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Mathematical literacy ability of 9th grade students according to learning styles in Problem Based Learning-Realistic approach with Edmodo

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Abstract

This study aims to determine the difference and increase of the mathematical literacy ability using PBL-PRS-E, PBL-PS and scientific approach, and to find out difference of the mathematical literacy ability between learning styles. This study belongs to quantitative research. The population in this study are 9th grade students SMP Negeri 1 Majenang, Cilacap academic year 2016/2017. This study uses a quasi-experimental design with pretest-posttest control group design. Then, methods of the study are test, questionnaire, and documentation. Data analysis was performed by one way anova, two way anova, and increase in the gain normalized. The results of the study are (1) the mathematical literacy ability of students in the experimental group 1 is better than the mathematical literacy ability of students in the experimental group 2 and control group, (2) there is no difference in the mathematical literacy ability between learning styles, (3) there is no interaction between the mathematical literacy ability based learning models and student's learning styles, and (4) ithe increase of students' mathematical literacy ability in the experimental group 1 is better than in the control group but less than the increase of stuednts' mathematical literacy ability in the experimental group 2. Eventually, this study suggests that 9 grade mathematics teacher in SMPN 1 Majenang can use PBL-PRS-E model to improve the learning result and mathematical literacy ability of students.

1. Introduction

Mathematics role in preparing students to enter the change in state of being developed with the act of basic as logical thinking, critical, rational, and accurate and can use mathematical mindset in studying various sciences or in daily life. Hence, it requires the development of materials and the learning process. Mathematics learning is learning that was built with attention to the important role of understanding students conceptually, providing appropriate materials and procedures of students' activity in the classroom (NCTM, 2000). Mathematics learning will be successful if the students can use the concepts, procedures and facts to explain a problem that occurs in daily life. In fact, students still have difficulty in fulfilling these criteria.

In Permendiknas 22 year 2006 about the aims of the mathematics subjects, there is understanding with the definition of mathematical literacy. Mathematical literacy helps a person to understand the role and use of mathematics in every aspect of life, and can be used to make the right decisions and reason as citizens who build, care, and think. These reasons make mathematical literacy becomes important for students to be considered because it can prepare students for the association in modern society (OECD, 2013). This is supported by Kusuma in Aini (2013), that living in the modern era, everyone needs mathematical literacy to against a variety of problems, because it is very important for everyone associated with the work and duties in daily life. Mastery of mathematics can help students to solve the problem. Therefore, it is expected that students have the literacy ability (Johar, 2012). According to OECD (2013), the literacy skills of mathematics

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consists of seven components used in the assessment process of mathematics in PISA: (1) communication, (2) mathematizing, (3) representation, (4) reasoning and argument, (5) devising strategies for solving problems, (6) using symbolic, formal, and technical language, and operations, and (7) using mathematical tools. Besides, based on the Program for International Student Assessment (PISA) report in 2003, Indonesia was ranked 39th out of 40 countries, in 2009 Indonesian students were ranked 61 out of 65 participating countries, in 2012 Indonesian students were ranked 64th out of 65 countries, while in PISA 2015, Indonesia was still ranked 63 out of 70 countries (Wardono *et al*., 2017).

PISA is an international scale assessment program that aims to determine the extent to which students (age 15 years) can apply the knowledge they have learned in school (Wijaya, 2012). Mathematical literacy in PISA focuses on students' ability to effectively analyze, justify, and communicate ideas, formulate, solve and interpret mathematical problems in a variety of forms and situations (Aini, 2013). According to Hayat (Maryanti, 2012), in measuring competence in mathematical literacy, PISA has divided into three parts, such as reproductive competence, competence, connection and reflection competence. PISA covers three major components of the domain of mathematics, namely the content, context, and competencies (OECD, 2009). According to Silva, et al (2011), content is divided into four parts: (1) space and shape, (2) changes and relationships, (3) Quantity, and (4) uncertainty and data. In this study, the content used is the space and shape of the material surface area and volume of the tube and cone. Mathematics context is divided into four topics: (1) personal, (2) employment, (3) social, and (4) scientific. While the mathematical literacy competencies are grouped into three groups, among others: (1) reproduction process, (2) connections process, and (3) reflection process (OECD, 2013).

The educational curriculum which is currently applied in Indonesia is the curriculum 2013. One of the main changes to the curriculum 2013 is a change in learning materials are developed based on competency that fulfills the suitability and adequacy, then the content accommodates local, national, and international, such as TIMSS, PISA, and PIRLS. Therefore, the questions used in the textbook curriculum in 2013 already contains mathematical literacy problems.

