Implementation of Problem Based Learning Model Assisted Edmodo to Measure Students Scientific Communication Skills

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Implementation of Problem Based Learning Model Assisted Edmodo to Measure Students Scientific Communication Skills

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Abstract: This study aims to determine the scientific communication skills of students of SMA 6 Yogyakarta through learning Problem Based Learning assisted Edmodo. The sampling technique is through cluster random sampling, that is 2 classes randomly selected from the entire population, class X MIPA 6 as experiment classes and class X MIPA 8 as an implementation class using the same learning. Experiment classes given by the researchers themselves while the implementation class given by the subject teacher of physics at school. Each class was given learning one and the result is known that scientific communication skills of learners in experiment classes get good enough category and scientific communication skills of learners in the implementation class to get a good category.

Keywords: Problem Based Learning; Scientific communication skills; Edmodo.

1. Introduction

Communication skills that are the basis for many other skills, can be defined as sensitivity to verbal and non-verbal messages, listen and react efficiently [1]. Communication activities are carried out without regard to the elements needed in the process, problems can occur in people's understanding of each other. This results in a situation where individuals cannot express themselves as they mean or misunderstand the other party [2]. One of the results of science learning is communication skills. The results of this study recommend that learners can effectively communicate scientific results to a variety of audiences for different purposes using a variety of models.

Problems often encountered in physics learning is that the students learn physics by simply following the instructions of the teacher. The teaching and learning process in the classroom that emphasizes on memorizing learning and focusing too much on content causes students to memorize the knowledge learned, not to analyze and synthesize the true meaning of knowledge. Because they do not have an in-depth understanding of the knowledge learned, it causes reducing their ability to think critically while solving complex problems [3].

Oral and written communication skills and work on the problems of understanding the concept of learners is still low. Communication skills of learners is important in physics because learning can transform the learning situation to the better with the advent of social interaction among learners with learners and students with teachers. Communication skills of learners should be stimulated by learning that is able to explore the capabilities of the learners [4]. In addition, the ability of oral communication, interpersonal and written communication skills current decreases and this is often not aligned with the requirements in terms of acceptance of the work [5]. Communication skills are an

essential element of a professional [6]. Therefore, scientific communication skills are very important in everyday life, one of them is learning.

Scientific communication skills are defined as the ability to speak, read, and write about science. This requires special understanding and ability to describe and present their knowledge to others [7]. Communication is the most important element that humans need to adapt to the environment. Through communication, people can find opportunities to express, share, and evaluate concepts and ideas in their minds [8]. Communication skills form the basis for many other skills can be defined as a sensitivity to the message of verbal and non-verbal, listening to efficiently and react efficiently [9]. Through some of these things it can be said that scientific communication skills are the abilities that students have to present knowledge and express their thoughts and ideas verbally and in writing.

Problem based learning is an instructional method where relevant problems are introduced at the beginning of the instruction cycle and are used to provide context and motivation for learning [10]. PBL can improve self-learning skills [11], having problem-solving skills means that people can think critically, logically and creatively [12]. The learning process with PBL can enhance creative thinking skills [13], PBL gives learners the skills to self-communication, and communication with the group, and finally individual communication with groups with special problems [13], with the problems presented by learning PBL is expected to learners can acquire the knowledge to develop specific skills such as communication skills [14].

Problem Based Learning is a learning model based on the theory of constructivism. In this model, learners generate new knowledge of real-world problems, which is considered as a learning context to help students get analytical thinking skills and problem-solving thinking [15]. PBL is a student-centered teaching approach that allows students to become active participants in solving problems, answer questions, work together in learning, work in teams on problems or projects, and take on more responsibility for learning [1].

Five steps in implementing PBL include: (1) Identify the problem under study (2) explore the problem (3) guide students in conducting scientific research (4) combine findings, and (5) present findings, teacher evaluation and self-reflection. The fifth stage is based problems [16]. In addition, measures-based learning model other problems include: (i) orienting learners at issue, (ii) organize the students to learn, (iii) guiding the investigation of individual / group, (iv) develop and present the results, (v) analyze and evaluate the results of [17] [18].

Under these conditions, the model problem-based learning is learning which are learner to be active in solving the problems presented in learning through the five-step learning of orienting students on issues, organize the students to learn, guiding the investigation, develop and present the results and analyze and evaluate results.

