The Effect of Discovery Learning with the Scaffolding Method on Science Literacy Ability and Student Motivation in terms of Academic Ability

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Abstract. This study aims to 1) The influence of discovery learning model with scaffolding toward the scientific literacy and student's learning motivation, 2) the influence of academic ability toward scientific literacy and student's learning motivation, 3) The interaction between learning models and academic abilities on scientific literacy and student motivation. This research is a quasi-experimental research type. The research design used in this study was Postest only nonequivalent design. This research was conducted at SMAN 5 Surakarta as a research subject. The sampling technique used in this study is cluster random sampling. The instrument used in this study used a questionnaire instrument to measure learning motivation and scientific literacy test questions using indicators from NOSLiT. The data analysis technique used is Two Way Analysis of Variance. The results of the study (1) the learning model discovery learning accompanied by scaffolding has an effect on scientific literacy and student learning motivation, (2) students' academic ability has an effect on scientific literacy competence, and (3) there is no interaction between discovery learning and scaffolding learning models in terms of academic ability on scientific literacy skills, and learning motivation.

Keywords: Discovery learning, Scaffolding, Science Literacy, Motivation to learn, Academic ability

INTRODUCTION

Scientific literacy is the ability to understand science, identify questions, draw conclusions with evidence, and make decisions regarding problems that occur in the natural environment. (Firman, 2007). Students' scientific literacy skills need to be developed because understanding the concept of science provides its satisfaction after learning it, information and scientific thinking are needed to solve problems in everyday life, everyone needs to be involved in important issues involving science and technology, scientific literacy is needed in working world (Putri & Wasis, 2016).

The scientific literacy skills of students in Indonesia are still very low. This is evidenced by data analysis conducted by the Organization for Economic Co-operation and Development (OECD) that the results of Indonesian scientific literacy which are below level 1 are 20.3%, level 1 is 41.3%, level 2 is 27.5. %, level 3 is 9.5%, and level 4 is 1.4%. This score determines that Indonesia's scientific literacy skills Indonesia are on average at level 1. This level shows that Indonesian students have just arrived at the ability to recognize some basic facts, but they have not been able to communicate and relate these abilities to various science topics, let alone up to applying the concepts in everyday life(Arohman & Priyandoko, 2016).

Learning motivation is needed to encourage the achievement of learning goals. Lack of motivation can affect learning outcomes that are less than optimal and not achieving learning goals. The factor causing the lack of student motivation in learning biology is the delivery of material that tends to be boring so that students pay less attention to the material being taught.

The solution to improve students' scientific literacy skills and student motivation to study requires an appropriate learning model. The learning model used must include dimensions of scientific literacy, one of these dimensions is the process dimension. The process dimension emphasizes the process of a scientific approach, namely: observing, asking, trying, associating, and communicating. The stages of the scientific approach require students to actively seek out the necessary information through discussion with groups. Discovery Learning contains steps in a scientific approach and the learning process requires students to be active so that Discovery Learning is suitable for increasing scientific literacy and student learning motivation in learning(Dewi, Ahied, & Irsad Rosidi, 2019). Learning Discovery Learning which requires active and independent students must also be balanced with the provision of supporting learning methods, namely the Scaffolding method. The purpose of this study was to determine: 1) the effect of the Discovery Learning model with Scaffolding on students' scientific literacy skills and learning motivation, 2) the effect of academic abilities on scientific literacy skills and student learning motivation and 3) The interaction between learning models and academic abilities on scientific literacy and student motivation.

METHOD

This type of research is a Quasi-Experimental Design (quasi-experimental) with a post-test only nonequivalent design. This study used two homogeneous classes. The experimental class 1 used the Discovery Learning model while the experimental class used the Discovery learning model with Scaffolding. The next step for the two classes was given a post-test to measure the competence of scientific literacy and a questionnaire was used to measure student learning motivation. The data were processed and analyzed using SPSS 25 to determine the difference in the influence between the two learning models. The posttest-only group design research design can be seen in Table 1.

TABLE 1. Research Design Posttest-Only Group Design

Group	Treatment	*Post-test*
Experiment 1	X1	T
Experiment 2	X2	T

Information :
T   : A test of scientific literacy and learning motivation given to the sample
X1   : Experimental group 1, namely discovery learning model
X2   : Experimental group 2 is the discovery learning model with the Scaffolding method

The study population was all students of class XI MIPA SMA N 5 Surakarta even semester of the 2019/2020 school year, the research sample selected with cluster random sampling technique. Researchers divided the student population of class XI MIPA into five groups or clusters based on class. Then the researchers selected two clusters according to the research being carried out through systematic random sample selection. Then from several class clusters that have been randomly selected, the researcher chooses to include all students in the class as subjects The variables in this study consisted of three variables, namely independent variables, dependent variables, and variables. moderator. The independent variable in this study is the Discovery learning model with Scaffolding. The dependent variable of this research is the competence of scientific literacy and student motivation. The moderator variable in this study is academic ability (high, medium, and low).

