

Implementation of E-LKPD Integrated Problem Based Learning Model to Improve Students' Mastery of Concepts and Communication Skills

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ABSTRACT

21st century learning requires a student-centered learning process and requires students to have knowledge and skills regarding technology, media and information, as well as having 4C skills, one of which is communication skills. Communication skills are 21st century competencies that need to be developed in the independent curriculum. The type of research conducted was classroom action research with the aim of improving students' communication skills through the implementation of an integrated E-Students Worksheet with the Problem Based Learning (PBL) model. The classroom action research model used is the Kemmis-Mc Taggart spiral model. The PTK model consists of 4 stages, namely planning, action, observation, and reflection. Classroom action research was conducted over two cycles of four meetings. Each meeting is carried out for 3 hours of lessons apart from daily test activities. The instrument used was an observation sheet of students' communication skills filled in by two observers during the learning process. The results of the first cycle of research obtained an average of 76 students' communication skills in the communicative category and the second cycle obtained an average of 84 in the very communicative category. This shows that the application of an integrated E-Students Worksheet with the Problem Based Learning model can improve students' communication skills.

Keywords :E-Students Worksheet; PBL; Communication skill.



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I. INTRODUCTION

The curriculum is one of the elements of educational resources that makes a significant contribution to realizing the process of developing the quality of students' potential. Indonesia's education minister has made curriculum changes to produce graduates who are relevant to the 21st century [1]. The curriculum currently used is the independent learning curriculum. The Independent Curriculum is a curriculum with diverse intracurricular learning where the content will be more optimal so that students have enough time to explore concepts and strengthen competencies. The competencies expected in this independent curriculum are 21st century learning competencies.

The 21st century is a century where knowledge and technology are increasingly developing, known as the age of knowledge [2]. Technological advances have entered various aspects of life, including education. Education in the 21st century experiences an extraordinary acceleration of knowledge increase supported by the application of digital media and technology [3]. 21st century education requires preparation to create graduates who can compete in the 21st century [1]. The 21st century learning system demands a student-centered learning process, and requires students to have knowledge and abilities regarding technology, media and information, and have skills [4]. The 21st century skills include creative thinking, critical thinking and problem solving, communication, and collaboration. These 4C competencies are starting to be embedded in the learning process.

Communication skills are one of the 21st century competencies that need to be developed in the independent curriculum. Communicating can be interpreted as a way to convey and obtain facts, concepts and principles of science in the form of audio, visual or audio visual [5]. Communication skills are inseparable from one's self-confidence. Self-confidence is related to the feeling of happiness felt by a person, and happiness itself lies in feeling safe and calm [6]. Communication determines the quality of human life, and having the ability to

communicate effectively is very necessary, to convey ideas, ideas and knowledge to the community. Communication skills are described in presenting the results of studies ranging from observing activities to the stage of reasoning which can be presented in the form of writing, graphics, electronic media, multi-media and others [7]. Communication skills have four indicators of achievement in the learning process, namely: a. Able to express ideas and thoughts effectively b. Able to listen effectively c. Able to convey information well d. Using good and effective language [8]. Using good and effective language Students' communication skills play a very important role in learning towards a better direction by appearing social interactions between students and students and students and teachers. However, the reality in the field is that students' communication skills are still low. This is in accordance with the data obtained through the observation instrument of the communication skills of XE2 class students of 50.6 in the communicative enough category. The data shows that the communication skills of students in class XE2 need to be improved and the knowledge competence of students is still low. One alternative solution that can be used is the application of E-LKPD integrated with the Problem Based Learning model to improve students' mastery of concepts and communication skills.

Students' communication skills must be stimulated by learning that is able to explore students' abilities [9]. Students' communication skills can also be influenced by internal factors from the students themselves, for example student self-efficacy. Research results [10] found that self-efficacy has a positive and significant relationship with communication skills. Communication skills are needed in science education so that students are trained from an early age to be able to report the results of their experiments systematically and clearly, it is also expected that they can explain the results of their experiments to their friends, discuss them, and describe their observations in the form of graphs, tables and diagrams.

