STUDENTS' MATHEMATICS PROBLEM-SOLVING ABILITY WITH KINESTHETIC LEARNING STYLE AT VOCATIONAL SCHOOL

Andi Mulawakkan Firdaus[1], Herwandi[2]
[1]Universitas Muhammadiyah Makassar, [2]Institut Teknologi dan Kesehatan Permata Ilmu Maros
[1]Sultan Alauddin Street No. 259, Makassar, [2]Buttatoa Maros
Email: andi.mulawakkan@unismuh.ac.id[1], herwandi.itkpi@gmail.com[2]

Abstract:

According to the interview results, students of SMK Muhammadiyah 2 Bontoala Makassar have good mathematical problem-solving skills. However, some students still find it difficult to solve math issues in the form of non-routine questions. According to other research, learning styles, notably kinesthetic learning styles, have a considerable impact on students' ability to solve mathematical problems. This study aims to describe the profile of students' mathematical problem-solving abilities based on Polya's theory (understand, strategy, solve and look back) in terms of kinesthetic learning styles. This type of research is descriptive qualitative research, and the data collection techniques in this study used three ways, namely filling out questionnaires, giving tests, and interviews. From the data collection techniques, the results obtained that two (2) students with kinesthetic learning styles have high problem-solving scores with an average of 77.5 and only fulfill three stages of problem-solving based on Polya's theory. Therefore, the teacher must pay attention to the tendency of kinesthetic learning styles in order to be able to improve students' mathematical problem-solving abilities.

Abstrak:

Berdasarkan pada hasil wawancara yang diperoleh, menyatakan bahwa siswa SMK Muhammadiyah 2 Bontoala Makassar yang mempunyai kemampuan memecahkan masalah matematika yang baik, ternyata masih terdapat beberapa siswa yang sulit dalam menyelesaikan soal matematika berbentuk masalah non rutin. Data lain menyatakan bahwa kemampuan pemecahan masalah matematika siswa dipengaruhi oleh gaya belajar secara signifikan termasuk gaya belajar kinestetik. Tujuan penelitian ini adalah untuk mendeskripsikan profil kemampuan pemecahan masalah matematika siswa berdasarkan teori menurut Polya (understand, strategy, solve dan look back) ditinjau dari gaya belajar kinestetik. Jenis penelitian ini adalah penelitian kualitatif deskriptif, teknik pengumpukan data pada penelitian ini menggunakan tiga cara yaitu pengisian kuesioner, pemberian tes dan wawancara. Dari teknik pengumpulan data tersebut, maka diperoleh hasil penelitian bahwa 2 orang siswa dengan gaya belajar kinestetik mempunyai nilai pemecahan masalah yang tinggi dengan rata-rata 77,5 dan hanya memenuhi tiga tahap pemecahan masalah berdasarkan teori Polya. Oleh karena itu guru harus memperhatikan kecenderungan gaya belajar kinestetik agar mampu meningkatkan kemampuan pemecahan masalah matematika siswa.

Keywords:
Learning Styles, Math Problems, Problem-solving

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INTRODUCTION

Sustainable Development Goals 2030 (SDGs, 2030) is a form of joint decision that is agreed upon internationally and contains 17 development plan goals and 169 targets for 15 years, from 2015 to 2030. One of these 17 goals is quality education (UN, 2015). Citing the SDGs 2030 goal from point 4th to the 6th target ensures that by 2030 everyone regardless of gender, male or female must be able to read, write and count. Based on the sustainable development goals, it is found that one of the focuses of education set on the development of international education is mathematical ability.

Discussing math skills based on Program for International Student Assessment (PISA) data in 2018, Indonesia is in the 7th bottom of the 79 participating countries (Ratnaningsih, Hidayat, & Santika, 2019), and of course, that is a problem for education in Indonesia. In response to this, the government has also formulated regulations that become instruments for stakeholders to determine strategic steps in the future, one of which is Permendibud RI No. 160/2014, concerning the Implementation of the 2006 Curriculum and the 2013 Curriculum become a reference for education actors to determine educational strategic steps. The regulation states in article 4 "elementary education units and secondary education can implement the 2006 curriculum no later than the 2019/2020 school year".

