Hipotenusa : Journal of Mathematical Society
Volume 04 Issue 02 Year 2022
ISSN: 2716-3156
Website: https://hipotenusa.iainsalatiga.ac.id/index.php/hipotenusa/index

Analysis Mathematical Problem Solving Ability of Assimilator Student: Kolb Learning Style

Ade Kumalasari[1*], Sri Winarni[2], Rohati[3], Marlina[4], Mersya Gusti Aulia[5]
[1,2,3,4,5] Department of Mathematics and Natural Sciences, Mathematics Education Study Program, Jambi University, Indonesia.

*Corresponding Author. E-mail: ade.kumalasari@unja.ac.id
DOI: 10.18326/hipotenusa.v4i2.7715

Article submitted : July 29, 2022
Article revised : October 19, 2022
Article accepted : November 29, 2022

Abstract

Student learning styles affect the problem-solving abilities. Therefore, further studies on student learning styles are needed regarding problem solving abilities. This research aims to analyze students' problem-solving ability with assimilator learning styles. This research is qualitative research using descriptive method. The subjects of this study were two students of class XI MIPA 1 SMA Adhyaksa 1 Jambi City. The students in question are students with assimilator learning styles. The instruments used were Kolb's learning style questionnaire, mathematical problem-solving ability tests, and interview guidelines. Based on the results of tests and interviews on the subject, it was found that, in general, not all indicators of problem-solving abilities can be met by students with assimilator learning styles. However, they are good at formulating, planning, and implementing problem solving. However, not by checking again. In formulating the problem, students do not write it on the answer sheet but can explain it well during the interview. The tendency of students to solve problems theoretically causes students to have difficulty when they do not know the formula to solve the problem.

Keywords: *problem solving ability, assimilator student, kolb learning style*

INTRODUCTION

Problem solving is a general goal in learning mathematics. It becomes the basis of the process of learning mathematics (Sariningsih & Purwasih, 2017). Mathematical problem solving is the goal of Learning. Students must master to apply previously acquired knowledge to new situations and as a basic skill in mathematics learning objectives. (Angkotasan, 2014; Widodo, 2012). Polya (1945) argues that problem solving ability is a process of finding solutions to non-routine problems through a

systematic stage and cannot be solved directly to achieve certain goals. In solving the problem, steps are arranged to include understanding, planning, implementing problem solving, and checking again. The importance of this problem-solving goal is shown by the establishment of five mathematics standards that are the main ones in learning mathematics in schools by the National Council for Mathematics Teachers. These competencies consist of mathematical problem solving, mathematical reasoning, mathematical communication, mathematical connections, and mathematical representation (NCTM, 2000).

Problem solving abilities can be improved by applying problem-based models, approaches, or assessment techniques (Arrahim et al., 2020; Hartatiana, 2015; Sariningsih & Purwasih, 2017; Solikah & Himmah, 2019; Zahara et al., 2020; Zulkarnain, 2015). Problem solving abilities that are still lacking need to be studied further to find out how the problem-solving abilities of students with different learning styles are. To describe students' problem-solving abilities to be known better, in this study, students were directed to use the problem-solving stage according to Polya. The material that the researcher took to test the students' mathematical problem-solving abilities was material about Trigonometry. Researcher chose it because this material had many stages/ processes in working on the problem and could be adapted to the Polya's problem solving stage.

Learning styles affect developing thinking skills (Richmond & Cummings, 2005; Safitri et al., 2013), especially in students' mathematical problem solving skills (Imamuddin, 2019). It is in line with the statement of Özgen et al. (2011) that learning style influences how students learn mathematics. Therefore, identifying student learning styles can help students to become effective problem solvers (Bhat, 2014). Identification of student learning styles by teachers is very important. It is because if students and teachers know the type of learning style, students can adapt to learning in class, and teachers can do meaningful learning in class. The learning style is one factor that can influence students in learning, especially in learning mathematics.

One of the known learning styles is the learning style according to Kolb. According to Kolb & Kolb (2005b), learning styles are based on four stages of learning. Namely, students have real experiences (concentrate experiences), observe and reflect from various points of view (reflective observation), form abstract concepts, generalize

into theories (abstract conceptualization), and finally actively experience the theory and test what they have learned in complex situations (active experimentation). These four stages then form four learning styles, namely the converger learning styles, diverger learning styles, accommodator learning styles, and assimilator learning styles. (Kolb & Kolb, 2005a).

