



Mathematics Literacy Ability in Terms Of Self Efficacy in Cooperative Learning Type of Group Investigation Model With Humanism Approach Assisted by Schoology

Fiqi Annisa Indrawati[✉], Wardono Wardono, Iwan Junaedi

Universitas Negeri Semarang, Indonesia

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Abstrak

The purpose of this study is to describe the ability of students' mathematical literacy in terms of self efficacy in group investigation learning with humanism approach assisted by schoology. This research is a type of qualitative research. The research approach used is a descriptive approach. Data collection is done by self efficacy assessment scale, interview guidelines and observation. The subject of the research was class X MIPA 6 of SMAN 1 Juwana. The results showed that the qualitative data analysis at the planning and preparation stages, syllabus, lesson plans, teaching materials, worksheets, mathematics literacy ability tests, interview guide sheets and student response sheets were categorized as very good. At the classroom environment stage, the implementation of learning that has been delivered in the category of very good quality and at the professional responsibility stage, more than 75% of the majority of students assess that learning has been carried out properly. Based on the analysis of the interview data, it was found that each type of self efficacy has different mathematical literacy abilities. This is indicated from 5 students in the category of self efficacy magnitude, there are 2 categories of high and 3 categories of medium, from 6 students category of strenght there are 1 category of medium and 5 categories of low, from 22 students the category of generality there are 7 categories of high, 12 categories of medium and 3 categories of low .

[✉]Correspondence:
Kampus Unnes Kelud Utara III, Semarang, 50237, Indonesia.
E-mail: annisaindra9@gmail.com

INTRODUCTION

In the 2013 curriculum, mathematics is expected to not only equip students with the ability to use calculations or formulas to do test questions, but also be able to involve their reasoning and analytical skills in solving everyday problems. Solving this problem is not solely a problem in the form of routine problems but rather the problems faced daily (Surya puspitarini B.K, Wardono, & Kartono, 2018).

Mathematical literacy is the ability of individuals to formulate, apply and interpret mathematics in the form of context. Includes mathematical reasoning and the ability to use mathematical concepts, procedures, facts and mathematical functions to describe, explain, and predict a phenomenon. The framework includes three constructs namely content, context, and cognitive (OECD, 2016).

There are seven components in mathematics literacy. The seven components are (1) communication, (2) mathematics, (3) restatement, (4) reasoning and giving reasons, (5) using problem solving strategies, (6) using symbols, formal language and techniques, (7) using mathematical tools (Nolaputra et al., 2018). Thus mathematical literacy is interpreted as an understanding and application of mathematical concepts in everyday life.

Literacy achievements of Indonesian students can be seen in the Program for International Student Assessment (PISA). PISA is organized by the Organization for Economic Cooperation and Development (OECD) to find out students' mathematical literacy abilities. PISA focuses on students' abilities in identifying, understanding and using mathematical concepts in everyday life. Indonesian students' mathematics literacy ranking in 2000 ranked 39th out of 41 countries. 2003 ranked 38 out of 40 countries while 2006 ranked 50 out of 57 countries (Puspendik, 2012b). The achievement of Indonesian students' mathematics literacy in 2012 ranked 64th out of 65 countries (OECD, 2013). At PISA 2015 mathematics literacy of Indonesian students ranked 62 out of 70 countries (OECD, 2016). Literacy achievement at PISA 2018 students' mathematical literacy ranked 73 out of 79 countries (OECD, 2019). Based on these data, Indonesia's mathematical literacy rating is still low when compared to several other countries.

According to the Ministry of Education and Culture (2016) mathematics education in schools is expected to contribute in supporting the achievement of elementary and secondary graduate competencies through learning experiences so that (1) understanding concepts and applying mathematical procedures in daily life, (2) making generalizations based on patterns, facts, phenomena, or existing data, (3) carry out mathematical operations to simplify and analyze existing components, (4) carry out mathematical reasoning. which includes making guesses and verifying them, (5) solving problems and communicating ideas through symbols, tables, diagrams, or other media to clarify situations or problems, (6) fostering positive attitudes such as logical, critical, careful, thorough, thorough, and not easy give up in solving problems. The formulation of the objectives of mathematics education has referred to mathematics literacy. The ability of mathematical literacy has an important role, through mastering mathematical literacy each individual can reflect mathematical logic to play a role in life, community, and society. But mathematics literacy is still foreign to students and teachers in Indonesia.