The 2013 curriculum also regulates the practical steps of teachers in teaching in the classroom, including the learning model. Based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 65 of 2013, which was later replaced by the Minister of Education and Culture of the Republic of Indonesia Number 22 of 2016 concerning the Standards for Primary and Secondary Education which states that the recommended learning models in the 2013 curriculum are discovery learning, inquiry-based learning, problem-based learning, and project-based learning (R. S. Anggraini & Fauzan, 2020). Discussing problem-solving problems is very relevant to 21st-century competencies that make problem-solving a skill that must be met from several skills (Herwandi & Kaharuddin, 2020).

Based on the research results, Arbo & Ching (2022; Kaymakcı & Can (2021) stated in their writings that students' ability to solve problems can be significantly influenced by learning styles. This is caused by the higher and lower levels of student learning styles in the learning process affecting problem-solving abilities if balanced with the student's desire to learn and improve problem-solving skills to solving problems (DiFonzo & Bordia, 1998).

According to Anggraini, Hendroanto, & Hendroanto (2021); Zhang & Dai, (2004), learning styles consist of three types based on the way and speed of students in processing information, including visual, auditory, and kinesthetic learning styles. The results of the ex-post facto research conducted by Carmo, Gomes, & Pereira (2006) revealed that the students' highest ability to solve mathematical problems in succession was Sawa who studied with a kinesthetic style. Students with a tendency to learn kinesthetic styles are easier to remember information through the activities carried out (Adolphus & Aderonmu, 2012).

Based on the background described above, it can be stated that problem-solving ability is a skill that should be mastered by students. In the discussion of this study, what attracted the researchers' attention were the students of SMK Muhammadiyah 2 Bontoala Makassar. The school was chosen because it is a school that has a good predicate in Makassar, Sulawesi Selatan Province, as the school with the highest Computer-Based National Examination or *Ujian Nasional Berbasis Komputer* (UNBK) score in 2019 in Makassar city and received the title of the best SMK in Makassar on January 2020.

After confirming to the mathematics teacher that although not all but some students in the school have good mathematical problem-solving skills so that they can contribute to obtaining the highest UNBK score. Apart from these achievements, based on the results of interviews, the data also obtained that it turns out that students of SMK Muhammadiyah 2 Bontoala Makassar find it difficult to solve math problems in the form of stories (non-routine problems). This matter attracted the attention of researchers to find out the profile of the mathematical problem-solving ability of SMK Muhammadiyah 2 Bontoala Makassar students in terms of style tendencies in learning.

Based on the results of Ma'rup & Firdaus research (2020) it is concluded that the mathematical problem-solving ability of visual learning styles students is better than auditory and kinesthetic students. Then the problem-solving ability of auditory is better than kinesthetic students. The results of the study by Anggraini, Hendroanto, & Hendroanto (2021) showed that from 27 students, there were 16 (59%) students with visual learning styles, 4 (15%) students with auditory learning styles, 5 (19%) students with kinesthetic learning styles, and 2 (7 %) of them are mixed. Problem solving abilities in visual students can carry out up to the third step of Polya (understanding the problem, devising a plan, and carrying out the plan), auditory students can carry out to the third step, but subject A2 does not carry out steps 2, namely devise a plan. Kinesthetic students carry out up to step 3. The three subjects both did not carry out step 4 of Polya Problem Solving, namely, look back.

The results of the study by Inastuti, Subarinah, & Kurniawan (2021) show that in the steps of problem-solving abilities, students with visual and auditory learning styles, have been able to reach the step of understanding the problem, devising a plan, designing and choosing a solution strategy, and solving problems with mathematical models, but have not yet reached the step looking back the answer obtained. On the other hand, students with kinesthetic learning styles have been able to reach the step of understanding the problem, but have not been able to reach the step of devising a plan by designing and choosing a solution strategy, solving problems with mathematical models, and look back the solutions obtained. This shows that the problem-solving ability of students with visual and auditory learning styles is better than students with kinesthetic learning styles.