In order to support the use of a learning model that required the use of specific instructional media [19]. Some research suggests that by using e-learning, learning can improve learning outcomes and motivation of learners. Not only that, learning to use e-learning to facilitate the limitations of space and time between learners and teachers, learners with learners, and learners with the material. Mathematics literacy skills of learners using PBL learning approach aided PMRI Edmodo compared PMRI PBL learning approach and learning with expository models,

Under these conditions, one way to implement e-learning in PBL learning model is to use Edmodo assistance. Edmodo is a software that is able to facilitate learners in learning activities. The PBL models used in the study with assisted Edmodo to know how scientific communication skills of learners. Edmodo is an application that can be used on both mobile devices and in the web environment to create online practice communities. Edmodo is a free social learning platform that allows students to access course content uploaded by their teachers. This platform allows teachers and students to communicate with each other through messages, thus giving students the opportunity to communicate and collaborate in a virtual classroom environment [20]. Edmodo is a medium that allows students to access learning resources wherever and whenever they want [21]. Edmodo is a closed social network that was developed with the intention to create an online learning environment for teachers and students to share ideas, tasks, and other activities [22].

The rest of this paper is organized as follow: Section 2 describes the proposed research method. Section 3 presents the obtained results and following by discussion. Finally Section 4 concludes this work.

2. Research Method

This research took place in SMA 6 Yogyakarta, Indonesia. The study was conducted on a class X MIPA 6 as experiment classes and class X MIPA 8 as the implementation class. Learning on experiment classes provided by investigators while on the implementation class given by a teacher physics class X SMA 6 Yogyakarta. Problem Based Learning model is applied to both the media-assisted class with Edmodo. Edmodo use learners to worksheets based on problem-based learning that has been prepared to work with learners in terms of improving the ability of learners to communicate scientifically. After experimenting learners are asked to do LKPD through Edmodo.

Scientific communication skills of learners measured by indicators: state the purpose of the problem, write down work steps and problem-solving solutions, stating the data in tables and graphs, express conclusions about the problem, present the results of the experiment, stated reason logically [23]. Scientific communication skills of students in this study was measured using observation sheet scientific communication skills of learners. The observation sheets filled by the observer when learners to experiment and a presentation of the results of experiments they have done. Scores of scientific communication skills of learners and score the acquisition of each of the indicators are analysed by calculating the average value of the results of observations, then the average value obtained categorized as follows in Table 1 [24]:

Table 1. Scores and Scientific Communication Skills Category

Scores of Scientific Communication Skills	Category
1.00 to 1.49	Not good
1.50 to 2.49	Not good
2.50 to 3.49	Pretty good
3.50 to 4.49	Good
4.50 to 5.00	Very good

3. Results and Discussion

The data in this research is the scientific communication skills of students in the class experiment and implementation class. Experiment class is class X MIPA 6 with the number 26, while the implementation class is class X MIPA 8 with the number 24. Data communication skills learners scientifically derived from the value of observations made during the study carried out in each class. Presentation of data from scientific communication capability through two ways, namely in general and each indicator. The results of scientific communication skills of students in general are presented in Figure 1.

The results of the experiment class that is equal to 54% of students obtain good enough category and by 46% earn both categories. In the implementation class 37% of students obtain good enough category, and 63% gained either category. In general, it can be concluded scientific communication skills in the implementation class is better than experiment classes. The results of scientific communication capabilities of each indicator are presented in Table 2.

Experiment classes and implementation classes are given learning Problem Based Learning model aided Edmodo media on the Law of Conservation of momentum materials. Learning is done following the steps problem based learning models, namely at the stage of its core activities through a phase of organizing students to study and guide the investigation group, the students conducted a study to learn the concepts of physics on the law of conservation of momentum, followed by conducting experiments on the *bekel* ball pendulum impact. The trials were conducted in groups. In the phase of developing and presenting the results, the students do an analysis of what happened during the trial. The analysis

of LKPD that has been provided through Edmodo and continued to present the results of experiments in class. The observations were made to determine the scientific communication skills of learners and then the data obtained is calculated the average score for the then known category of communication skills of learners.