Teaching materials are material guides that guide students to learn. This is in line with Prastowo saying that teaching materials are a set of materials that are arranged systematically to create an atmosphere for students to learn [11]. Teaching materials function as: guidelines for teachers who will direct all their activities in the learning process, as well as the substance of competencies that should be taught to students; guidelines for students who will direct all their activities in the learning process, as well as the substance of the competencies they should learn / master; and evaluation tools for achieving / mastering learning outcomes [12]. Teaching materials consist of printed and non-printed teaching materials. E-LKPD is one of the non-print teaching materials that makes it easy for students to access material anywhere according to the needs of the 21st century. The purpose of preparing LKPD according to [11] is to present teaching materials that make it easier for students to interact with the material provided, present tasks that increase students' mastery of the material provided, train students' learning independence, make it easier for educators to assign tasks to students. The subject matter is presented in the form of text, videos and attractive images. E-LKPD is packaged in electronic form using the flipbook application and can be accessed using each smartphone, easy to carry anywhere and does not require large storage space [11].

The model used in the E-LKPD is the problem-based learning (PBL) model. Problem Based Learning is one of the active learning applications as well as a student-centered learning model and focuses on skills, lifelong learning, the ability to apply knowledge, and skills in problem solving [13]. The Problem Based Learning model prioritizes real-world problems in the educational process, and also develops critical thinking processes, assumes students in problem solving, and integrates fundamental concepts for differentiated learning in subjects. Characteristics of problem-based learning (PBL) are as follows:[14]

1. The problem posed is in the form of real-world problems so that students can make questions related to the problem and find various solutions in solving the problem.
2. Learning has an interdisciplinary relationship so that students can solve problems from various subject perspectives.
3. Learning conducted by learners is an authentic investigation and in accordance with the scientific method.
4. The product produced can be in the form of real work or demonstration of the problem solved to be published by students.
5. Learners work together and motivate each other related to the problem being solved so as to develop students' social skills.

The syntax of the problem-based learning model can be seen in Table 1.[15]

Table 1. Syntax of Problem Based Learning Model

Fase	Indicator	Teacher Activity
1	Orientation of students to the problem	The teacher explains the learning objectives, explains the logistics required, proposing the problem, motivating students engage in the problem-solving activity of their choice.
2	Organizing students to learn	The teacher helps students define and organize learning tasks related to the problem.
3	Guiding individual and group investigations	The teacher encourages students to gather appropriate information, carry out experiments, to obtain explanations for solving problems.
4	Develop and present work	The teacher assists students in planning and preparing appropriate works such as reports, videos, models and helps them to various tasks with their groups.
5	Analyze and evaluate the problem-solving process	The teacher helps students to reflect or evaluate their investigations in the processes they use.

Problem Based Learning is based on scenarios where real situations are known from the variables of problems, learning improvements, communication skills and learning methods carried out. The purpose of this study is to improve students' communication skills can be done by applying E-LKPD integrated Problem Based Learning (PBL) model so that it can improve students' mastery of concepts and communication skills.

II. METHOD

This research is a Classroom Action Research (PTK). The PTK research model uses the Kemmis and Mc. Taggart model which has four stages, namely planning, action, observation, and reflection. The research was conducted at SMAN 3 Padang in February 2023. The research subjects were students of class X.E.2 Semester 2 of the 2022/2023 academic year which numbered 36 people. This classroom action research (PTK) was conducted for two cycles of four meetings. Each meeting was conducted for 3 lesson hours outside of daily test activities.

The planning stage carried out several activities, namely analyzing learning outcomes, learning objectives and the flow of learning objectives. prepare teaching modules and E-LKPD integrated with the Problem Based Learning learning model. The implementation stage applies the E-LKPD integrated with the Problem Based Learning model in the introduction, core activities and closing activities during the learning process. The observation stage is carried out during the learning process by two peer observers to observe the application of the E-LKPD integrated with the Problem Based Learning model. The Reflection stage is carried out after applying the E-LKPD integrated Problem Based Learning model to see the weaknesses and shortcomings found during the learning process. after reflecting, the second cycle is carried out with the same stages as the first cycle. The stages can be seen in Figure 1.

**Figure 1:** Kemmis and McTaggart spiral model of action research

Data collection instruments in the form of student communication skills observation sheets were filled in and observed by two peer observers during the learning process to see the improvement of student communication skills during cycle 1 and cycle 2. The instruments and categories of student skills observations can be seen in Table 2 and Table 3.