OECD (2012) the change and relationship and space and shape content are ones that are closely related to the Trigonometry Basic Competence. In addition it also relates to various symbols, algebra, graphs, geometric shapes and tables. As for space and form it deals with testing the ability of students to recognize shapes, look for similarities and differences in various dimensions and representations of shapes. The learning process of trigonometry material at the previous level tends to use memorization method in solving problems. Methods like this should be changed, if you encounter problems related to mathematical literacy not only remember the formula but emphasize understanding of the problem.

Seeing these problems, mathematical literacy was applied in class X SMAN 1 Juwana which is a transition from junior high school to high school so that the problem solving problems related to mathematical literacy problems that contain content of change and relationship and space and shape have obtained material related to that before.

Problems encountered during the preliminary study at SMAN 1 Juwana many students who have not been able to associate mathematics with everyday life, have not been able to model problems into

mathematical models and still cannot communicate problems into mathematical symbols.

There are three main points of the concept of mathematical literacy that students must master, namely (1) the ability to formulate, apply, and interpret mathematics in various contexts called mathematical processes, (2) involving mathematical reasoning and the use of mathematical concepts, procedures, facts, and tools to describe, explain, and predict phenomena, and (3) the benefits of mathematical literacy can help someone in applying mathematics into everyday life. In addition to the formation of mathematical literacy skills, good mathematics learning must also consider the psychological problems of students where the development of psychological aspects can be expected to positively influence the formation of students' mathematical literacy skills.

Based on the graduation ability standards students must have behaviors that reflect noble character, knowledgeable, confident and responsible in integrating effectively with the social and natural environment within the reach of association and existence. From the SKL one of the attitudes or psychological aspects that must be developed in mathematics learning is self efficacy which is the most important concept of the affective nature of the individual.

According to Bandura (2009) self efficacy affects how a person thinks, feels, motivates oneself and acts. In line with the statement of Lunenburg (2011) self efficacy has a strong influence on learning, motivation, and performance, because with self efficacy a person will try to try to learn and perform tasks that they believe will be successful. Pardimin (2018) Self-efficacy is formed in the relationship between personal characteristics, behavior patterns and environmental factors and is not formed alone. According to Dhoriva et.al (2017) concluded that Self efficacy is a person's belief in taking action. Student self efficacy influences success and failure in mathematics, in addition to the influence of individual differences on student motivation and achievement in mathematics.

Indicators of Self efficacy itself are aspects that are measured from Self efficacy according to Bandura (2009) include: (1) level, is the level of difficulty of a task. Individuals who have high self efficacy tend to choose tasks according to their abilities; (2) Strength, has an emphasis on the strength or stability of

individual beliefs; (3) Generality, is the breadth of the field of an individual feeling confident in his abilities.

Based on interviews with class X students of SMAN 1 Juwana most students only remember not understand the concept, so students are confused when connecting information presented, when applying what is known and finding out what is asked is still lacking in estimating the completion of the reasoning process and the reasons given to a question. Most students are concerned with the final answer rather than the process of solving a problem or problem that has a clear formula that is easier to calculate. Moreover, if the questions are given with different types, it causes students' lack of confidence in solving the problem being faced. Many students' perceptions of mathematics are difficult subjects. When finding things that are considered lack of understanding, students prefer to remain silent not dare to question the teacher.

So it can be concluded that self efficacy is one's belief in himself in the form of actions in order to realize an achievement or target to be achieved. In learning mathematics self efficacy is very important because with the belief in self efficacy, it automatically influences the way of choosing someone's actions, how much effort will be done, how strong they are in dealing with problems, how diligently they can be various failures, how much pressure how they feel when they have to adjust the demands of the times and circumstances, and how high the level of success they achieve.