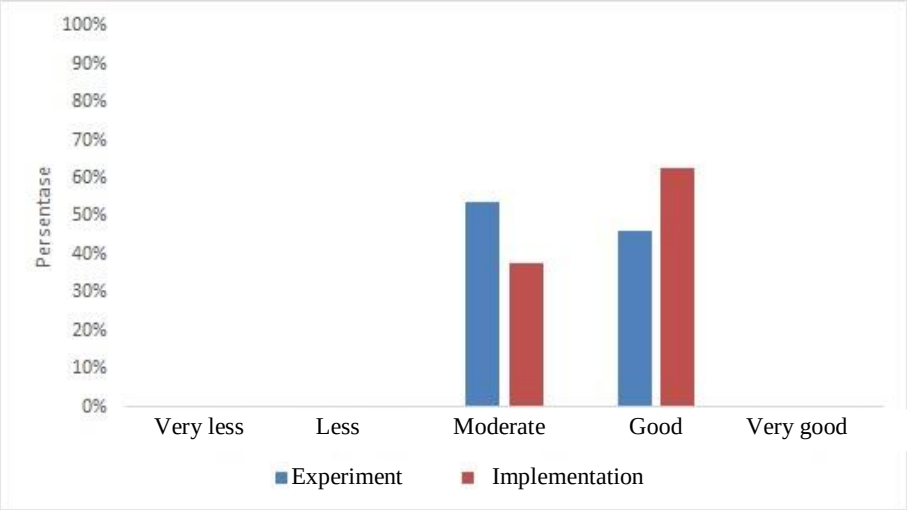


Figure 1. Results of Scientific Communication Ability of Students

Figure 1 above shows that the average scientific communication capability experiment classes learners acquire good enough category, while in the implementation of the class average gain both categories. Differences in scientific communication skills in both classes was influenced by the implementation of learning in each class. On learning experiment classes given by the teacher has the disadvantage that the ability of teachers in guiding learners time to the practical implementation of activities presented the results of the experiment. Most learners have still not completed the experiment because of insufficient learning time so that students are still difficult to determine and deliver problem-solving learning conclusion. In the implementation class teacher guiding and directing learners during practical implementation it very well, so that students are able to understand the trial concerning the law of conservation of momentum on collision *bekel* ball pendulum properly and deliver the results of learning with appropriate conclusions.

Table 2. Results of each Indicator of Scientific Communication Skills

No.	Indicators of Scientific Communication Skills	Class Experiment		Class Implementation	
		Score	Category	Score	Category
1	State the purpose of the problem	3:33	Pretty good	3:52	Good
2	Write down work steps and problem-solving solutions	3:23	Pretty good	3:34	Pretty good
3	Stating the data in tables / graphs	3:58	Good	3.63	Good
4	Express conclusions about the problem	3.6	Good	3:54	Good
5	Present the results of the experiment	3:58	Good	3:54	Good
6	State reason logically	3.64	Good	3:57	Good

Table 2 above shows the results of scientific communication capabilities of each indicator in each class. In experiment classes, there are two indicators that obtain good enough category and four other indicators obtained either category, while only one indicator implementation class communication skills gained quite good category and the other five categories. Indicator of the ability express purpose problem, write down the pace of work and problem-solving solutions, write the data in tables / graphs, as well as the stated conclusions on the issue is an indicator of scientific communication skills in

written aspects. These indicators were obtained the results through observation of learner assessment answers on a worksheet about the law of conservation of momentum. Ability to present the results of the experiment and revealed the reason logically is an indicator on the oral aspect. These indicators were obtained the results through observation when learners present the results of the experiments as well as through debriefing of students at the time of presentation. The results of the answers of students in a given LKPD are shown in Figures 2 and 3.