The results of research by Al-Hamzah & Awalludin (2021) show that visual students can understand the problem, devise a plan, carry out the plan (solve the problem), and look back at the solution. Auditory students can understand the problem,

are less able to devise a plan, are less able to carry out the plan, and are less able to look back at the solution. Kinesthetic students can understand the problem, are less able to devise a plan, are able to carry out the plan (solve the problem), and are less able to look back at the solution. It is because students are not used to working on non-routine problem-solving problems so that students find it difficult to understand the information on the questions. Therefore, students need to be trained to work on questions that require high-level thinking so that students mathematical problem-solving abilities can develop well (Firdaus, Akib, & Nasrun, 2022).

Results of research by Shaputra & Supardi (2019) found that the ability to solve mathematical problems with visual learning styles was better than those with auditory and kinesthetic learning styles because all learning media use sight more while the others are still less. In addition, students with auditory and kinesthetic learning styles are more active and creative in learning and fast in doing assignments.

The results of the research by Aljaberi (2015) concluded that in the process step of understanding the problem, students with kinesthetic learning styles were able to distinguish between known and asked information on questions. The relationship with Taxonomy Bloom's cognitive levels C1 and C2 is remembering the initial material by being able to distinguish between known and asked information and being able to understand the questions. At the step of devising a plan with designing and selecting a settlement strategy, students have not been able to show a design or strategy used in determining the steps for solving problems, because students with kinesthetic learning styles in all planning and strategies are less precise and complete. In relation to Bloom's Taxonomy, students with kinesthetic learning styles have not been able to apply or apply the formulas that are known and understood from the questions at the C3 level. Whereas, Aslan & Duruhan (2021) in the step of solving problems with a mathematical model, students with kinesthetic learning styles, in relation to cognitive levels based on Bloom's Taxonomy, students at this step, have not been able to reach levels C4 and C5, namely able to analyze or formulate a problem on the matter and synthesize the knowledge possessed or design a problem-solving model on the problem.

Research results Remsis, Ratnaningsih, & Nataliasari (2021) give the conclusion that the subject of activists (S1), reflectors (S2), theorists (S3), and pragmatists (S4) can determine things that are known and asked from the problem, determine the steps for problem solving planning, and perform calculations according to the problem-solving plan systematically. Meanwhile, the four subjects were less able to ask questions and explore all dimensions of the problem, and the activist subjects (S1) and theorists (S3) were able to look back at the results obtained in different ways and solve problems according to what had been learned. State that the factors that cause this situation include students who do not understand the information on the questions, students who are less able to make mathematical models, and students are less solving the problem (Wicaksono, Chasanah, & Sukoco, 2021).

According to the results of research Argarini (2018), subjects with visual learning styles are able to understand the problem well and plan to solve the problem, at the

implementation stage of the completion of the visual subject, they are less thorough in working so that the operation is valid, while at the last stage the subject does not re-examine, (2) Auditory subjects have good problem understanding skills, then in the planning stage the subject is able to determine problem solving plans correctly and solve problems appropriately, besides auditory subjects also re-examine the answers that have been given. While the research by Setiyadi (2020) shows that visual learning style is able to solve problems until the final stage. The auditory learning style is able to reach the stage of implementing the plan to solve the problem, but he/she is less able to see or check again. The kinesthetic learning style is able to reach the stage of implementing the problem-solving plan, but he/she is not able to see or check again.

As for the comparison to the results of previous studies regarding the mathematical abilities of students with kinesthetic learning styles is the research Ridwan (2017) which examines the mathematical reasoning abilities of students with kinesthetic learning styles. While the research of Komala & Afrida (2020) examines the ability of mathematical representation with kinesthetic learning styles. Based on those aforementioned, this study examines specifically how the ability of students with kinesthetic learning styles in solving mathematical problems based on the steps of Polya's theory.

This study was undertaken to describe the profile of mathematical problem-solving abilities of students in class XI Pharmacy at SMK Muhammadiyah 2 Bontoala Makassar with visual, auditory, and kinesthetic learning styles based on the issues given above. The researchers' interest in examining the subject of kinesthetic learning styles is that there has been no research that specifically examines the ability of kinesthetic learning style students to solve mathematical problems so that it can be compared with previous research on how consistent students' mathematical problem-solving abilities are in terms of learning styles. The importance of this study is to determine the profile of students' mathematical problem-solving abilities in school so that it can generate a paper that can be used as a reference for readers and future studies, as well as be considered by stakeholders for developing policies.