Table 2. Observation Instrument for Student Communication Skills

Question Indicator	No	Statement
Expressing Opinions	1	Learners always ask questions at the end of physics lessons
	2	Learners clarify their friends' speech when aske
	3	Learners express opinions in each discussion
Answer the Question	4	Learners answer questions according to physics concepts
	5	Learners answer questions using good language, and easy to understand.
	6	Learners answer questions and responses briefly and clearly
Respect other people's opinions	7	Learners respect other people's opinions even if they are different from their own.
	8	Learners submit responses or opinions without belittling or offending group mates
	9	Participants listen carefully to the opinions and responses of others
Convey ideas, discussion results clearly, effectively, systematically and convincingly.	10	Learners convey ideas by linking physics concepts in everyday life
	11	Participants seek information from various sources and record important information from the discussion.
	12	Learners express ideas, suggestions and solutions in discussions
Respond positively to interlocutors	13	Learners listen to the explanation of the discussion participants when there is a fatigue during physics learning.
	14	Learners use good language when responding to conversations so that there is no misunderstanding.
	15	Learners understand, and take into account different views to solve problems.
Write down the final result of the discussion	1	Learners make conclusions at the end of each lesson
	2	Learners write reference sources clearly
	3	Learners make worksheet reports on time

Table 3. Categories of student communication skills[16]

Improvement	Category
81-100	Very Communicative
61-80	Communicative
41-60	Moderately Communicative
21-40	less Communicative
0-20	Uncommunicative

The competence of students' communication skills was obtained through an observation sheet during the learning process which was observed by two peers who acted as observers. Indicators of student communication skills are divided into 2 indicators. The first indicator of oral communication skills is divided into five sub-indicators, namely Expressing opinions, answering questions, Respecting other people's opinions, Conveying ideas, discussion results clearly, effectively, systematically and convincingly, Responding to interlocutors positively observed when students make presentations and the second indicator of written communication skills seen from the E-LKPD done. To see the improvement of student communication skills in cycle 1 and cycle 2, the observation sheet that has been observed by the observer is analyzed using the equation.

$$\text{Communication Skills Score} = \frac{\text{Score obtained}}{\text{Maximum score}} \times 100\% \dots\dots\dots(1)$$

III. RESULTS AND DISCUSSION

The research was conducted in February 2023 in class X.E.2 SMAN 3 Padang with 36 students. The research was conducted in 2 cycles, namely cycle 1 and cycle 2. Cycle 1 research stages are planning, implementation, observation and reflection. Cycle 2 has the same stages as cycle 1, the results of cycle 1 reflection are used as consideration and input for learning planning in cycle 2. Cycle 1 begins with the Planning stage by analyzing learning outcomes, learning objectives and the flow of learning objectives. prepare teaching modules and E-LKPD integrated with the Problem Based Learning learning model. The action stage (implementation) applies E-LKPD integrated with the Problem Based Learning model in introductory activities, core activities and closing activities during the learning process. students are divided into six groups during the learning process students access E-LKPD using their respective smartphones through the flipbook link that has been distributed. With the teacher's guidance, students solve the problems in the E-LKPD integrated Problem Based Learning model in their respective groups. Furthermore, students alternately present the results of their group work in front of the class. The observation stage was carried out during the learning process by two peer observers to observe the application of the E-LKPD integrated with the Problem Based Learning model. The reflection stage is carried out after applying the E-LKPD integrated Problem Based Learning model to see the weaknesses and shortcomings found during the learning process. Indicators of student communication skills that were observed were (M1) Expressing opinions, (M2) Answering questions, (M3) Respecting other people's opinions, (M4) Conveying ideas from discussions clearly, effectively, systematically and convincingly, (M5) Responding to interlocutors positively, (M6) Writing down the final results of the discussion. The results of observations of student communication skills can be seen in Figure 2.