Test instrument variables in the form of construct validation and content. Validation of constructs and contents with the help of expert analysis and assistance of SPSS 25 using statistical test calculations validation with the Pearson product-moment technique which states that 80 scientific literacy questions and 80 motivational questionnaire questions are valid and usable. The reliability test used the Alpha formula, the value of r11 was> 0.6, which means that the question instrument had high reliability. The data analysis technique used the Two Path Anava test assisted by the SPSS 25 program at the 5% significance level. Two-way Anava Test is carried out after performing the normality test and homogeneity test.

RESULT AND DISCUSSION

Research result

The research was conducted at SMA N 5 Surakarta for the 2019/2020 academic year. The classes used in the study were class XI MIPA 4 as the experimental class 1 and class XI MIPA 5 as the experimental class 2. The selection of research samples used the normality test, homogeneity test, and T-test using students' PAS scores in biology subjects. The following is a summary of the students' initial ability tests and the results of the research instrument trials.

Student Initial Ability Test Results

The results of the students' initial ability test used a balance test with a t-test with a significance level of 5% to determine whether the initial abilities of the two groups were the same or not. The t-test decision is H0 accepted if Sig. > α (α = 0.05) and H0 is rejected if Sig. <α (α = 0.05). The t-test was carried out after carrying out the normality test and the homogeneity test. The normality test used the Kolmogorov-Smirnov test while the homogeneity test used Levene's test with a significance level of 5%. The results of the normality test state that the two classes have a normal distribution because of sig. The experimental class and control class were 0.043 and 0.200, respectively. The results of the homogeneity test state that the two classes have a homogeneous score variance because of the sig. in the amount of 0.009. The results of the balance test with the t-test indicate that both classes have the same initial ability because of the sig. amounting to 0.336.

Results of Research Instruments Trial

The data from the research instrument trial included post-test questions that measured scientific literacy competencies. For the posttest questions, expert validation was carried out (expert judgment) and validated using the help of SPSS 25 and reliability testing with the Alpha test. The results of the validation test were 80 questions of sains literacy test and 80 questions of learning motivation questionnaire, stated that all questions were valid and reliable with Alpha values of 0.747 and 0.670 which meant they had high-reliability categories.

Description of Data

The study used three data, namely data on academic ability, data on scientific literacy competencies, and data on student learning motivation. Students' academic ability data in the Discovery Learning learning model accompanied by scaffolding and the Discovery Learning learning model show a significant difference. The summary of the student's academic ability data is summarized in Table 2.

TABLE 2. Student Academic Ability Data

Statistics	Experiment 1			Experiment 2		
	Low Academic Ability (AR)	Medium Academic Ability (US)	High Academic Ability (AT)	Low Academic Ability (AR)	Medium Academic Ability (US)	High Academic Ability (AT)
Score	X < 61.26	61.26 <X <88.74	X> 88.74	X < 69.31	69.31 <X <86.25	X> 86.25
Frequency	6	20	5	6	20	6
Mean	52	77.5	92.6	65,83333	77.55	90.5
St. Deviation	4,335897	6,065433	2.302173	3.311596	4.071402	2.258318
Variance	18.8	36,78947	5.3	10,96667	16,57632	5.1
Minimum	48	66	91	60	70	87

Maximum	58	87	96	69	85	93
Median	51	72	91	67	77	90

The scientific literacy competency data were obtained based on the results of the student's election test totaling 80 questions when the learning material was taught. The summary of the data on scientific literacy competencies and student motivation in experimental class 1 and experiment class 2 is summarized in Table 3.

TABLE 3 Data Description of Science Literacy Ability and Student Motivation

Description		Experiment 1		Experiment 2	
		Science Literacy	Motivation	Science Literacy	Motivation
N	Valid	31	31	32	32
	Missing	0	0	0	0
Mean		35.90323	75.12903	40.59375	79,625
Median		36	76	40.5	80.5
Std. Deviation		6.289435	6.955774	8.206447	8.631338
Variance		39,55699	48.3828	67.34577	74.5
Minimum		27	63	27	63
Maximum		49	89	59	96

Table 3 shows that the mean, standard deviation, and variance of experimental class 2 (Discovery learning accompanied by Scaffolding) have a greater value than the experimental class 1 (Discovery learning).