RESEARCH METHOD

Descriptive qualitative research is one sort of this study (Firdaus, Juniati, & Wijayanti, 2020; Sa'dijah, Murtafiah, & Anwar, 2021). The purpose of this research is to examine specifically how students with kinesthetic learning styles are able to solve mathematical problems based on the steps of Polya's theory.

There are three methods of data collecting were used: questionnaires, test questions, and interviews. Seven students from SMK Muhammadiyah 2 Bontoala Makassar's Class XI Pharmacy will be chosen based on their learning styles to determine study subjects with kinesthetic learning styles, which will then characterize their mathematics problem-solving abilities. Of the 7 total students, 2 students were selected who have a kinesthetic learning style. In addition, the subjects were selected based on their communication skills with the aim of making it easier to be interviewed. The

interview was conducted 1 time to confirm the results of the subject's work with the kinesthetic learning style.

The research instrument used in this study is in line with the data collection technique carried out, namely using an instrument in the form of a questionnaire sheet consisting of 30 questions and 3 alternative answers to each question, a mathematical problem-solving ability test sheet containing one math problem in the form of a non-routine problem with system material. Two-variable Linear Equation or *Sistem Persamaan Linear Dua Variabel* (SPLDV) and interview guidelines adapted to the indicators of the problem-solving stages according to Polya's theory, namely: understand (understanding the problem), strategy (composing a solution strategy), solve (solve the problem), and look back (check back) (Anggraini, Hendroanto, & Hendroanto, 2021).

The subject must complete the tasks within the designated time frame. In the following section, the subject of the study is adjusted according to the respondents' responses to the challenges presented in the meddling with the problem. Interview is also used to collect information that might not be collected during a task that is in progress since not every information that is believed to be relevant to the students can be published. This might hold true throughout the interview. The interview results are documented with a recorder. Once the data are completed, the next step is to begin data cleansing. According to Moleong (2012), there are 4 (four) criteria for judging the quality of data: credibility, transferability, dependability, and confirmability. In this study, two types of data validity criteria namely credibility and profitability were used.

Data from the task of solving the problem and the results of the interview were then analyzed using a qualitative descriptor. According to Miles & Huberman (2014), the analysis of data in this paper focuses on the steps of a rigorous analysis of data: data analysis, redaction of data, data analysis, coding, and conclusion. The type of data analysis that was used in this study was a mathematical problem-solving analysis.

The flow of the data analysis process resulting from solving mathematical problems is presented in Figure 1.

