completeness of classical learning in trial I worth 71.43% (ineffective), then a development test was carried out, namely trial II worth 89.29% (effective). This student worksheet (LKPD) has increased from trial I to trial II. The following are the successes of each indicator: 1) formulate the situation systematically (formulate) in trial I worth 2.27 and trial II worth 2.45 an increase of 0.19, 2) apply concepts, facts, procedures, and mathematical reasoning (employe) in trial I worth 2.25 and trial II worth 2.46 an increase of 0.21 and 3) interpret, apply, and evaluate mathematical results (interprete) in trial I worth 2.04, trial II worth 2.32 increased by 0.28.

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