According Wardono (2013) that junior and senior high school mathematics teachers are advised to always be creative in using learning that is innovative and help socialization for the introduction of assessments based on PISA, so that the achievement of PISA assessment ratings for the future can be better. In the learning process must make students able to recognize and use in contexts outside mathematics. Thus it can provide opportunities for students to recognize and appreciate the relationship of mathematics with everyday life. In other words, mathematics learning must be adapted to the times and can be applied in real life (Budiono et al., 2014).

Based on the description above, one of the efforts to improve students 'mathematical literacy abilities and students' self efficacy requires the learning process through mathematical learning innovations that are able to activate, support abilities

both in terms of cognitive, affective and literacy abilities. The innovation requires collaboration between teachers and students to build learning components that aim to develop mathematical literacy skills. The solution using the learning model is group investigation.

The Group Investigation (GI) learning model can integrate students with different abilities through heterogeneous groups, train students to increase collaboration in groups, train students to be responsible because they are given assignments to be completed in groups, students are trained to discover new things from the results the group conducted, trains students to come up with new ideas and ideas through the discoveries they find and can improve student learning outcomes (Wirdayat et.al, 2019). Approaches that touch on the human side of students and which shape their own learning experiences are needed in learning mathematics. According to Mahmud (2010) that humanistic psychology is very concerned about the human dimension in dealing with the environment humanely. According to humanistic theory, the learning process must begin and aim to humanize human interests (Budiningsih, 2005). Humanization of the teaching and learning process of mathematics helps students develop mathematical competencies and this enables students to become educated and intelligent individually (Cibulskaitė, 2013).

Junaedi (2012) The humanistic mathematical approach has the following conceptions: (1) students have a set of alternative concepts about mathematical ideas that affect their subsequent learning; (2) students acquire new knowledge by forming that knowledge for themselves; (3) knowledge formation is a process of change which includes addition, creation, modification, refinement, rearrangement, and rejection; (4) new knowledge built by students for themselves comes from a diverse set of experiences; (5) each student regardless of race, culture and gender is able to understand and teach mathematics.

Teachers are expected to have the ability to develop learning through technology. Learning models that integrate web-based technology can be developed with e-learning, e-modules or blended learning. Cheung (2011) Blended learning as a combination of face to face learning and online learning. One alternative learning media in blended learning is schoology. Schoology is a site that combines social networking and LMS features. The media has

features that facilitate the management of learning such as task creation, quizzes and group formation (Wardono, et al., 2018). This schoology can be accessed not only through laptops / computers, but also Android mobile phones. So that students more easily access unlimited time and place. Online schoology learning becomes one of the alternatives providing resource, question bank, attendance, message, analytic (Tigowati, et al., 2017). The results of the study conducted by Dwi (2012) that the internet proved to be influential to improve student learning outcomes. One of the LMS that is deemed suitable to be used to support learning activities is schoology.

Based on the background above, the problem formulation in this study is how is the description of students' mathematical literacy abilities in terms of self efficacy in group learning investigations with humanism approach assisted by schoology? While the purpose of this study is to describe the ability of students' mathematical literacy in terms of self efficacy in group investigation learning with humanism approach assisted by schoology.

METHOD

This research is included in a descriptive study with a qualitative approach. This research was conducted at SMAN 1 Juwana, the material taken was trigonometry. The subjects of the study were students of class X MIPA 6 of SMAN 1 Juwana.

The instruments used in the study include self-efficacy assessment scale, interview guidelines, observation of the learning process of teachers and students. To account for credibility in this study, researchers conducted triangulation. Triangulation used in this research is triangulation of sources and techniques. The results of triangulation are used as a reference in achieving transferability. The validity of the data in this study consisted of a trust test, aness test, a dependency test, and a certainty test (Moleong, 2013). Data analysis in this study uses analysis techniques that refer to the opinion of Miles and Huberman. Data analysis is done through data reduction, data presentation, and conclusion drawing (Sugiyono, 2015).