Discussion

Students' scientific literacy competencies are assessed at the end of the lesson after basic competencies have been taught. The assessment of students' scientific literacy competencies used 80 optional questions which were an adaptation of the NOSLiT questions which were modified according to the learning material. The average score of scientific literacy competence from experimental class 1 and experimental class 2 was analyzed using SPSS 25.

The Influence of Model Discovery Learning with Scaffolding Method on Science Literacy Ability

The results of the two-way ANOVA test show that the discovery learning model with the Scaffolding method affects scientific literacy skills. The results of the analysis show that there is a significant difference in the average scientific literacy ability between the discovery learning model and the discovery learning model accompanied by scaffolding. The average value of scientific literacy skills in experimental class 2 which uses the discovery learning model with the scaffolding method is higher than the experimental class 1 which uses the discovery learning model.

The discovery learning model has weaknesses, one of which involves the risk for learners from inaccuracies in learning, bad decision making, untested ideas, inaccurate conclusions and takes a long time (Hai-jew, 2008). In line with (Cruickshank, Jenkins, & Metcalf, 2003) that the shortcomings of discovery learning in its implementation require a lot of time to make complex knowledge discoveries. The application of discovery learning models also demands mental readiness and maturity of students because students will design their experiments to get concepts in learning and this will take a long time (Roestiyah, 2008). Thus, the scaffolding that is inserted into the discovery learning model syntax aims to further assist students in understanding the parts that are understood and not understood in learning (Dermawan, Sunarno, & Suciati, 2018).

The Scaffolding stages are inserted into the Discovery Learning model syntax. These stages include 1) Environmental provisions; 2) Explaining, Reviewing, and Restructuring; and 3) Developing Conceptual Thinking (Anghileri, 2006). The Discovery learning model with Scaffolding can optimize students in exploring and solving

problems, generalizing problems, and confirming old knowledge with new knowledge. (Skeen & Zafonte, 2015). The discovery learning model stages accompanied by scaffolding consist of 1) environmental provisions; 2) orientation; 3) explaining, reviewing, and restructuring; 4) hypothesis generation; 5) hypothesis testing; 6) conclusion; 7) developing conceptual thinking; 8) regulation(Anghileri, 2006; Veermans, 2003b).

In the Environmental provision phase, the teacher mapped the students' initial knowledge through the learning outcome test. At the orientation stage, students identify problem phenomena and formulate problems, while the teacher facilitates them. Explaining, reviewing, and restructuring stages the teacher helps students to construct initial knowledge from formulating problems to finding concepts, while students identify problems to find concepts. At the Hypothesis generation stage, students formulate hypotheses based on the formulation of the problem, while the teacher facilitates them. At the Hypothesis testing stage, students conduct experiments to prove the hypothesis, while the teacher facilitates them. In the Conclusion stage, students make conclusions based on experiments, while the teacher facilitates them. At the Developing conceptual thinking stage, The teacher helps students discuss the final answer and look for alternative answers, while students discuss the final answer and look for alternative answers. At the Regulation stage, students confirm and evaluate learning outcomes (Dermawan et al., 2018).

The results of this study indicate that the discovery learning model with scaffolding carried out in the experimental class 2 affects the students' scientific literacy skills, compared to the discovery learning model in the experimental class 1. This is because students tend to gain meaningful learning from problem-solving using discovery learning models accompanied by scaffolding to get accurate data (Thitima & Sumalee, 2012). In contrast to experimental class 1, which uses a discovery learning model that is less than optimal in its implementation because it takes a lot of time to make complex knowledge discoveries that are less than optimal.

Three aspects of standard scientific literacy include knowledge of science content, understanding of science as a knowledge process, and understanding in carrying out scientific investigations (Wenning, 2006). The results showed that the results of each aspect of scientific literacy in experimental class 2 were higher than those in experimental class 1. The achievement of each aspect of scientific literacy can be seen in Figure 1.
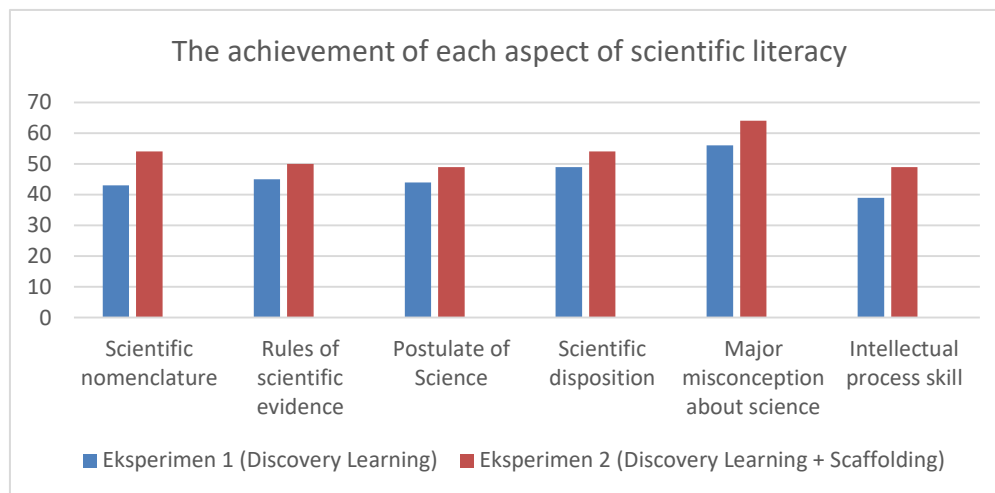