Students with assimilator learning styles score the highest in abstract conceptualization and reflective observation (Apiati & Hermanto, 2020). They can understand the theory, have good ability in inductive reasoning, and integrate varied ideas and observations as a whole. Students with an assimilator learning style pay more attention to abstract concepts but are less concerned about the practice and usefulness of existing theories. For them, the theory must be logical and precise (Kolb & Kolb, 2005a).

Based on research conducted by Syaputra et al. (2022) it was found that students with assimilator learning styles tend to have low problem solving abilities. Students with this learning style do not really like reading materials with long texts (Soraya et al., 2020). Therefore, students with assimilator learning styles often avoid working on identical story problems with long sentences. Instead of reading texts, they are more interested in the problems that are demonstrated or analyzed, because they are more focused on working by waching and thinking (Soraya et al., 2020).

Students with assimilator learning styles can understand the problem by knowing what is known and asked in the problem and able to explain the problem in their own sentences (Syaputra et al., 2022). In theory, students with assimilator learning styles have good abilities in making plans (Rumasoreng & Mahayati, 2019; Syaputra et al., 2022). They can arrange the steps they need to solve a given problem well. Not only designing plans, students with assimilator learning style also have the ability to execute the plans they have made. This is supported by Rumasoreng & Mahayati's statement that students with assimilator learning styles are able to carry out the completion plan well (2019).

Basically, students with assimilator learning styles like mathematics because they have the ability to understand theory well (Ardiyansah et al., 2021; Kolb & Kolb, 2005b; Syaputra et al., 2022). Therefore, students with assimilator learning styles tend to work based on theory (Nugroho, 2016). The way students work with the assimilator

learning style is more focused on abstract and theoretical concepts and ideas (Nugroho, 2016). Students with assimilator learning styles are able to unite varied ideas and observations into a unified whole (Apiati & Hermanto, 2020; Azrai et al., 2017; Ghufron & Risnawati, 2014; Rumasoreng & Mahayati, 2019). However, students with assimilator learning styles tend to be still unable to make final conclusions (Apiati & Hermanto, 2020).

Based on the statement above, the researcher is interested in further reviewing students' problem-solving abilities with assimilator learning styles. Learning style is one of the important variables in determining how students understand school lessons, especially mathematics.

METHOD

This research is a qualitative research using descriptive method. The research was conducted at Adhyaksa 1 High School in Jambi City in the odd semester of the 2021/2022 academic year. The class that became the research subject was class XI MIPA 1, which had 17 students. All students of class XI MIPA 1 will be given a Kolb learning style questionnaire instrument to determine the research subjects who will take the mathematical problem solving ability test and interviews.

The Kolb learning style questionnaire instrument consists of 28 statements regarding the stages/ dimensions of learning styles, namely: (1) CE dimension statement (concrete experience), (2) AE dimension statement (active experimentation), (3) dimension statement AC (abstract conceptualization), (4) RO dimension statement (reflective observation). As for the test instrument for mathematical problem solving abilities, there are 2 questions based on Polya's steps, namely: (1) understanding the problem; (2) making plans; (3) implementing the plan; (4) checking back.

The interview technique in this study used a semi structured method. A semi structured interview is an interview process that uses interview guidelines. However, it is more flexible so that researchers can ask questions outside the interview guidelines but should not be out of the context to be studied. The interview guide refers to the polya solving step. This interview guide consists of four main questions with indicators of understanding the problem, making a plan, implementing the plan, and checking again. These four questions are then developed according to the context found in the field later. Interviews were conducted by asking research subjects who had categorized

students with assimilator learning styles. The questions asked by researchers related to the problem solving ability test that had been done previously. It aims to obtain information related to the data needed in this study, namely the ability to solve mathematical problems in terms of the assimilator learning style.

The subjects in this study were selected for the category of students with assimilator learning styles using purposive sampling technique. In this study, the consideration of taking the subject/ student was based on the advice of the supervising teacher. In addition, based on the uniqueness of students' answers on the problem solving ability test, the selected students are students who can convey their thoughts orally and in writing. Obtained two students as subjects with assimilator learning styles. These two subjects will be given a mathematical problem solving ability test and. Based on the students' written answers on the test, interviews were then conducted to examine more deeply the problem-solving abilities of students with this assimilator learning style. To test the validity of the data, researchers triangulated techniques and data sources.