RESULT AND DISCUSSION

The results of the planning and preparation phase of the study (planning and preparation) based on the recapitulation of the investigative group learning tools with the schoology-assisted humanism approach to mathematical literacy skills obtained the final results in very good categories. Thus it can be

concluded that the learning tool developed by researchers is a learning tool of investigative group with a validated schoology-assisted humanism approach to mathematics literacy abilities. In other words, group investigative learning with a schoology-assisted humanism approach can seek exploration of students' mathematical literacy abilities. The recapitulation is presented in Table 1 below:

Table 1. Recapitulation of Learning Tools Validation Results

| Number | Learning Media | Validation results | Final results | Criteria |
|--------|---|--------------------|---------------|-----------|
| 1. | Syllabus | 4.36 | | |
| 2. | Lesson Plan | 4.27 | | |
| 3. | Teaching Materials | 4.30 | | |
| 4. | Student worksheet | 4.38 | | |
| 5. | Preliminary Test of Mathematical Literacy Ability Mathematics Literacy Ability Test | 4.37 | 4.30 | Very Good |
| 6. | Self Efficacy Questionnaire Student Response Questionnaire | 4.43 | | |
| 7. | Interview guidelines for mathematical literacy skills | 4.58 | | |
| 8. | | 4.27 | | |
| 9. | | 3.80 | | |

Classroom environment stage (classroom environment), based on observations of mathematics learning group investigation with humanism-assisted schoology approach by taking into account 17 assessment indicators obtained the fact that each observer gives an excellent criterion for each meeting

except the first meeting the observer only gives an assessment with good criteria. Obtained the average results of observations of teacher activity in learning mathematics group investigation with a humanism-assisted approach to schoology for each meeting are 79.15%, 83.3%, 92.4%, 95.84% with an average final

observation of 87.68%. The results of the observations are presented in Table 2 below:

Tabel 2. Observations Of Teacher Activitie

| Number | Observer Code | Meeting observations | | | | Final Average |
|---------|---------------|----------------------|-------|--------|--------|---------------|
| | | 1 | 2 | 3 | 4 | |
| 1. | P01 | 78.3% | 81.6% | 93.30% | 95% | 87.68% |
| 2. | P02 | 80% | 85% | 91.60% | 96.67% | |
| Average | | 79.15% | 83.3% | 92.45% | 95.84% | |

Based on observations of student activities in learning mathematics learning group investigation with a humanism-assisted approach to schoology with regard to 19 assessment indicators obtained the fact that each observer gives an evaluation with very good criteria for each meeting. Obtained the average

results of observations of student activity in learning mathematics group investigation with a humanism-assisted approach to schoology for each meeting was 81.58%, 86.70%, 92.76%, 96.71% with an average final observation of 89.48%. The results of the observations are presented in Table 3 below:

Tabel 3. Observations Of Student Activities

| Number | Observer Code | Meeting observations | | | | Final Average |
|---------|---------------|----------------------|-------|-------|-------|---------------|
| | | 1(%) | 2 (%) | 3(%) | 4 (%) | |
| 1. | P01 | 89.47 | 96.05 | 96.05 | 96.05 | 89.48 |
| 2. | P02 | 73.69 | 77.63 | 89.47 | 97.37 | |
| Average | | 81.58 | 86.70 | 92.71 | 96.71 | |

Thus it can be concluded that the activities of teachers in learning mathematics group investigation with a schoology-assisted humanism approach conducted by researchers have an average result for each meeting and the final average with a very good category. In addition, the average results of the observations of student activities in learning mathematics group investigation with the approach of humanism aided by schoology obtained an assessment with a very good category. This can show that learning mathematics group investigation with a humanism-assisted approach to schoology can seek exploration of mathematics literacy abilities.

Professional responsibility stage, conducted an evaluation of student responses at the end of each meeting with student questionnaire responses, obtained results that students who gave positive learning mathematics group investigation with a humanism-assisted approach to schoology reached more than 75%. This shows that the majority of students as many as 33 students rated learning mathematics group investigation with humanism-assisted approach to schoology very well. The observations are presented in Table 4 below:

Tabel 4. The Results of Students' Responses to Learning Group Investigation using the Humanism Approach are assisted by Schoology

| Interpretation | Score limit | Frequency | Percentage |
|----------------|-------------|-----------|------------|
| Very Positive | 64 - 80 | 2 | 6.06 |
| Positive | 63 - 48 | 26 | 78.78 |
| Negative | 47 - 32 | 5 | 15.15 |
| Very Negative | 31 - 5 | 0 | 0 |