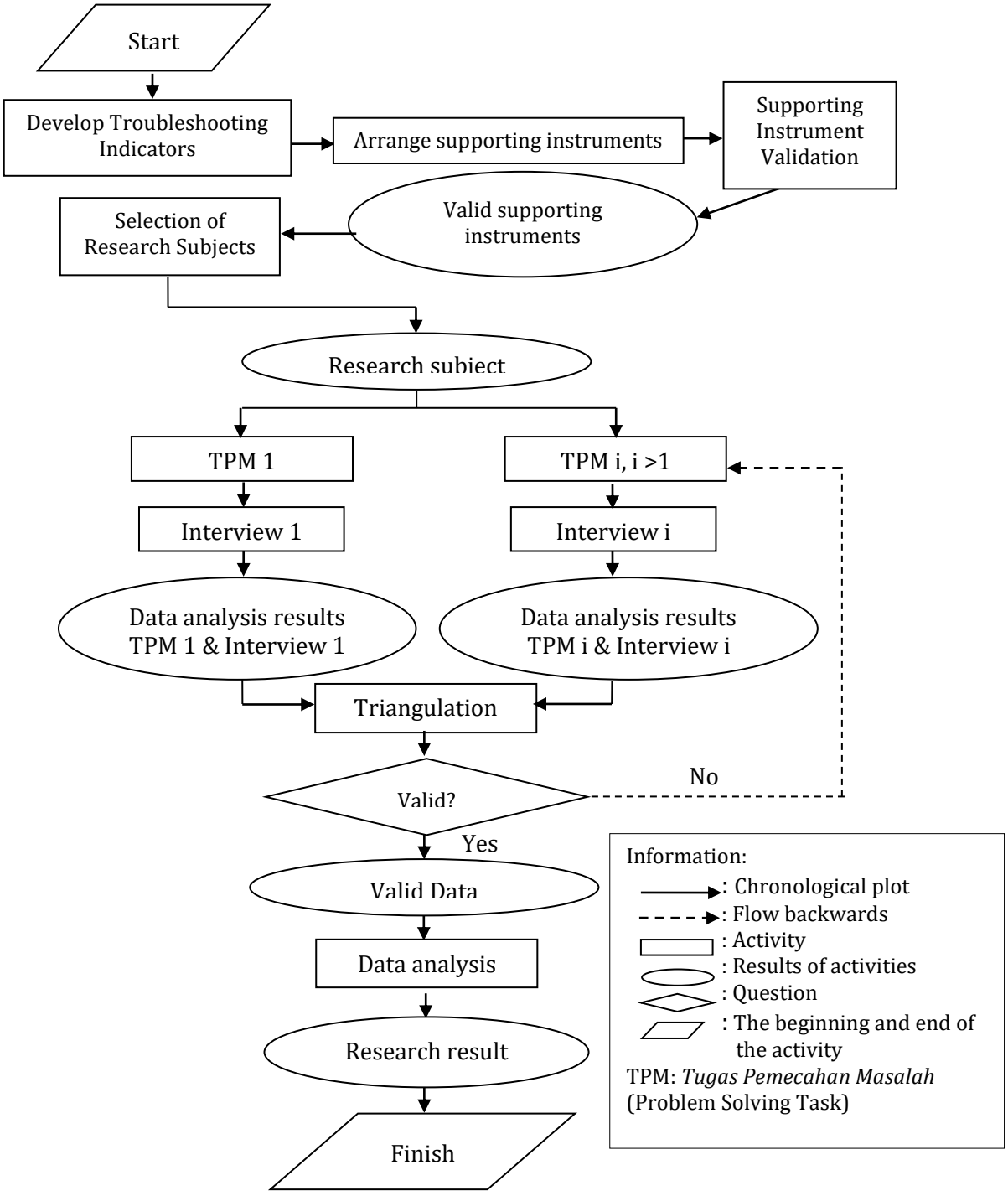

Figure 1. Research Procedure Flow

RESULTS AND DISCUSSION

RESULTS

The data collection was carried out in two meetings, namely, on October 31th, 2021, and on November 2nd, 2021, the following data were obtained by the researcher:

Table 1. Results of the Learning Style Questionnaire

No	Subjects of Research	Learning Style	Test Score
1	MPS	Visual	75
2	PAD	Visual	75
3	ANM	Auditory	65
4	RMZ	Kinesthetic	80
5	ET	Auditory	65
6	AW	Visual	80
7	RRF	Kinesthetic	75

Based on the tabulation of the data above, it was found that of the 7 research subjects who gave responses, there were 2 subjects with kinesthetic learning styles, namely RMZ with a test score of 80 and RRF with a test score of 75.

The results of the research obtained two subjects with kinesthetic learning styles whose data can be seen in table 2 below:

Table 2. Data of Research Subjects with Kinesthetic Learning Style

No	Subjects of Research	Learning Style	Test Score
1	RMZ	Kinestetik	80
2	RRF	Kinestetik	75
	Average		**77.5**

The two subjects with kinesthetic learning styles were asked to do a math problem-solving ability test with the following questions.

Question: The difference between the ages of a father and his daughter is 26 years old, whereas five years ago, the sum of their ages was 34 years old. Calculate the age of the father and daughter in two years!

1. Profile of RMZ Subject's Mathematical Problem-solving Ability

a) Understand

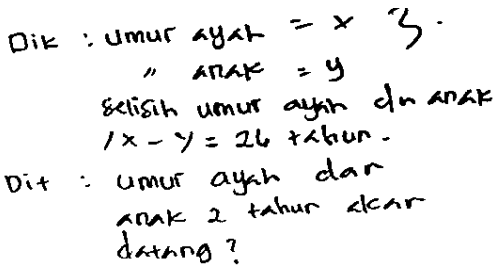

Figure 2. Understand Stage by RMZ

Figure 2 shows that RMZ used an example to help with the completion process, namely considering the father's age as x, the daughter's age as y, and formulating the equation for the difference in the father and son's ages as $x - y = 26$. RMZ, on the other hand, took notes on what was asked, starting with the second question, which was about the age of the father and son in the next two years.