The report of Junior High School national exam results in 2015 shows that the average of mathematics scores of students is only 56.40. It is the lowest from other subjects. In addition, there were only 26.41% students who joined the exam and got the score above 7.00. Thus, it can be concluded that generally, mathematics learning has not been successful in Indonesia. At the national exam, there are questions related to daily problems, it can be concluded that students in Indonesia have not been able to solve problems with good mathematical literacy. The average of mathematics national examination, students' score of SMP Negeri 1 Majenang reached 76.29, but there are still 37% students who joined the exam got score below 7.00. Further, the school's rank is the 4th best Junior High School national examination results in Cilacap district. It indicates that mathematics learning process that has been implemented is minimized.

For more, the results of interview which was done in June 2016 with a 9th grade math teacher SMP Negeri 1 Majenang show that the teacher uses scientific approach in explaining the teaching materials which are combined with other learning models. By applying scientific approach, it is expected that it can improve students' learning outcomes. In fact, the student's ability to solve the problems is still low. It is proven by the data 9th grade students UTS in odd semester, it is only about 30% of students who can reach KKM math which is 70. Based on above explanation, it can be concluded that students' learning result is still low.

In dimensional matter, mathematics teacher of SMP Negeri 1 Majenang explains that students are still having difficulties to complete problems relating to the daily problems. The same thing happened to the curved-face three-dimensional object learning, the students have not been able to associate the subject matter to daily problems. They are confused to apply the concept related to the issue.

Seeing these conditions, the learning that can improve student learning outcomes especially mathematics literacy ability of students is highly necessary. An efficient learning can be achieved if the teacher uses appropriate learning strategies (Slameto, 2003). The strategy can be a learning model application in accordance with the existing situation. One of them is Problem Based Learning with Realistic-Scientific Approach (PBL-PRS). A learning through PBL-PRS which is applied is presumed can help students to be creative,

independent, and improve students' mathematical literacy.

Indeed, PBL model is a learning approach which uses real problems as a context for students to learn about problem solving skills (Arends, 2007). It is also regarded as a model of student-centered learning that encourages them to develop their own knowledge (Huang & Wang, 2012). Through problem-based learning, students use a "trigger" which comes from problems or scenarios which determines their own learning goals (Awang & Ramly, 2008). Afterwards, the students solve the problem independently in which the learning is centered on them before returning to their group to discuss and choose the knowledge that they have had. Furthermore, it is an instructional model which is based on the many problems which require authentic investigation that is investigation that requires a real settlement of the real problem (Trianto, 2007). The realistic approach which uses reality and environment grasped by students is to facilitate the mathematics learning process to be better than the past. The reality means things which are real and concrete that can be observed and understood by students' imagination, while the environment means a student's environment in daily life (Turmudzi, 2004).

Furthermore, the learning with a realistic approach can increase the students' literacy skills that PISA refers to. It is in accordance with Wardono et.al (2016)'s research with PMRI PBL approach with Edmodo. It can improve the ability of mathematics literacy.

PMRI has various positive impact toward teaching and learning process in the classroom (Fauzan, 2002). Learning scientific approach is a learning process which has been designed in order students are able to actively construct concepts, laws, or principles through the stages of observing, formulating problems, proposing or formulating hypotheses, collecting the solution with a variety techniques, analyzing data, drawing conclusions, and communicating concepts, laws or principles which are found. It is expected can create learning conditions which aim to encourage them to find out from various sources of observation, and not only from the teacher (Daryanto, 2014). Above all, PBL realistic scientific approach is a combination of models and learning approaches that are considered suitable for solving problems related to daily problems.

At learning time, students have different learning styles in the material which is presented by teachers. There are students who focus on what the teacher says, to listen and then record it, and also to try or practice through physical objects as props. With regard to the fact that a student has a different learning style then how to solve the problem is also different. The differences will affect their mathematical literacy skills though. Teachers can use the understanding of learning styles to maximize students' learning outcomes and support effective learning by using teaching methods learning styles (Mousa, 2014). If they know their own learning styles, then the learning process in the classroom will run optimally. Likewise with the teacher, as an educator, he or she should be able to know students' learning style. By knowing it, he/she will process and carry out the learning in the classroom easily. He/she will choose the model, strategies, approaches, and methods to be used easily (Gokalp, 2013). Regarding to preliminary research, the researchers will identify the students' learning styles in learning mathematics literacy skills. Everyone has one or a combination of three types of styles of learning, namely visual, auditory, and kinesthetic learning style (DePorter & Hernaki, 2004).