Figure 1. The achievement of each aspect of scientific literacy in the Discovery learning model and the Discovery learning model accompanied by Scaffolding

The explanation regarding the increase in each aspect of scientific literacy is as follows:

The scientific naming aspect is an ability that students and teachers must have regarding scientific terms used in science, including assumptions, evidence, deduction, empirical, facts, hypotheses, law, induction, truth, belief, control, models, parameters, knowledge, explanation, prediction, principles, pseudoscience, science, science, systems, theory and variables (Wenning, 2006). This aspect has increased with the application of discovery learning and scaffolding learning models. The increase occurred because each stage in discovery learning trained students to recognize more scientific terms in science (biology). Investigation with discovery learning model orientates students to be able to understand and know scientific terms in science (Wenning, 2006). At the stage of observation of the problem of investigation, students are taught to recognize scientific evidence and scientific names used in biology. In the hypothesis testing stage, students are trained to process the knowledge they have to compile a design by

distinguishing the measured variable (dependent variable), the treated variable (independent variable), and the variable that must be maintained to produce valid data (control variable). At the stage of observing the problem and making the experimental design, it was able to make students better understand and know the aspects of scientific naming so that they could increase the percentage of score achievement in this study.

The aspect of the rule of scientific evidence is a rule in science that is following the scientific method. Some examples of the rules of scientific evidence used to like science literacy, namely, scientific conclusions must be based on general evidence, a prediction to be scientific must go through stages of testing and scientists must test independently for a prediction, etc (Wenning, 2006). The increase in the regulatory aspect of scientific evidence was due to group discussions in planning investigation. This planning of inquiry trains students to carry out investigations according to the scientific method. Adaptation to the scientific method of makes students increasingly understand and know the scientific rules that apply in science and through planning that is investigated students can find new scientific evidence.

The postulate aspect of science is an aspect that contains the assumptions of science used in general. This assumption is also considered as a law that makes a scientific statement accepted or rejected (Wenning, 2006). This aspect has increased because at the learning stage students carry out investigations in which several rules apply in general to the investigation. The existence of this rule makes students understand more and more universally applicable scientific assumptions. Conclusion-drawing activities based on the results of investigations through the scientific method train students to make and understand scientific assumptions that are generally accepted.

The aspect of scientific disposition is a characteristic that must be possessed by a scientist to explore and know science. Attitudes that include scientific dispositions are curiosity and skepticism, objective and open, creative and logical, clever, honest and trustworthy(Wenning, 2006). The aspect of scientific disposition increases because there are stages in presenting problems that train students' curiosity to make problem formulations. The stage of scientific investigation (investigation) can improve students' scientific attitudes, including being objective, creative, honest, and trustworthy. There are stages of an investigation carried out by students, so students practice objectively, creatively, honestly, and reliably in carrying out investigations and processing the data obtained. Discovery-based science learning teaches scientific attitudes to students, students are not made as scientists but students are equipped with the abilities possessed by scientists so that students can solve problems faced in their lives.

The main aspects of misconceptions in science are aspects that contain the analysis of misconceptions that exist in science which are closely related to the scientific method as the basis of science (Wenning, 2006). The main misconceptions in science are increasing which means that students are increasingly able to analyze the existence of misconceptions in learning, so that the higher the percentage, the lower the students' misconceptions. The lower misconceptions in learning and scientific methods in science are due to the stages of students planning and investigating and drawing conclusions that make students understand more about correct planning, correct scientific methods, and conclusions following the correct theory.