Interview Transcript

Q : "After you read question number two, how can you understand?"

RMZ : "The difference between the ages of father and daughter is twenty-six years and the sum of the ages of father and son five years ago was thirty-four years. Then the question is the age of the father and son in the next two years."

According to the interview sample above, RMZ understood the situation and could write down what was known as well as what was asked of question number two without getting into problems, as seen in Figure 3.

b) Strategy

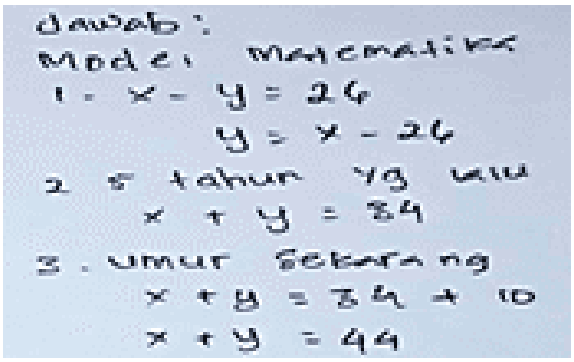

Figure 3. Strategy Stage by RMZ

From Figure 3, it can be seen that RMZ wrote a problem-solving plan by writing three mathematical models based on the problem referred to in the problem. The first mathematical model, RMZ wrote an equation for the age of the child, namely $y = x - 26$. The second mathematical model, RMZ wrote the equation for the sum of the ages of the father and son five years ago, namely $x + y = 34$. And the third mathematical model is the sum of the ages of the father and son now, which is $x + y = 44$.

Interview Transcript

Q : "After that, what else do you do after writing down what you know?"

RMZ : "Completion, start mathematical model"

Q : "What is the mathematical model?"

RMZ : "The first x minus y equals twenty-six ($x - y = 26$), y equals x minus twenty-six ($x = x - 26$). Two, five years ago x plus y equals thirty-four years ($x + y = 34$), and present age x plus y equals thirty-four years plus ten ($x + y = 34 + 10$), x plus y equal to forty-four years ($x + y = 44$)."

According to the preceding interview extract, RMZ developed a settlement plan before addressing question number two by putting down the mathematical model, as shown in Figure 3.

c) Solve

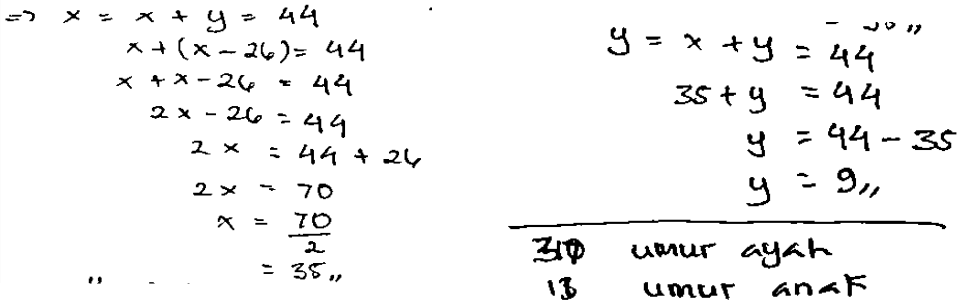

Figure 4. Solve Stage by RMZ

Based on Figure 4, we can see that RMZ uses the third equation at the strategy stage ($x + y = 44$) to find answers to the questions. RMZ substituted the y value of equation one ($y = x - 26$) into equation three so that $x + (x - 26) = 44$ was obtained to find the value of x (father's age) first. After finding the x value, which is $x = 35$, then RMZ again uses the third equation to find the y value by substituting the x value that has been found previously so that $y = 9$. The question is how old the father and son will be in the next two years, with the father being 37 and the daughter being 11 years old.

Interview Transcript

Q : "What else do you do after that?"