Before being used, the Kolb learning style questionnaire, mathematical problem-solving ability tests, and interview guidelines were first tested. Based on the test data, the validity and reliability of the instrument were checked. Based on the test results, it was found that the three instruments (Kolb's learning style questionnaire, mathematical problem solving ability test, and interview guide) were valid and reliable.

The data analysis of this research is in the form of data analysis of learning style questionnaires, test questions instruments, and interviews. The steps in this analysis are (1) Data reduction is an activity that refers to selecting, concentrating, paying attention, simplifying, abstracting, and transforming raw data in the field. If there is invalid data, then the data is collected separately and may be used as verification or other by products. (2) Data Exposure includes classifying and identifying data, namely writing organized and categorized data sets so that it is possible to conclude the data. (3) Conclude from the data that has been collected and verify these conclusions.

RESULTS AND DISCUSSION

The first step in this study was to identify students with assimilator learning styles using a Kolb learning style questionnaire. Of the 17 students obtained, two students with assimilator learning styles. These two students were then given a mathematical problem-solving ability test and continued with an interview in accordance with the answers to the problem solving test they wrote. The following data is presented based on students with assimilator learning styles 1 (SA 1) and students with assimilator learning styles 2 (SA 2).

Students with Assimilator Learning Styles 1 (SA 1)

Figure 1 shows students' answers to solving problems in the mathematical problem-solving ability test. In Figure 1, it appears that SA 1 is working on questions number 1 and 2. Students with assimilator learning style 1 (SA 1) worked on all the questions on the problem-solving test instrument to completion, but the answers given were still inaccurate.

In Figure 1, it can be seen that in questions 1 and 2, SA 1 did not write down what information was obtained from the question SA 1 did not write down what was known and asked in the question. SA 1 can understand the problem well, and it is proven that when interviewed, SA 1 can mention the information obtained correctly. It is in line with the statement of Syaputra et al. (2022) that students with assimilator learning styles can go through the stages of understanding the problem by knowing what is known and asking about the problem and being able to explain the problem in their sentences. However, when writing the Answer, SA 1 did not write it down. Students with assimilator learning styles work by watching and thinking (Soraya et al., 2020). They do not like a long text. Their way of working is more towards abstract and theoretical concepts and ideas (Nugroho, 2016).

In Figure 1, it can be seen that in question number 1, SA 1 can determine what formula or steps will be used by SA 1 to solve the problem. The following are excerpts of the interview with SA 1 and Researcher (P)

P : From the information obtained, what methods can be used in solving problem number 1?
SA 1 : Using the sine rule formula, Miss.
P : To solve problem number 1, what things must be determined in advance?
SA 1 : Substituting known values into formulas