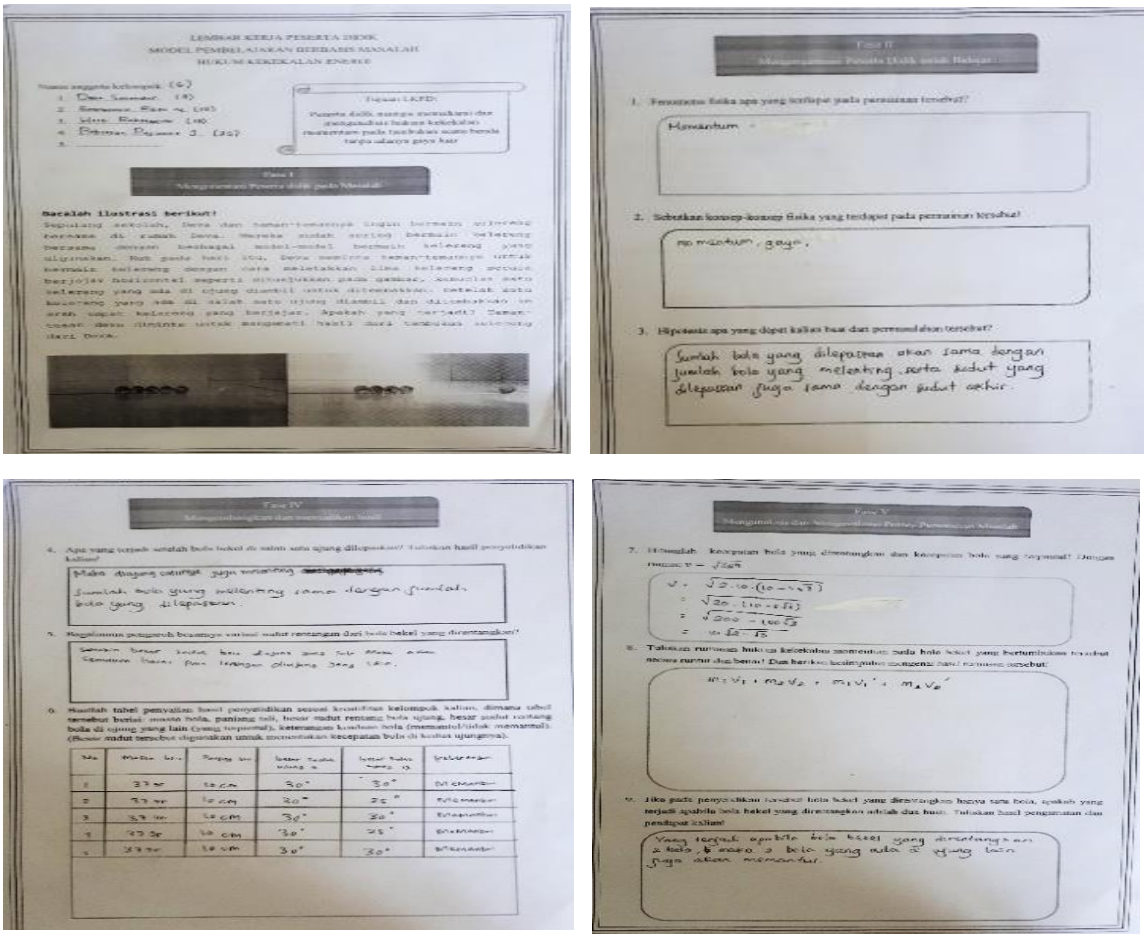
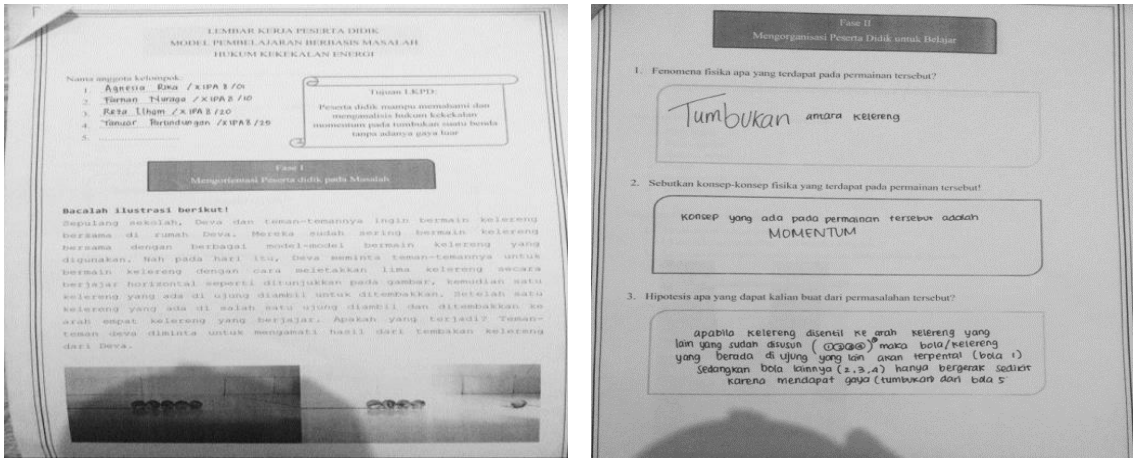