The use of contextual issues must be supported by the media that can connect teachers and students to be better. The Internet can be a good learning media because it is cheap and can also be accessed anytime and anywhere. Internet use is highly recommended in a collaborative classroom learning (Kemendikbud, 2014). One of the social networks that has a variety of features to support the learning process is Edmodo. Edmodo is a social network which is designed for education. It provides a way to safe and comfortable learning both for teachers and students. It is operated as social media like Facebook. Teachers can post, send grades, assignments, quizzes, create a parameter, and gave the topic for discussion to the students (Pange & Dogoriti, 2014). Learning with Edmodo will make students will be more interested. Edmodo allows the students to interact with their teacher. Eventually, it will have a positive impact on students' learning outcomes.

Based on the background of the study, the problem in this study are (1) is the literacy skills of students with the mathematical model of PBL-PRS-E better than those with of PBL-PS and PS model; (2) is there any difference in mathematical literacy skills of students who have learning styles of visual, auditory, and kinesthetic; (3) is there any interaction between mathematics literacy skills with learning model based that is applied to the

student's learning style, and (4) id the increase of students' mathematics literacy skills by using model PBL-PRS-E higher than by using model PBL -PS and PS. Rgarding to the problem statements above, this study aims (1) to prove that mathematical literacy skills of students with models of PBL-PRS-E is better than those who use PBL-PS and PS models; (2) to prove that there are differences in students; mathematical literacy skills who have a visual learning style, auditory, and kinesthetic; (3) to prove that there is interaction between mathematical literacy skills based learning model that is applied to the student's learning style; and (4) to prove that the increase in the literacy skills math student by using PBL-PRS-E model is higher than those who use PBL-PS and PS model.

2. Method

The population of this research is a 9 grade student SMP Negeri 1 Majenang. The sample is 9G as experiment group 1, 9E as experimental group 2 and 9F as a control group. The sampling technique is cluster random sampling. The research design is quasi-experimental design with pretest-posttest control group (Sugiyono, 2013). While the design was patterned after giving pretest, a different treatment, and posttest. This study used a control group and two experimental classes. In this study, the control group used scientific approach (PS), while the experimental group 1 uses PBL realistic-scientific approach with Edmodo (PBL-PRS-E), and the experimental group 2 used PBL scientific approach (PBL-PS).

Table 1. Pretest-Posttest Control Group Design

Group	Pre-test	Treatment	Post-test
$\mathbf{1}^{st}$ Experiment	O_1	X_1	O_2
$\mathbf{2}^{nd}$ Experiment	O_3	X_2	O_4
Control	O_5		O_6

Moreover, there are variables that study mathematics literacy ability of students. In collecting data, this study used method which consists of test, questionnaire, and documentation. Documentation methods used to obtain the required data, the value of the midterm grade odd 9E, 9F, and 9G SMP Negeri 1 Majenang academic year 2016/2017. The test method is used to obtain data on the results of the literacy skills of mathematics students on the material surface area and volume of the tube and the cone (Agus, 2007; Djumanta et al., 2008; and Kemendikbud, 2015), whereas the questionnaire method used to measure students' learning style.

In this study, the group obtained the surface area and volume of the tube and the cone. Before learning, pretest of students' mathematical literacy ability and learning styles classification was conducted by using the questionnaire. The questionnaire used was developed from the book Quantum Learning (DePorter & Hernaki, 2004) and Accelerated Learning (Rose & Nicholl, 2003). The learning activities were conducted three meetings, then continued by post-test to determine students' mathematical literacy ability. The test used has been tested and there were questions about which qualification that both based on reliability, validity, level of difficulty, and different power problems.

The results of the questionnaire, pretest, and posttest students' mathematical literacy ability are then analyzed to verify the research hypothesis. Analysis of these data include average difference test (one-way ANOVA test), two-way ANOVA test, and test an increase in the gain normalized.

3. Results and Discussion

The implementation of the learning process was conducted on three groups of samples. The treatment was given in the experimental group 1 is the PBL-PRS-E model, the experimental group 2 is the PBL-PS model, and the control group is the scientific approach. The meetings in the classroom for each group was five meetings, three meetings of learning, and two meetings to test students' mathematical literacy which consisted of pretest and posttest.