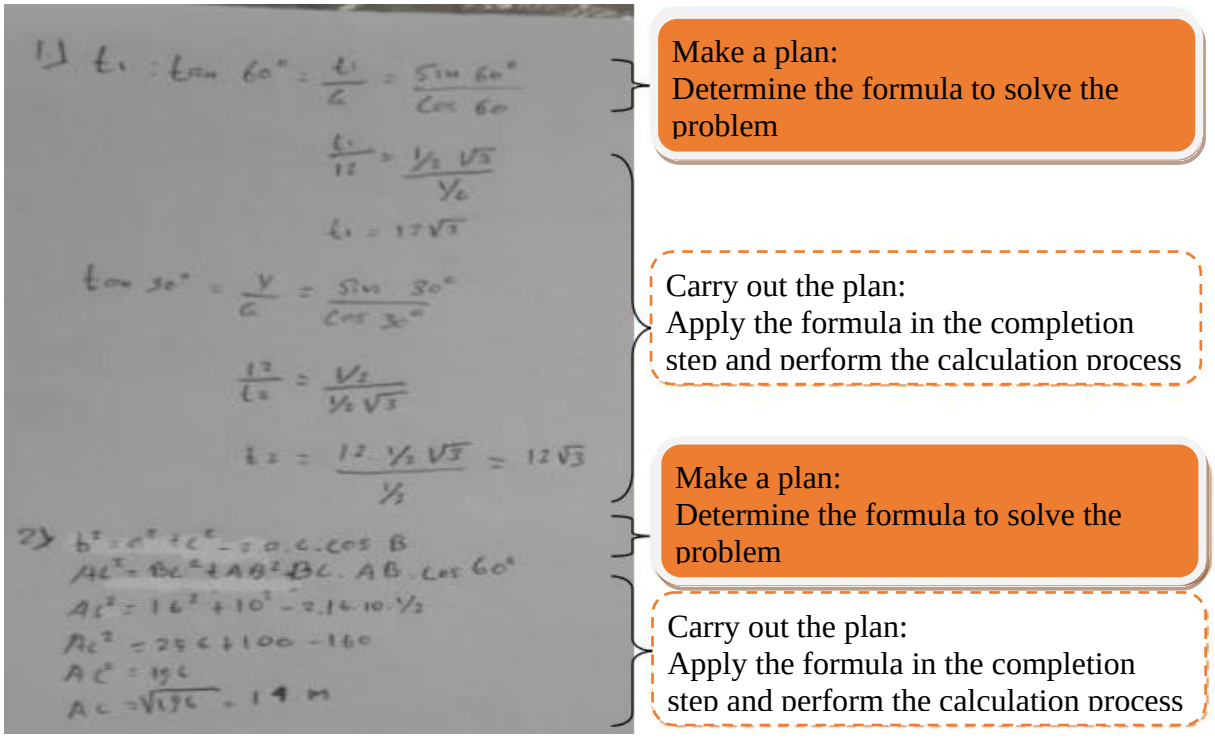

Figure 1. Answers to Students with Assimilator Learning Styles 1

Based on Figure 1 and the interview excerpts of SA 1 in carrying out the plan, it can be concluded that SA 1 can determine the appropriate resolution steps for the above problems. Students with assimilator learning styles can unite varied ideas and observations in a unified whole (Apiati & Hermanto, 2020; Azrai et al., 2017; Ghufron & Risnawati, 2014; Rumasoreng & Mahayati, 2019). However, SA 1 cannot create illustrations for each problem. With this, the researcher concludes that the indicator for planning the SA 1 problem is not good because SA 1 cannot simplify the problem by converting it into an image but can determine the correct solution.

Furthermore, the indicator carries out the plan in question number 1. Based on the Answer of SA 1 in Figure 1, SA 1 has completed the calculation process but has not finished. SA 1 only performs the work process for comparing each angle, but the results obtained from the comparison results have not been added to get the final result. SA 1 also cannot change it into a mathematical language, such as explaining the steps for making the image for question 1.

The indicator for implementing the plan in question number 2. Based on SA 1's Answer in Figure 1, SA 1 has carried out the calculation process correctly so that the Answer obtained by SA 1 is correct. Herein, the SA 1 Answer sheet has symbols such as BC, AC, and AB in the calculation process. However, SA 1 does not explain where

the examples and symbols come from. It is because SA 1 did not create a Figure to explain the mathematical languages created by SA 1.

P : Can you explain the process of solving question number 1?
SA 1 : First of all, I worked on it by looking for the length of the side sought known side length, which is 12m meters with an angular tangent ratio of 60° because the angular tangent can be changed to sin per cos then we have to substitute the sine value of 60° and cos 60° so that after calculation, the other side length value of the angle of 60° is obtained with the result then after I look for the height of the building using a comparison using an angle of 30° using which is the same as the 60° angle earlier with the results After getting the results I do not know to continue it anymore, mom, so I just worked until there.

Based on figure 1 and the passage of the SA 1 interview in implementing the plan, it is quite good because SA 1 did the calculations and the process of working on the questions correctly. Students with assimilating learning styles can carry out the completion plan well (Rumasoreng & Mahayati, 2019). It is just that there are questions that have not been completed, so they do not find the final Answer. In addition, SA 1 does not explain where the symbols it creates come from due to the absence of images or explanations, such as providing general information in the form of symbols.

Based on the SA 1 Answer in figure 1, both SA 1 questions do not conclude to obtain the final result. So that when you finish doing the question, there is no information on the final result to answer the question. It was confirmed by SA 1's Answer when the interview was conducted. According to SA 1, the final result of the settlement is the answer, so there is no need to write down the conclusion. Meanwhile, based on writing conclusions, it is an important stage to check again whether the final answer is to what is asked in the question. As per the theory, students with assimilator learning styles are still unable to make conclusions (Apiati & Hermanto, 2020).