Figure 2. Results of Students Class Spreadsheet Experiment



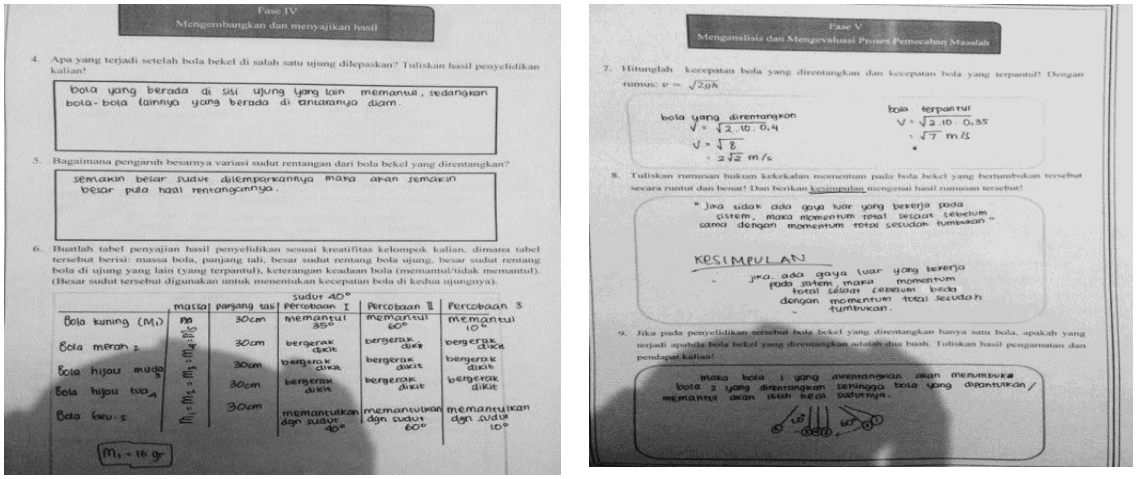


Figure 3. Results of Students Class Spreadsheet Implementation

The ability of an intent looks on the answer problems of learners in a worksheet about the number 1, 2 and 3. Figure 2 above depicts for experiment classes for learners to provide answers to the problems associated with the illustrations given previously. In question number 3 students were asked to give a hypothesis related to problems in the illustration. Learners give a hypothesis but not in accordance with the problems in the illustration. Figure 3 depicts the answer learners to the implementation class and looks learners have been able to hypothesize on the answer Question 3 correctly.

Ability to write work steps and solutions to problems raised in the worksheets of students in Question 7. Problem No. 7 students were asked to calculate the speed of the ball stretching and speed of the ball that bounces. Data obtained from the experiments they have done. Learners are expected to write the troubleshooting steps correctly and provide solutions to problems that can be seen from how learners wrote the formula for calculating the speed of the ball as well as potential solutions. In answer to learners in Figure 2 for experiment classes and Figure 3 for an implementation class is seen that the students do not understand the steps and settlement solutions for solving problems finding the speed of the ball stretching and reflected. The ability of the data expressed in tables / graphs appear on Question 6. After each group experiment in experiment classes and an implementation class is able to properly write the data that they have acquired and express it in the form of a table. Learners are able to write well what data they need to complete the trial and categorizing the ability of learners to express the data in tabular form is good for each class.

The ability of states conclusions on the issues raised in Question 8 and 9. After conducting experiments and write the results of the experiment, students were asked also to write conclusions about the experimental results correspond to the learning objectives. Through assessment on the worksheet answers, learners are seen already able to write the conclusion of the trial in accordance with the purpose of learning properly and categorizing learners have been able to express a conclusion on the results of experiments.

Ability to present the results of the experiment and revealed the reason logically is an indicator on the oral aspect which made direct observation when the students presented the results of experiments and discussions and answering questions related to the results of experiments they have done. In this regard, see how learners are able to present the results of experiments with properly, confidently and firmly in the delivery of opinions. Through these observations showed that the learners both in the classroom as well as the implementation class experiment able to present the results of experiments and revealed the reason logically well in order to obtain either category.

4. Conclusion

Learning outcomes which have been done using a model-assisted Edmodo Problem Based Learning shows that scientific communication skills of students in general obtain good enough category for experiment classes and categories both for classroom implementation. It shows that is good to measure the communication skills of learners and will be enhanced by the application of learning better.

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