In the experimental group 1, students showed discipline and curiosity in both the discussion and determining contextual problem solving at LDS. The students can observe the contextual issues and continued with making questions which were submitted to the teacher. They actively discussed and found the information needed, in the presentation sessions some students explained the results of their discussion and the other students watched. They could draw conclusions and deliver learning outcomes. When the formative test was ongoing, students were working properly and orderly even though the outcomes were not satisfying. Some students who get less than the maximum value. Each teacher gave the assignment through Edmodo media.

In the experimental group 2, students showed discipline and curiosity character in both discussion and determining the settlement of problems in the LDS. The students can observe the problem and continued with making questions submitted to the teacher. They actively discussed and found the information needed, the presentation sessions some students explained the results of their discussion and the other students watched. Thye could draw conclusions and deliver learning outcomes. When formative test was held, they worked well although there were still some students who got less than the maximum value.

While in the control group, students showed discipline and curiosity in defining the problem-solving worksheets. The students could observe the problem and continued with making questions which were submitted to the teacher. During the presentation of their work results, they explained the results and other students watched. They could draw conclusions and deliver learning outcomes. When formative test was held, they worked well although there were still some students who got less than the maximum value.

3.1. The Result of Mathematical Literacy Ability Test

Based on the results of data analysis of pretest and posttest mathematical literacy skills, the data obtained from the third pretest and posttest study sample have a normal distribution and homogeneous variance.

Then, based on the results of mathematical literacy skills pretest, the experimental group 1 had an average of 34.68 with the highest score of 63 and the lowest score of 9, the experimental group 2 had an average of 29.35 with the highest score of 56 and lowest score of 9, and the group control has a class average 28.97 with the highest score of 60 and the lowest score of 9. Shortly, experimental group 1, the experimental group 2, and the control group were under the KKM.

Based on the results of mathematical literacy skills posttest, experimental group 1 had average grade of 81.91 with the highest score of 97 and the lowest score of 60, the results are satisfactory although there are 3 students whose score below the KKM. The experimental group 2 had average grade of 76.5 with the highest score of 96 and the lowest score of 60. The results are quite satisfactory although there are 3 students whose score below the KKM. Whereas the control group had an average grade of 64.85 with the highest score of 77 and the lowest score of 40. The result is less than satisfactory because there are 22 students who score below the KKM. The experimental group 1 and 2 have reached mastery learning while the control group has not.

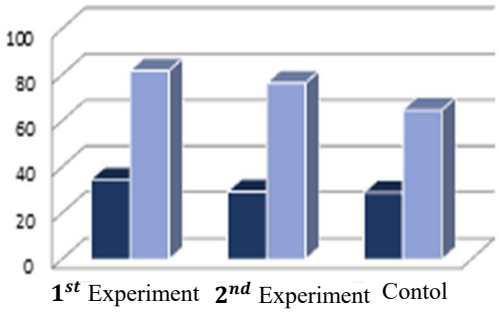

Figure 1. Graph of Result Test Mathematical Literacy Ability Students

3.2. The Result of Learning Styles Questionnaire

The process of determining student's learning style experimental group 1, the experimental group 2, and control group using a questionnaire is to measure students' learning styles which are developed from the book Quantum Learning (DePorter & Hernacki, 2004) and Accelerated Learning (Rose & Nichol, 2003).

Based on Table 2, it can be seen that a visual learning style students have better volume than auditory and kinesthetic learning style students. It shows that students tend to be happy to see or pay attention to what the teacher present during the lessons rather than listen or practice anything relating to learning.

Table 2. The Result of Learning Styles Questionnaire

Group	Visual	Auditorial	Kinesthetic
Experiment $\mathbf{1^{st}}$	16	8	4
Experiment $\mathbf{2^{nd}}$	16	7	2
Control	16	9	1

3.3. Result of Research

To find out whether there are differences in mathematical literacy skills of students between experimental groups 1, experimental group 2, and control group or not, average difference test (one-way ANOVA test) was used.

Based on the calculation results, it is obtained that $F = 41.554 > F_{table} = 3.09$, so H_0 rejected. It means that there are significant differences in the 9 grade students math literacy ability between the model-PRS-E PBL, PBL-PS,

and PS. To know the difference, it needs further test. Further, the test used in this study is a further test of Tukey aided by SPSS 16.0.

Based on Tukey's test further research, it can be concluded that the average of students math literacy ability with the model PBL-PRS-E is more than those with PBL-PS models and more than those with PS.