Aspects of intellectual processability are experimental and observational abilities that can be learned when science is taught using inquiry-oriented learning and laboratory methods (Wenning, 2006). An increase in the aspect of intellectual processing ability because there is at the stage of students making problem formulations and hypotheses, this increases students' ability to predict and explain which is part of the ability of intellectual processing. At the planning stage of the investigation, students practice designing and starting a scientific investigation. The investigation stage improves students' abilities in observing, recording data, constructing graphs, and controlling variables which are part of intellectual processing abilities. The stages of concluding students increase because there are stages of students to make conclusions on the results of their investigations.

The achievement of every aspect of scientific literacy is indirectly supported and accommodated by the syntax of the discovery learning model during the learning process. (Balim, 2009) suggesting the active participation of students in the learning process through discovery, involving reflection, thinking, experimenting, and exploring. These activities require students to take examples from everyday life, especially to propose and test hypotheses so that it allows students to interact and understand the expected performance. Syntax hypothesis generation and hypothesis testing are stages in learning that accommodate students' scientific literacy, such as understanding science as a knowledge process, and understanding in carrying out scientific investigations. Hypothesis generation is the stage where students formulate hypotheses,(Veermans, 2003a)

The Discovery learning model accompanied by scaffolding is a model that has the potential to empower scientific literacy skills. This is because the discovery learning model facilitates students to solve problems scientifically through a series of scientific activities. While scaffolding in its application helps students in solving problems and trains students' thinking skills in the learning process(Thitima & Sumalee, 2012).

The Influence of the Discovery Learning Model with the Scaffolding Method on Student Motivation

The results of the two-way ANOVA test show that the discovery learning model with the Scaffolding method has an effect on student learning motivation with a significance of 0.007 or less than 0.05, meaning that there is a difference in the average student motivation between discovery learning and scaffolding learning models and discovery learning models. The average value of student motivation in experimental class 2 which uses the discovery learning model with the scaffolding method is higher than the experimental class 1 which uses the discovery learning model. This is because scaffolding is also able to build student motivation in learning and reduce students' insecurities when they are unable to solve problems in the learning process (Ratnasari, Suciati, & Maridi, 2019). The graph of the achievement of each aspect of learning motivation can be seen in Figure 4.4
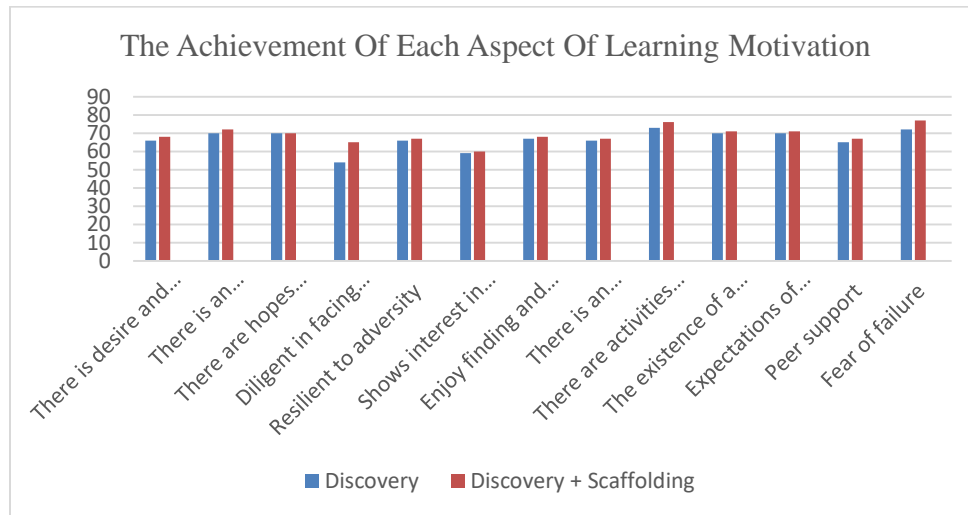

Figure 2. The achievement of each aspect of learning motivation in the Discovery learning model and the Discovery learning model accompanied by Scaffolding

The percentage achievement of the intrinsic motivation score can be seen in every aspect. The explanation regarding the increase in each aspect of intrinsic motivation is as follows:

1. There is a desire and desire to succeed

The indicator of the desire and desire to succeed has increased because students who have a goal to excel are competing. Students who have achievement motivation are often agile and learn independently. Students aspire to be successful in the future so that their motivation is higher. Desire in the learning process is marked by the active (originality) of students asking questions when the teacher is given the opportunity. Students are allowed to ask questions, argue, answer, and discuss in the experiment or presentation process. This opportunity is given if there are problems or things that are deemed by students who do not understand according to the material presented, either with teachers or students. When students ask questions, the teacher does not immediately answer students' questions but allows other students to respond to the questioner. (Halim, Boleng, & Labulan, 2019)