Students with Assimilator Learning Styles 2 (SA 2)

Figure 2 shows students' answers to solving problems in the math problem solving ability test. In Figure 2, it appears that SA 2 is doing questions number 1 and 2. Students with assimilator learning style 2 (SA 2) worked on all the questions on the problem-solving test instrument to completion, but the answers given were still inaccurate.

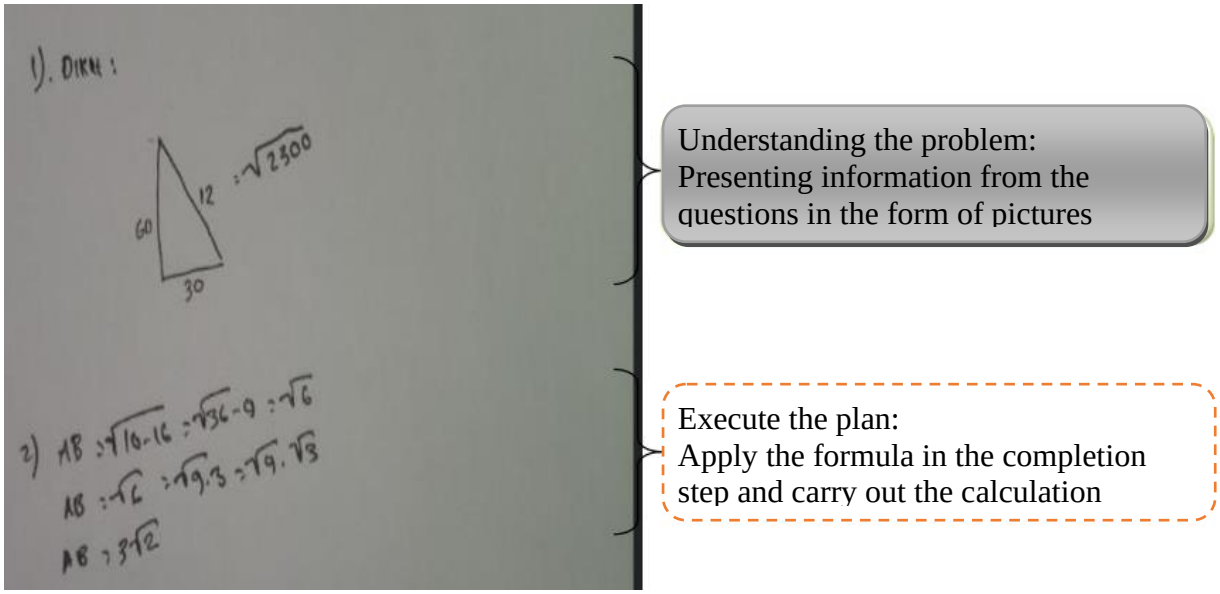

Figure 2. Answers to Students with Assimilator Learning Styles 2

Based on SA 2's Answer in Figure 2, in question number 1, SA 2 states that the information he obtained is in the form of an image. However, the image is still incorrect, and the information is incomplete, so it is not contained in the picture of the section asked in the question. Moreover, in question number 2, SA 2 does not write down the information obtained in the form of known and questioned nor in the form of pictures.

Here is an excerpt from the SA 2 interview to understand the problem:

P : What do you know about the number 1 question?
SA 2 : what I got from question number 1 is that the information known in the problem can form an image of a right triangle with a height of 60, the length of the base 30, and the inclined side of 12.
P : What is asked in question number 1?
SA 2 : from that question that was asked, the height of the building, ma'am but from what I wrote in the drawing, there is already a height of 60

Based on Figure 2 and the passage of the SA 2 interview in understanding the problem, SA 2 can understand the problem well. It is evident that when interviewed, SA 2 can mention the information obtained. Students with an assimilator's learning style can go through the stage of understanding the problem by knowing what is known and asked about the problem and being able to explain the problem with their sentences (Syaputra et al., 2022). However, they do not like long texts and are more focused on working in a watching and thinking way (Soraya et al., 2020). They work more toward abstract and theoretical concepts and ideas (Nugroho, 2016).