Description of Mathematical Literacy Ability in terms of Self Efficacy

Analysis of mathematical literacy skills taught by the group investigation learning model with the schoology-assisted humanism approach is divided into three categories based on self-efficacy, namely

magnitude, stability and generality. The research subjects consisted of 33 students of X MIPA 6 SMAN 1 Juwana. The results of the self efficacy rating scale based on the mathematical literacy ability of the experimental class students can be seen in table 5 below:

Table 5. The Summary Results of Mathematical Literacy Ability Analysis in terms of Self Efficacy

| Number | Self Efficacy | Mathematical Literacy Ability | |
|--------|---------------|-------------------------------|----------|
| | | Many students | Category |
| 1 | Magnitude | 3 | High |
| | | 2 | Medium |
| | | 0 | Low |
| 2 | Strenght | 0 | High |
| | | 1 | Medium |
| | | 5 | Low |
| 3 | Generality | 7 | High |
| | | 12 | Medium |
| | | 3 | Low |

Based on table 5, students in the magnitude category have 3 high categories and 2 medium categories, out of 6 students the strength category has 1 medium category and 5 low categories, out of 22 students in the generality category there are 7 high categories, 12 medium categories and 3 low categories. Based on an analysis of self-efficacy rating scales, 7 research subjects were chosen to be further investigated regarding mathematical literacy abilities. The following description of mathematical literacy abilities in terms of self efficacy.

Subjects with self efficacy category magnitude of high mathematical literacy ability are mastering communicating and mathematizing, sufficiently mastering representation, reasoning and argument, strategic devising for problem solving and using symbolic formal and technical operations but lacking mastering using mathematics tools, Subjects with self efficacy category magntude ability medium mathematics literacy is mastering communicating and mathematizing, sufficiently mastering representation, less mastering of reasoning and argument and strategic devising for problem solving, but not mastering using symbolic formal and technical operations and using mathematics tools.

So it can be concluded that the description of mathematics literacy ability in class X MIPA in solving problems in terms of self efficacy of students with magnitude category is that there are masters of

communicating and mathematizing, enough to master representation, reasoning and argument, strategic devising for problem solving, lack of mastering using symbolic formal and technical operation but do not master using mathematics tools.

Subjects with self efficacy category of moderate mathematical literacy ability are sufficient to master communicating, mathematizing, representation, reasoning and argument, strategic devising for problem solving and using mathematics tools but lack mastering using symbolic formal and technical operations, Subjects with self efficacy category of literacy ability strenght low mathematics is quite good at communicating and mathematizing, not good at representation, but not mastering reasoning and argument, strategic devising for problem solving using symbolic formal and technical operations and using mathematics tools.

So it can be concluded that the description of mathematics literacy ability of class X MIPA in solving problems in terms of students' self efficacy with strenght category is that there is sufficient mastering of communicating, mathematizing, representation, lack of reasoning and argument, strategic devising for problem solving, using mathematics tools but not mastering using symbolic formal and technical operations.

Subjects with self efficacy in the generality category of high mathematical literacy ability are

those who master communicating, mathematizing, representation, reasoning and argument, strategic devising for problem solving, using mathematics tools, using symbolic formal and technical operations, Subjects with self efficacy in generality category in mathematical literacy are mastering communicating, mathematizing, representation and using mathematics tools but quite mastering reasoning and argument, strategic devising for problem solving, using symbolic formal and technical operations and subjects with self efficacy generality low mathematical literacy ability to master communicating, enough to master mathematizing, representation and using mathematics tools, less mastering reasoning and argument, strategic devising for problem solving, but not mastering using symbolic formal and technical operations.

So it can be concluded that the description of mathematics literacy ability of class X MIPA in solving problems in terms of students' self efficacy with the generality category is that there are masters of communicating, mathematizing, representation, reasoning and argument, strategic devising for problem solving, using mathematics tools, using symbolic formal and technical operation very well.

Based on the discussion of the description of literacy ability, self efficacy is reviewed in line with Sunaryo's (2017) research that self efficacy experiences differences in several cognitive areas. In this study, mathematics literacy ability reviewed by self efficacy shows differences in each category. The differences in these categories affect how students apply knowledge in real-world problems or everyday life, so that knowledge can be felt more directly useful by students. In addition to mathematical literacy skills, psychological aspects that also contribute to students' success in solving mathematical problems are self efficacy.