Then, to find out whether there are differences in mathematical literacy ability of visual, auditory, and learning styles students, two-way ANOVA kinesthetic comparative test was used on posttest value of students' mathematics literacy ability which has been prepared based on the V-A-K learning style. The calculation of two-way ANOVA comparisons is shown in Table 3.

Table 3. The Result of Two Ways Anova

Sources of Variation	$F_{results}$	F_{table}	Sig
Group	10,539	3,12	0,000
Learning Model	0,080	3,12	0,923
Learning Model Groups	1,614		0,181

Based on Table 3, it is obtained $F = 0.080 < F_{table} = 3.12$, then H_0 is accepted. Thus, there is no difference in mathematical literacy skills in visual, auditory, or kinesthetic learning style students.

Furthermore, to find out whether there is an interaction between mathematical literacy ability based learning model that is applied to the student's learning styles, it is used two-way ANOVA comparative test on the value of the mathematical literacy ability posttest students who have been prepared based on V-A-C learning style. The calculation of two-way ANOVA comparisons is shown in Table 3.

Based on Table 3, it is acquired that $Sig > 0.05$, then H_0 is accepted. Shortly, there is no interaction between mathematical literacy ability based learning models that are applied to the student's learning style.

To determine whether there is an increase in the literacy skills of mathematics in the experimental group 1, the experimental group 2, and control class, the different test average pairwise, the increase the literacy skills of mathematics (test to gain normalized) test and the difference test in different average between pretest and posttest literacy mathematics were conducted.

Based on the test results of the average difference in pairs, it was concluded that an increase in students' mathematical literacy ability in model-PRS-E PBL, PBL-PS models, and learning happened by using scientific approach.

Table 4. The Result of Normalized Gaining Test

Experiment Group	$< g >$	$Criteria$
Experiment 1^{st}	0,72	High
Experiment 2^{nd}	0,67	Mid
Control	0,50	Low

Based on Table 4, it can be concluded that an increase in the experimental group 1 is in the high category, the increase in the experimental group 2 includes in the category, and the control group is in the category 3,12 of increase. Besides, in average difference test of pretest and posttest in mathematical literacy skills, it is acquiredc$F = 35{,}152 > F_{table} = 3{,}09$. It means that there is a significant difference in the average difference between pretest and posttest os students' literacy ability on the surface and volume of the tube and cone material of 9th grade among the PBL-PRS-E, PBL-PS, and PS model. While to find out the difference, it is required to do a further test. It is a further test of Tukey aided by SPSS 16.0.

Furthermore, based on Tukey's test results, it can be concluded that an increase in os students' mathematical literacy ability with PBL-mode PRS-E is more than those with PS, but not more than those with PBL-PS.

3.4. Discussion of Research

Based on the results of preliminary research, it shows that students' mathematical literacy ability with the PBL-PRS-E model is better than those with PBL-PS model and better than those with PS. As Kusuma (2016) states that students' mathematical literacy ability in model PBL realistic-scientific approach with Edmodo is better than those with scientific approach. One of mathematics learning which gives positive impact on students' literacy ability is realistic mathematics learning which applies realistic approach. As the result, students' mathematical literacy ability can be improved.

Besides, the achievement of students' learning outcomes in the experimental class 1 is caused by several factors, as follows (1) using the PBL learning. Indeed, PBL model is considered as student-centered learning that encourages students

to develop their own knowledge, find and solve problems independently (Huang and Wang, 2012). According to Arends (2007), the PBL learning consists of five phases namely providing an orientation about the problem, organizing students to examine, helping the investigation independently and groups, developing and presenting the artifacts and the exhibit, and the last is analyzing and evaluating. The PBL learning phase gives an orientation about the problem to the students in which they have to be actively involved in these activities. Then in the third phase that is helping the investigation, students are assisted by the teacher to get the right information, carry out experiments, search for explanation and solution to interact with group members, so that they can discuss the problems and ways how to determine the solution. Through the discussion, they can connect themselves to study, improve reflective thinking, and expand their knowledge. This is in accordance with one of the principles of learning theory of Piaget that is learning through social interaction, because the shared learning will help students' cognitive development. (2) Using realistic-scientific approach in linking mathematics to daily life. A knowledge will be meaningful for students if the learning process uses realistic problems (Wijaya, 2012). The scientific approach is intended to provide insight to the student in recognizing, understanding the various materials using scientific activities, so that information can come from anywhere and anytime does not depend on the information in teacher's direction. Therefore, the learning conditions are expected to encourage students to find out from various sources of observation, and not only being informed (Daryanto, 2014). (3) The use Edmodo media as a learning media. Edmodo which is assisted learning makes students become more interested in, and not only allows students to interact with teachers, it also had a positive impact on student learning outcomes.