2. There is an encouragement and need in learning

There is increased motivation and need in learning seen from the attitudes of students who want to study the material being explained, work very well in groups, do the best-given assignments by the teacher, have high expectations during biology lessons, complete assignments on time, and shows the goals to be achieved in the future (Halim et al., 2019)

3. There are hopes and dreams for the future

The results showed that the aspects of future hopes and aspirations in both experimental classes were the same. There is a desire to achieve goals, students will earnestly participate in learning. Students will pay attention to the explanation from the teacher and participate actively in the learning process. Motivation to learn has a unique role in increasing passion, feeling happy, enthusiastic about learning, and serves as a driving force for achievement (Endriani, 2016).

4. Diligent in facing the task

Persistence is a continuous effort to achieve certain goals without giving up easily until success. The improvement in this aspect is evidenced by the persistence and seriousness of students when completing

assignments, focusing on working on assigned tasks, and collecting assignments according to a predetermined time. (Jampel, 2016).

5. Resilient to adversity

Resilient, which means not easy to give up, accompanied by strong will and efforts to achieve goals. This is shown when students try hard in their studies so they easily face difficulties in learning. (Tiara, Ayu, & Hakim, 2019)

6. Shows interest in various problems

The increase in this aspect is shown by the enthusiastic attitude of students to prove the hypothesis that has been proposed. Students actively discuss in groups and actively ask other students or their teachers(Wibowo, Mustafidah, Wicaksono, & Aryanto, 2013).

7. Enjoy finding and solving problems

This is proven by students who like to learn biology so that it is easy to find and solve biology problems, students are happier if they have to work on questions because the student who is the fastest and can answer correctly will get a prize. (Wibowo et al., 2013).

The percentage achievement of the intrinsic motivation score can be seen in every aspect. The explanation regarding the increase in each aspect of intrinsic motivation is as follows:

1. There is an appreciation in learning

Aspects The existence of appreciation in learning has increased because teachers always try to motivate students so that they are more interested in participating in the learning process. One way is by providing educational rewards and punishments. The efficacy of reward and punishment as educational tools to get feedback from students will be felt if the application is correct. Too often giving rewards and punishments is also not justified, because it will make the habit less profitable in teaching and learning activities. It is feared that students are active in studying and doing assignments if their work is rewarded by the teacher. But if there is no reward, students will be lazy to learn and do assignments.

2. Some activities are interesting in learning

External motivation on indicators of activities that attract students. Students need activities that are interesting and exciting in learning activities to spur motivation. Increasing academic achievement and increasing achievement motivation in students is influenced by factors from within (internal) and factors from outside (external) students. Internal factors consist of motivation and interest. A person's inner care, interest, and desire for a problem. While external factors consist of family support, association (environment), and learning infrastructure(Halim et al., 2019)

3. The existence of a conducive learning environment

In the learning process, the environment is a source of learning that influences student learning motivation and in the learning process. As with learning facilities, the learning environment is also a factor that cannot be ignored. This is because the environment is a part of humans, especially for students to live and interact with each other. A conducive learning environment, both the home environment and the school environment, will create calm and comfort for students in learning so that students will find it easier to master the learning material optimally.(Ririn Widiyasari & Mutiarani, 2011). A similar statement is also given by(Slameto, 2012) that "A good environment needs to endeavor so that it can have a positive influence on the child or students so that they can learn as well as possible".

4. Expectations of families and teachers

In terms of extrinsic motivation itself, the authority of parents and teachers greatly influences the external motivation of students when compared to other factors. This is because students feel responsible for making their parents or teachers proud so that students study seriously. Students think that school is not easy and tuition fees are quite expensive. Therefore, making parents happy is a must so that it encourages students to study harder(Ekasari & Yuliyana, 2012).

5. Peer support

Peers have a very important role in the life of student groups today. The number of time students spends with their themes can affect their lives. therefore apart from the form of parental care, peers in the social environment are very important(Afiif & Makkulau, 2016)

In adolescence, the role of peers has a major influence on life. Because with these peers, students can be more open to feel safe and comfortable so that they can more easily express important opinions to their peers to provide social support with a form of motivation. As stated by(Ekasari & Yuliyana, 2012) said that peer support comes from people who have meaningful relationships with individuals such as the family of close friends, coworkers, neighbors, and relatives.