RMZ : "Solution, x equals x plus y equals forty-four ($x = x + y = 44$), x plus x minus twenty six equals forty four ($x + x - 26 = 44$), two x minus twenty-six equals forty-four ($2x - 26 = 44$), two x equals forty-four plus twenty-six ($2x = 44 + 26$), two x equals seventy ($2x = 70$), x equals seventy divided by two ($x = 70/2$), equals thirty-five. Then y equals x plus y equals forty-four ($y = x + y = 44$), thirty-five plus y equals forty-four ($35 + y = 44$), y equals forty-four minus thirty-five ($y = 44 - 35$) y equals nine ($y = 9$). "

Q : "What is the form of the conclusion?"

RMZ : "So, the age of the father is thirty-seven years and the age of the son is eleven years old."

Based on the interview excerpt above, it is known that the subject of RMZ did the problem solving based on the problem-solving plan that had been previously written without any problems. As can be seen in Figure 3, RMZ also drew conclusions from the final answers.

d) Look Back

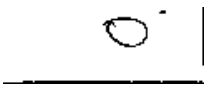

Figure 5. Look Back by RMZ

Figure 5 shows that RMZ did not write anything during this look back stage, indicating that RMZ did not complete this phase throughout the problem solution process. As a result, RMZ received a score of 0.

Interview Transcript

Q : "Are you sure that's the answer?"
RMZ : "First, there was a mistake. Then repeat (check again)"
Q : "How do you check again?"
RMZ : "Re-read the questions, then rework"
Q : "Not done with other methods?"
RMZ : "No!"

Based on the interview excerpt above, RMZ re-checked the answers obtained by observing again. Then RMZ found an error in the answer so RMZ made improvements. However, RMZ did not re-check their answers using mathematical procedures as can be seen in Figure 5.

Because RMZ did not write down the methods for rechecking responses using mathematical procedures, RMZ only fulfilled the three steps of solving mathematical issues according to Polya's theory, based on the interview results and the findings of the RMZ exam.

2. Profile of RRF Subject's Mathematical Problem-solving Ability

a) Understand

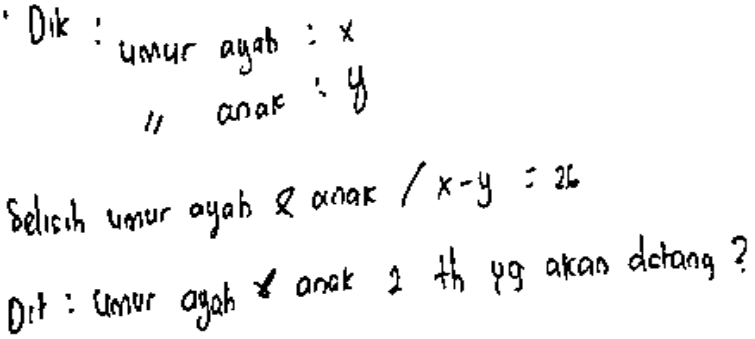

Figure 6. Understand Stage by RRF

Figure 6 shows how RRF simplified the completion process by associating the father's age with x and the daughter's age with y, and setting down the equation for the difference in the father and son's ages, namely $x - y = 26$. On the other hand, RRF took notes on what was asked, namely the age of the father and son in the next two years.

Interview Transcript

Q : "After you read the questions, what can you understand?"
RRF : "The difference is twenty-six years, and while the ages of five years ago were both thirty-four years old, calculate the ages of the father and daughter two years from now."
Q : "After that, what do you do?"
RRF : "Write known, which is asked."

According to the previous interview excerpt, RRF understands the situation and can write down what is known, as seen in Figure 6.

b) Strategy

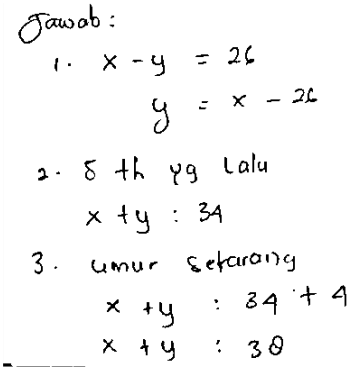

Figure 7. Strategy Stage by RRF

Figure 7 shows how the RRF subject created a problem-solving strategy by creating three mathematical models based on the problem in the issue. In the first mathematical model, RRF wrote an equation for the age of the child, namely $y = x - 26$. In the second mathematical model, RRF wrote the equation for the sum of the ages of the father and son five years ago, namely $x + y = 34$. The sum of the father and son's current ages is the third mathematical model. However, RRF made a mistake when creating the third mathematical model; the model should be $x + y = 44$, but RRF typed $x + y = 38$.