In the implementation of PBL-PRS-E model, students were actively interacted and discuss the issues. They worked together if there were students who did not understand the other would have explained or asked for teacher's help. They also actively asked in which it encouraged them to be able to solve the problem correctly. Thus, they could solve problems and understand correctly, in consequence, their ability in solving mathematical literacy is increased.

Implementation of PBL-PS model in the experimental group 2 is similar to the implementation of experimental group 1, yet the difference is in the used media; Edmodo. In the experimental group 2, the teacher focused on the completion of material with a few lessons. In PBL-PS learning, students actively improved their knowledge. The improvement of the information they got from observing the issues which weregoing to be studied. Followed up by asking the information to find the concept itself with the problems of daily life which then try and make sense in group discussions using LDS, communicate the results of the discussion to obtain a conclusion which was same for all students. Afterwards, the learning was closed with the presentation by the teacher to the student by giving a quiz to find out how much students' understanding during the learning process. As for the development of information after learning depends on each student's self.

While the implementation of learning the scientific approach in the control group, students were still less than the maximum in solving the problem. Students had not been able to identify and resolve the issue appropriately. It was caused by not using Edmodo as the supporting media to their learning process.

Based on two-way ANOVA test result, there is no difference in mathematical literacy skills based on V-A-C learning style. This is due not to award a special learning on students who had different learning styles. They were given a different treatment for each group of experiments. They are also able to adapt to the learning environment. Students who have a visual learning style, auditory, and kinesthetic maximize their learning by observing what happens, understanding and solving problems that occur in their own way and communicate what they have earned. This is in accordance with the steps to the scientific approach (Nasution, 2013). Although each student's learning style is different, they know the learning objectives which have to be achieved. Therefore, they are able to optimize their ability to achieve these goals.

Based on two-way ANOVA test, there is no difference between students' mathematical literacy skills based on learning model which was applied and based on different learning styles. Hence, the learning model with no interaction of learning styles are independent or not influencing each other. It was probably caused by students who have different learning styles to adapt to the learning environment.

To find an increase in the experimental group 1, group 2 experimental and control groups can be seen in the following discussion.

In the experimental group 1, the ability on mathematical literacy of students is better than initial ability before being given a PBL-learning model PRS-E. Through the implementation of mathematical model, their literacy skills have increased. As Anni (2011) argues that in the implementation of learning, students were active in solving the problem by using the information which has already obtained to find the concept itself. Followed by processing the information to find the concept itself through the problems of daily life which are then manipulated in discussion groups using a sheet student discussion, props. Then to deepen the materials, teachers gave assignments through Edmodo media.

In the experimental group 2, students' mathematical literacy ability is better than the initial capability before being given with PBL-PS models. Through the implementation of mathematical model, their literacy skills have increased. That is because, in the implementation of student learning, they were also active in solving the problem by using the information which had been already obtained to find the concept itself. Followed by processing the information to find the concept through the daily life problems which were then manipulated in discussion groups by using a sheet student discussion, props.

Meanwhile, in the ability on mathematical literacy of students is better than initial ability the initial ability before being given a scientific approach to learning. With the implementation of the model of mathematical literacy skills of students has increased. That is because, in the implementation of student learning, they were also active in solving the problem by using the information which had been already obtained to find the concept itself through daily life problems.

4. Conclusion

Based on the results of research and discussion, the conclusions which can be drawn are as follows (1) the mathematical literacy ability of 9 grade students with the model PBL-PRS-E is better than by using model PBL-PS and PS, (2) there is no difference in the mathematical literacy ability of 9 grade students based on visual, auditory, and kinesthetic learning style, (3) there is no interaction between students' mathematical literacy ability based learning model to those who based on learning styles, and (4) the increase of mathematical literacy ability of 9 grade students with model PBL-PRS-E is higher than those with PS, but not higher those with PBL-PS model.

Regarding to above conclusion, the researchers suggest that the model PBL-PRS-E can be used as an alternative by the 9 grade mathematics teacher of SMPN 1 Majenang, Cilacap to improve the students mathematical literacy ability and VAK learning style of each student need to be identified so that teachers of SMP Negeri 1 Majenang can optimize the use of media and learning activity in the classroom, as well as optimizing the use of instructional media such as Edmodo to improve students' spirit and interest in learning mathematics. In addition, it helps the students in the communication between teachers and students anytime and anywhere.

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