6.   Fear of failure

One of the motives to avoid failure is an embarrassment when the results of the task are bad or do not match expectations. Research shows that fear of failure is most pronounced when students are given tasks that are difficult to accomplish. Students may often fail at difficult tasks and tend to succeed frequently at relatively simple tasks. If the assignment is simple, then the need to avoid failure will motivate students to find the means necessary to achieve it. However, if the task is difficult enough, the possible build-up of anxiety can cause an avoidant reaction to the task and hinder the necessary means of accomplishing it. (Shia, 1992)

The Effect of Academic Ability on Science Literacy and Learning Motivation

The ANOVA test results show a significance of less than 0.05 on the variable of scientific literacy and learning motivation so that it can be concluded that there is an effect of low academic ability, moderate academic ability, and high academic ability on scientific literacy skills and student learning motivation. Graph of average scientific literacy skills based on the learning model in terms of academic ability can be seen in Figure 4.5.
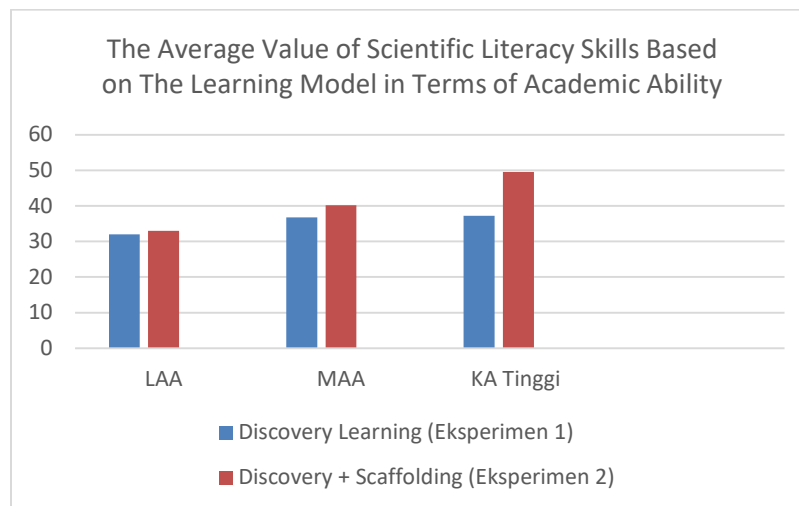

Figure 4.4. The average value of scientific literacy skills based on the learning model in terms of academic ability
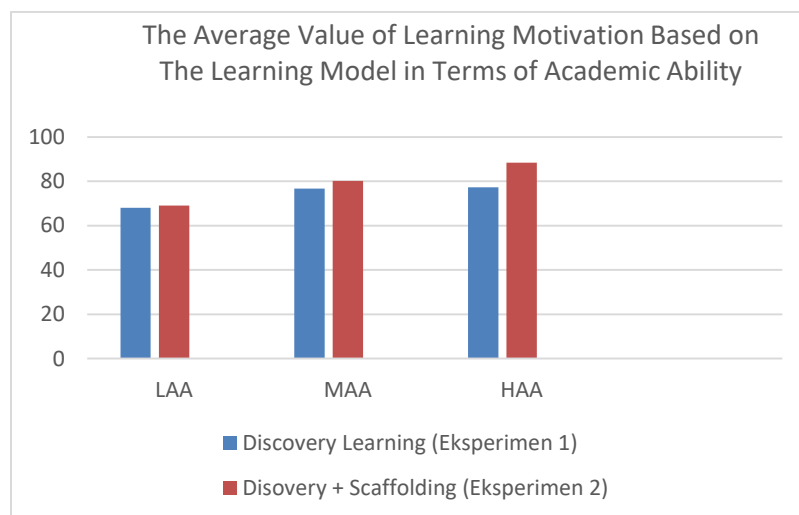

Figure 4.5. The average value of learning motivation based on the learning model in terms of academic ability

Figure 4.4 and Figure 4.5 show that students with academic abilities obtained the highest average score on scientific literacy skills and learning motivation. Students with moderate academic abilities have an average score of

literacy skills and learning motivation lower than those with high academic abilities. The lowest average score is obtained by students with low academic abilities on the scores of scientific literacy skills and learning motivation.

The results of this study also show that academic ability affects students' scientific literacy. The results of this study are in line with the research (Susilawati, Jamaluddin, & Bachtiar, 2018) stated, academic ability affects students' understanding of the science concept. In this study, the average experimental class 1 and experimental class 2 were higher for HAA students than LAA. The findings in this study indicate that the participants' scientific literacy skills in LAA and MAA increased. This fact indicates, the scaffolding process through tutorials by HAA students to LAA and MAA has occurred, as a result, students in LAA can enter the zone of proximal development. Mastery of scientific literacy skills is influenced by several factors, including the science learning approach or method used by teachers in building learning concepts.