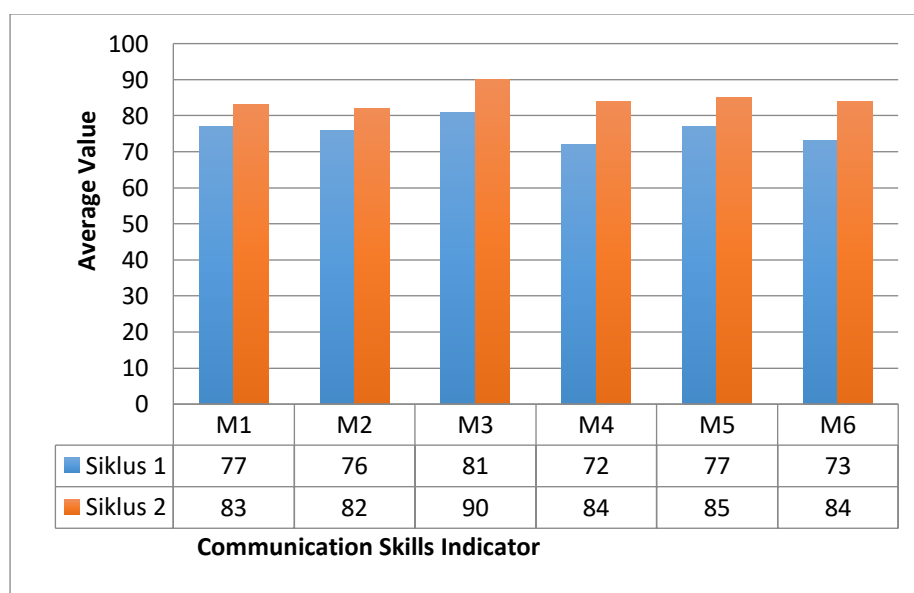


Figure 2. Improvement of Students' Communication Skills Cycle 1 and Cycle 2

The results of data analysis seen in Figure 2. Indicators of student communication skills in cycle one are indicators of expressing opinions 77, Answering Questions 76, Respecting other people's opinions 81, Conveying ideas, discussion results clearly, effectively, systematically and convincingly 72, Responding to interlocutors positively 77, Writing down the final results of the discussion 73. The average of the six indicators of communication skills in cycle one is 76 in the Communicative category. Indicators of student communication skills in cycle two are indicators of expressing opinions 83, answering questions 82, respecting other people's opinions 90, conveying ideas, discussion results clearly, effectively, systematically and convincingly 84, responding to interlocutors positively 85, writing the final results of the discussion 81. The average of the six indicators of communication skills in cycle two is 84 in the very communicative category.

At the end of learning the application of E-LKPD integrated with the Problem Based Learning model, a final test is held in each cycle to see students' mastery of concepts. After completing cycle 1, the teacher held a self-reflection to see the shortcomings and weaknesses in cycle 1. The results of self-reflection were used as planning for cycle 2. The results of students' knowledge competence in cycle 1 and cycle 2 can be seen in Table 4.

Table 4. Parameter Value of Student Knowledge Descriptive Statistics Cycle 1

Parameter Statistik Deskriptif	Nilai Siklus 1	Nilai Siklus 2
N	36	36
Rata-rata	76	84
Varians	41	47
Standar Deviasi	6,3	6,7
Nilai Terendah	61	72
Nilai Tertinggi	83	94
Median	78	83
Modus	78	83

Table 4 can be seen that the average score on the knowledge aspect of students in cycle 1, the lowest score is 61 and the highest score is 83, the average score is 76 in the good category. Cycle two obtained the lowest score of 72 and the highest score of 94. The average score is 84 in the very good category. In cycle 1 students were quite enthusiastic when opening the E-LKPD through their smartphones using the Flipbook application which sounded when moving slides to the next page, this was new to them because previous learning still used LKPD in the form of hardcopy. The average value of communication skills and knowledge of students is still 76 below the KKM set by the school this is because students are not used to communicating the results of the discussion of the worksheets they do. In cycle 2 the average value of students has increased to 84 in the very good category. This can be seen when presenting the results of the worksheet discussion, 85% gave opinions, suggestions and criticism to the group that performed. This proves that the application of E-LKPD integrated problem-based learning model can improve students' concept mastery and communication skills.

This is in accordance with the results of previous research, namely the improvement of critical thinking and communication has also been carried out by [17] with the title Improving Critical Thinking and Mathematical Communication Skills Using Problem Based Learning (PBL) Models Based on Mathematical Literacy. In this study, it was successful in improving critical thinking and mathematical communication of students using the Problem Based Learning (PBL) learning model based on mathematical literacy in class III at MI Muhammadiyah Kramat. Research by [18] also obtained the same thing, namely an increase in the critical thinking ability of grade VI students at SDN 19 Cakranegara, Mataram City through the use of PBL in thematic learning. Research by [19] also said that there was an increase in students' communication skills through TPACK-oriented learning with blended learning on the material of the motion system.

IV. CONCLUSION

The conclusion obtained from this research is that the Application of E-LKPD Integrated Problem Based Learning Model can Improve students' communication skills. This can be seen from the increase in the average value of student communication skills in cycle 1 of 76 in the communicative category and the average student communication skills in cycle 2 of 84 in the very communicative category. This research was conducted by researchers on renewable energy material in class X SMA. From the results of this study, it can be recommended to apply the E-LKPD integrated with the Problem Based Learning Model to improve students' communication skills.

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