Next, the indicator makes a plan on question number 1. Based on SA 2's answer in Figure 2. SA 2 cannot write down the formula to solve the problem. In addition, the picture on answer number 1 has many errors. In question number 2, SA 2 made a plan that will be used to solve the problem, but the plan made is not correct or irrelevant, so the results obtained are wrong or not what the researcher expected. This result is not SA 1 compliant. In theory, students with assimilator learning styles should have a good ability to make plans (Rumasoreng & Mahayati, 2019; Syaputra et al., 2022).

Based on the clarification in the SA 2 interview, it turns out that it does not know what formula or completion steps were used. Also, not all questions were given illustrations of images, some were made, but the images made were still erroneous. So the researcher concluded that SA 2, in the stages of planning the problem, is still not good because it cannot make the right plan and has not been able to simplify the problem correctly.

SA 2 did not meet the indicators of making a plan because it did not know the formula for completion, so the work carried out also became invalid. Students with assimilator learning styles work based on theory (Nugroho, 2016). However, SA 2 does not know the required formula, so SA 2 cannot continue to fulfil the indicators of implementing the plan.

Based on SA 2's Answer in Figure 2, it can be seen that SA 2 did not carry out the stages of re-examining indicators either on questions number 1 or 2. It can be seen from work on SA 2 questions, which did not explain or write down the results of concluding the answers. SA 2 does not re-examine the completion steps that have been made. It is in line with what is done by SA 1. It is supported by the theory that students with assimilator learning styles can still not make conclusions (Apiati & Hermanto, 2020).

Based on the results of this research analysis, it was obtained that students with assimilator learning styles tend to have low problem solving ability (Syaputra et al., 2022), although basically, this student likes math lessons because he can understand the theory (Ardiyansah et al., 2021; Kolb & Kolb, 2005b; Syaputra et al., 2022). Basically every learning style goes through 2 dimensions'/ learning stages. Students with assimilator learning style learn through the stages of abstract conceptualization where by learning through this stage allows students to have a focus on logic, ideas, and abstract concepts to explain an event. However, students with an assimilator learning

style cannot determine the focal point of the problem so they often make mistakes in making plans or implementing irrelevant resolution strategies (Kolb & Kolb, 2005b).

Based on the results of research on students with assimilator learning styles SA 1 and SA 2, it was found that students with assimilator learning styles could understand the problem well. Although not writing down what is known and asked in writing, students can understand the problems in the questions. Students with assimilator learning styles do not like texts (Nugroho, 2016), but they have a focus on logic, ideas and abstract concept (Kolb & Kolb, 2005b; Nugroho, 2016). So instead of expressing what they understand in written form, students with this learning style prefer to build their understanding in abstract concepts in their minds and pour their understanding directly into completion plans. This understanding can also be expressed in a different and more communicative form. Not the conventional way by writing down what is known and what is being asked. One way to convey understanding is to express what is known and asked in the form of pictures.

In concept, Kolb & Kolb (2005b) state that students with assimilator learning styles cannot determine the focal point of the problem so they often make mistakes in making plans. This is in accordance with the results of research that has been done. Both SA 1 and SA 2 show that they still have flaws in designing problems. SA 1 is able to determine the right solution steps for a given problem, but SA 1 has not been able to simplify the problem by converting it into an image. On the other hand, SA 2 has tried to put the draft plan of completion in the form of a drawing (although it is not perfect), but cannot write down the formulas that should be used. However, several studies have found that students with this assimilator learning style can plan well. Students with assimilator learning styles are able to unite varied ideas and observations into a unified whole (Apiati & Hermanto, 2020; Azrai et al., 2017; Ghufron & Risnawati, 2014; Rumasoreng & Mahayati, 2019). In a study conducted by Syaputra et al. (2022) that students with assimilator learning styles have good abilities in making plans.

In this study it is difficult to see whether SA 1 and SA 2 can implement the plan or not. This is because both SA 1 and SA 2 do not meet the indicators of making a full plan. However, SA 1 is able to carry out the calculation process at the step of solving the problem correctly even though it is not finished. This result is in line with the theory presented by Kolb & Kolb (2005b) that students with assimilator learning styles often

apply irrelevant solving strategies. However, several studies have found the opposite. As in the research by Rumasoreng & Mahayati (2019) where the student subject with his assimilator style was able to carry out the completion plan well.