Group investigation learning with humanism approach assisted by shoology leads to the application of Vygotsky and Skinner's theories in learning using the right learning approach, namely group investigation learning with a shoology-assisted humanism approach where mathematics learning, learning occurs through social interaction with learning with peers and students gain learning put more emphasis on behavior and experience that will shape their behavior. Desired behavior gets positive reinforcement.

This is in line with Vygotsky's theory in Utami (2016) stating that individual knowledge and cognitive development comes from social sources. Vygotsky stressed the importance of the active role of students in constructing their knowledge. Learning according to Vygotsky begins when students are in the development of the proximal zone, which is a level that is reached when performing social behavior (Hasan & Qaddafi, 2015). Skinner's Theory in Setiana (2019) emphasizes behavioral changes that are observed by ignoring the possibilities that occur in thought processes (cognitive) in one's brain. Reinforcement can be considered as a positive stimulus, if the reinforcement is often with increasing student behavior in repeating behavior.

The results of this study reinforce the results of existing research, Astuti research results (2014); Farida (2015) Suriati (2018); Haryati (2018); Haridi (2018); Maryani (2019); Wirdayat, et.al. (2019) concluded that the application of group investigation learning can improve student mathematics learning outcomes. At the end of the lesson, the questionnaire responses were more than 75% positive. This is also in line with the research of Tasyanti et.al (2018) and Trisnawati (2019) where the results show a significant influence in improving student learning outcomes, student activeness, and giving positive responses to the group investigation learning model.

Haglund's research (2004) states that humanistic classes can develop students' potential optimally compared to ordinary classes. Humanistic mathematics learning is better in improving students' abilities (Basalama, 2011). According to Hendriana (2013) Learning humanist mathematics to increase student confidence which places mathematics as part of real human life, places students not as objects but subjects who are free to find understanding based on their daily experiences, Amidi., S. B Waluyo, N. Hindarto (2014) the achievement of students' learning achievements both individually and classically, the influence of the process skills and learning attitudes of students, as well as positive responses from teachers and students to humanistic-based constructivist mathematics learning assisted by E-learning and other researchers show the results of mathematics learning quite in accordance with the humanistic approach (Fadholi, T., Budi Waluyo., Mulyono, 2015) and research also conducted by Dulsalam (2015) states that learning group investigation with a

humanistic approach is effective in increasing the ability to think creatively in mathematics.

The results of research conducted by Choirudin (2015) multimedia E-learning are effective in improving student learning outcomes in learning mathematics. Ningsih et.al (2017) learning using blended learning, in research using e-learning assisted by schoology can improve student learning outcomes. Aminoto & Pathoni (2014); Ulva, et al. (2017); Choirudin (2017); Yuliana & Jufri (2019); Putri & Manoy (2019) states that the application of schoology media can increase motivation, activities and student learning outcomes. In addition, improving mathematics literacy skills helps schoology learning factors because when students use learning outside, students will more and more often practice exercises, discuss, and understand questions more clearly so that they will support in increasing mathematical literacy and providing efficiency of learning time (Maulana, et al, 2019), the use of schoology-based e-learning can also improve students' digital literacy abilities (Pratama, et. al., 2019). The results of the study (Wicaksana, et al., 2017) stated that students' mathematical literacy abilities in learning projects were assisted by good quality schoology and showed the results of analyzes of better student literacy skills supported by schoology (Yodie, et al., 2019).

CONCLUSION

Based on the analysis and discussion, it is concluded that each self efficacy has different mathematical literacy abilities. Therefore, effective learning needs to focus on the learning process and improve the ability of mathematics literacy teachers need to provide reinforcement in the form of exercises in mathematical literacy questions so that students are more accustomed and trained in solving math literacy problems. The ability of mathematical literacy in terms of self efficacy shows differences in each category. The differences in these categories affect how students apply knowledge in real world problems or everyday life, so that knowledge can be felt more directly useful by students. In addition to mathematical literacy skills, psychological aspects that also contribute to students' success in solving mathematical problems are self efficacy.

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