Differences in scientific literacy abilities in low academic abilities, moderate academic abilities, and high academic abilities indicate that academic ability is a factor that influences students' thinking processes. This is because students with high academic abilities have better learning behavior and habits than students with moderate academic abilities and students with low academic abilities. Students' ability to manage study time tends to be better for students with high academic abilities. This causes students with high academic abilities to process learning faster, while students with moderate academic abilities and low academic abilities need longer time to process learning (Sarwar, Bashir, Khan, & Khan, 2009). Also, students with high academic abilities can achieve a higher understanding of concepts than students with low academic abilities. Those with a higher level of reasoning can test scientific hypotheses and identify dependent variables and are better able to analyze data.

Ability academics also affect student motivation. Students with high academic abilities tend to have high motivation to learn. Students with moderate academic abilities have average learning motivation, while students with low academic abilities tend to have low learning motivation as well. Heterogeneous division of groups according to academic abilities makes students more motivated in learning because students with high academic abilities will help provide explanations to all group members so that understanding of the material can be accepted by all group members(Sudarsana, 2018). Learning activities that involve maximally all students' abilities to seek and investigate systematically, critically, logically, analytically, so that students can formulate their findings confidently(Taofiq, Setiadi, & Hadiprayitno, 2018).

Interaction of Learning Model and Academic Ability on Science Literacy Ability and Learning Motivation

The results of the two-way ANOVA test showed that there was no interaction between the learning model and academic ability on scientific literacy skills and student learning motivation. Based on these results, students' academic abilities are not a consideration in the application of discovery learning models accompanied by scaffolding.

The application of learning models and student's academic abilities interacts sometimes. Interaction is a reciprocal relationship between two variables that influence each other. Conditions during the learning process greatly affect the student learning process so that teachers need to determine the right learning model to achieve learning objectives. The results of this study indicate that there is no interaction between the discovery learning model and scaffolding with an academic ability on scientific literacy skills and student learning motivation. Learning model variables and academic abilities are independent or not mutually related to each other influencing scientific literacy skills and learning motivation.

Discovery learning models with scaffolding affect Science literacy but are not specific to certain academic abilities. This means that all academic abilities can be learned using the discovery model with scaffolding with not as good results. Because there is evidence of statistical analysis which states that there are differences in scientific literacy abilities in students with high academic abilities and low academic.

The results of the Two Way Anava test indicate that the discovery learning model with scaffolding can be applied to students with low, medium, and high academic abilities. Students who have low, medium, and high academic abilities can follow discovery learning models accompanied by scaffolding and can improve students' scientific literacy competencies. Science literacy competence can be improved by using teaching materials that emphasize the content, processes, and attitudes of science in real life(Rostikawati & Permanasari, 2016).

The learning model is one of the external factors that affect students 'scientific literacy competencies while the academic ability is one of the internal factors that affect students' scientific literacy competencies. The Discovery learning model accompanied by scaffolding can reduce the gap between high and low academic ability students(Dewi et al., 2019). External factors are factors that affect the abilities of students who come from outside

the student body while internal factors are factors that affect the abilities of students who come from within the student body.

The absence of an interaction between learning models and academic ability on scientific literacy is in line with research conducted by (Susilawati et al., 2018) which states that other factors can cause no interaction between discovery learning models and scaffolding with an academic ability on scientific literacy and student learning motivation is that there are many other factors from outside and from within students that cannot be controlled by researchers which are thought to have a strong influence on these findings.

Learning using the discovery learning model accompanied by scaffolding can facilitate the ability of science literacy and build student motivation in learning and reduce students' insecurities when they are unable to solve problems in the learning process independently.

CONCLUSION

The conclusions in the research regarding the effect of discovery learning model accompanied by scaffolding on students 'scientific literacy competence in terms of academic ability are as follows: (1) the learning model discovery learning accompanied by scaffolding affects scientific literacy and student learning motivation, (2) students' academic ability affects scientific literacy competence, and (3) there is no interaction between discovery learning and scaffolding learning models in terms of academic ability on scientific literacy skills, and learning motivation. Researchers suggest that teachers apply a learning model that views biology as part of science which consists of aspects of products, processes, and attitudes, emphasizes group collaboration, reduces gaps in student learning outcomes of high, medium, and low academic abilities; see the character of each student so that learning objectives can be achieved optimally; Discovery learning model accompanied by scaffolding to improve science literacy skills and student motivation. Other researchers are expected to be able to carry out further research on the application of discovery learning models accompanied by the scaffolding of scientific literacy skills and learning motivation in terms of academic abilities more broadly and deeply.

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