Students with this assimilator learning style also tend to be less thorough in solving problems. This is because they have not been able to make final conclusions (Apiati & Hermanto, 2020). The results of this study indicate that neither SA 1 nor SA 2 has re-examined the problems they are working on. They do not make conclusions so they cannot check further whether the results obtained are questions / problems that must be solved in the problem.

Considering that problem solving ability is one of the objectives of learning and an important thing that must be mastered by students and is a basic skill in the purpose of learning mathematics, the condition of problem-solving abilities in students with this assimilator learning style needs to be followed up. Problem solving abilities can be improved by applying problem-based models, approaches or assessment techniques (Arrahim et al., 2020; Hartatiana, 2015; Sariningsih & Purwasih, 2017; Solikah & Himmah, 2019; Zahara et al., 2020; Zulkarnain, 2015).

CONCLUSION

Students with assimilator learning styles tend to have poor problem-solving skills. Subjects did not quite meet the four stage indicators of mathematical problem-solving ability. The students with assimilator learning styles learns through the stages of abstract conceptualization and reflective observation. This learning style is good at inductive reasoning and unites various ideas and observations into a unified whole. The students with assimilator learning styles pays more attention to abstract concepts. However, it pays less attention to the practice and usefulness of the existing theory so that the students with assimilator learning styles also excels in the stages of understanding the problem, making plans, and implementing plans. The indicators for the re-examination stage were not met in this study, which occurred in the students with assimilator learning styles due to the lack of focus on the problem point, tending to rush in working on the problem, and not paying attention to the solution that was found to be logical or not.

REFERENCES

Angkotasan, N. (2014). Keefektifan model Problem Based Learning Ditinjau dari Kemampuan Pemecahan Masalah Matematis. *Matematika Dan Pendidikan Matematika*, *III*(01).

Apiati, V., & Hermanto, R. (2020). Kemampuan Berpikir Kritis Peserta Didik dalam Memecahkan Masalah Matematik Berdasarkan Gaya Belajar. *Mosharafa: Jurnal Pendidikan Matematika*, *9*(1), 167–178. https://doi.org/10.31980/mosharafa.v9i1.630

Ardiyansah, A. A., Arifin, Z., & Asmana, A. T. (2021). Kemampuan Pemecahan Masalah Matematika Siswa SMK dalam Pembelajaran Discovery Learning Berdasarkan Gaya Belajar Siswa. *JURNAL EDUKASI: KAJIAN ILMU PENDIDIKAN*, *7*(2), 25–33. https://doi.org/10.51836/je.v7i2.241

Arrahim, A., Sugiharti, R. E., & Damayanti, D. (2020). Improving Mathematics Problem Solving Ability through Team Assisted Individualization Learning Model. *Hipotenusa : Journal of Mathematical Society*, *2*(2), 120–132. https://doi.org/10.18326/hipotenusa.v2i2.120-132

Azrai, E. P., Ernawati, E., & Sulistianingrum, G. (2017). Pengaruh Gaya Belajar David Kolb (Diverger, Assimilator, Converger, Accommodator) terhadap Hasil Belajar Siswa pada Materi Pencemaran Lingkungan. *BIOSFER: JURNAL PENDIDIKAN BIOLOGI*, *10*(1), 9–16. https://doi.org/10.21009/biosferjpb.10-1.2

Bhat, M. A. (2014). The Effect of Learning Style on Problem Solving Ability among High School Students. *International Journal Advances in Social Science and Humanities*, *2*(7), 1–6. www.ijassh.com

Ghufron, M. N., & Risnawati, R. (2014). *Gaya Belajar: Kajian Teoretik*. Pustaka Pelajar.

Hartatiana, H. (2015). Pengembangan Soal Pemecahan Masalah Berbasis Argumen untuk Siswa Kelas V di SD Negeri 79 Palembang. *Jurnal Pendidikan Matematika*, *8*(2). https://doi.org/10.22342/jpm.8.2.1912.76-85

Imamuddin, M. (2019). Kemampuan Pemecahan Masalah Matematika Siswa Berdasarkan Gaya Belajar. *Al Khawarizmi: Jurnal Pendidikan Dan Pembelajaran Matematika*, *3*(1), 11. https://doi.org/10.22373/jppm.v3i1.5138

Kolb, A. Y., & Kolb, D. A. (2005a). *The Kolb learning style inventory–version 3.1*. HayGroup. https://doi.org/10.1016/S0260-6917(95)80103-0

Kolb, A. Y., & Kolb, D. A. (2005b). Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education. *Academy of Management Learning & Education*, *4*(2), 193–212. https://doi.org/10.5465/amle.2005.17268566

NCTM. (2000). Principles and Standards for School Mathematics. *United States of America: The National Council of Teachers of Mathematics. Inc.* www.nctm.org

Nugroho, P. U. (2016). Aplikasi Test Personality dan Learning Style Inventory Berbasis Web untuk Mahasiswa Universitas Klabat. *Seminar Nasional Teknologi Informasi Dan Multimedia*, 37–42.

Özgen, K., Tataroğlu, B., & Alkan, H. (2011). An examination of multiple intelligence

domains and learning styles of pre-service mathematics teachers: Their reflections on mathematics education. *Educational Research and Reviews*, *6*(2), 168–181.

Polya, G. (1945). *How to solve it*. Princeton University Press.

Richmond, A. S., & Cummings. (2005). Implementing Kolbs Learning Style into Online Distance Education. *International Journal of Technology in Teaching and Learning*, *1*(1), 45–54.

Rumasoreng, M. I., & Mahayati, M. (2019). Analisis Kemampuan Pemecahan Masalah Matematika Siswa Kelas XI IPS I Imogiri dengan Model Pembelajaran Missouri Mathematics Project (MMP) berdasarkan Pendekatan Gaya Belajar Kolb. *Aksioma*, *8*(1), 19–28. https://doi.org/10.22487/aksioma.v8i1.200

Safitri, I., Bancong, H., & Husain, H. (2013). Pengaruh pendekatan multiple intelligences melalui model pembelajaran langsung terhadap sikap dan hasil belajar kimia peserta didik di sma negeri i tellu limpoe. *Jurnal Pendidikan IPA Indonesia*, *2*(2), 156–160. https://doi.org/10.15294/jpii.v2i2.2717

Sariningsih, R., & Purwasih, R. (2017). Pembelajaran Problem Based Learning untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis dan Self Efficacy Mahasiswa Calon Guru. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *1*(01), 163–177. https://doi.org/10.33603/jnpm.v1i1.275

Solikah, A., & Himmah, W. I. (2019). Keefektifan Model Pembelajaran Means Ends Analysis Dengan Strategi Heuristik Terhadap Kemampuan Pemecahan Masalah Matematika. *Hipotenusa : Journal of Mathematical Society*, *1*(1), 1–8. https://doi.org/10.18326/hipotenusa.v1i1.1-8

Soraya, K., Martasari, R., & Nurhasanah, S. A. (2020). Profil Gaya Belajar (David Kolb) di SMA Swasta Tasikmalaya dalam Mata Pelajaran Biologi. *Bioedusiana: Jurnal Pendidikan Biologi*, *5*(1), 50. https://doi.org/10.34289/bioed.v5i1.1198

Syaputra, D. A., Mulyono, M., & Hasratuddin, H. (2022). Analisis Kemampuan Pemecahan Masalah Matematis Siswa dalam Pembelajaran Berbasis Lesson Study for Learning Community Berdasarkan Gaya Belajar Kolb. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *6*(1), 721–734. https://doi.org/10.31004/cendekia.v6i1.1225

Widodo, S. A. (2012). Proses Berpikir Mahasiswa dalam Menyelesaikan Masalah Matematika Berdasarkan Dimensi Healer. *Prosiding*, 795–800.

Zahara, M. N., Hendrayana, A., & Pamungkas, A. S. (2020). The Effect of Problem-based Learning Model Modified by Cognitive Load Theory on Mathematical Problem Solving Skills. *Hipotenusa : Journal of Mathematical Society*, *2*(2), 41–55. https://doi.org/10.18326/hipotenusa.v2i2.41-55

Zulkarnain, I. (2015). Kemampuan Pemecahan Masalah dan Kemampuan Komunikasi Matematika Siswa. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *5*(1), 42–54. https://doi.org/10.30998/formatif.v5i1.164