Interview Transcript

Q : "After you write down what you know, what else do you do?"
RRF : "Write the mathematical model."
Q : "How many models do you make?"
RRF : "Three!"
Q : "What Is that the model?"
RRF : "The same age as five years ago, the same age as five years now."

Based on the interview excerpt above, after understanding the problem of the question test, RRF wrote a problem-solving plan first by writing down the mathematical model before working on the problem, as can be seen in Figure 7.

c) Solve

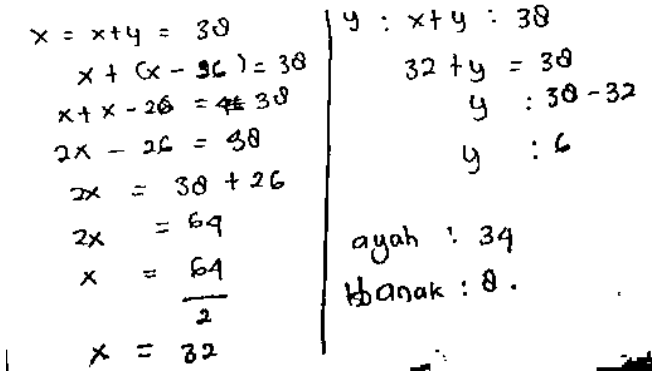

Figure 8. Solve Stage by RRF

In Figure 8, we can see that RRF uses the third equation at the strategy stage ($x + y = 44$) to find answers to the questions. RRF substitutes the y value of equation one ($y = x - 26$) into equation three so that $x + (x - 26) = 38$ is obtained to find the value of x (father's age). After finding the x value, which is $x = 33$, RRF returns to using the third equation to find the y value by duplicating the x value that has been found previously so that $y = 6$. What is asked in the question is the age of the father and son in the next two years, so that the father's age is 34 years old and the daughter's age is 8 years old. Nonetheless, due to a previous error in the strategy stage, RRF's final response was incorrect, therefore RRF substituted the value of the incorrect equation, affecting the final result.

Interview Transcript

Q : "When you have finished to write down the model, what do you find for the first time?"
RRF : "Hmm, father (x)."
Q : "After that, looking for the father's age, what else are you looking for?"
RRF : "Finding the daughter's age."
Q : "Do you have a conclusion?"
RRF : "Just father and son's age. Son's age is 9 years old, and father is 35 years old, which is not added 2 years old."

According to the above interview extract, RRF solved the difficulty by determining the father's age first, based on the previously written settlement agreement. RRF also wrote a conclusion from the final results obtained as can be seen in Figure 8.

d) Look Back

Figure 9. Look Back Stage by Subject RRF

From Figure 9, it can be seen that RRF did not write anything at this look backstage, which means that RRF did not do this step when solving the problem. So, RRF got a score of 0.

Interview Transcript

Q : "After you wrote down the final answer from number two, what did you do, and did you check the answer again?"
RRF : "No!"
Q : "Did you also not check in other ways?"
RRF : "No!"

According to the RRF interview extract above, RRF did not re-check the answers received, either by witnessing again or by using mathematical processes, as shown in Figure 9.

RRF did not meet the problem-solving phases according to Poya's theory based on the findings of interviews and test results. RRF did not double-check the answer after calculating the final result, hence the final result was incorrect. The error made by RRF is in the solving stage, where RRF is wrong in calculating the sum of the current ages of the father and daughter.

DISCUSSION

Based on the results of the study, it was found that of the 7 research subjects who gave responses, there were 2 subjects with kinesthetic learning styles, namely RMZ with a test score of 80 and RRF with a test score of 75, then problem-solving question was given, namely: "Difference in the age of a father and their daughter is 26 years old, while five years ago the sum of their ages was 34 years. Calculate the age of the father and his daughter in two years more."

The problem-solving stage is based on Polya's steps, the first subject is RMZ. RMZ understands the problem, namely doing an example to facilitate the completion process, RMZ writes a problem-solving plan by writing three mathematical models based on the problem referred to in the problem and then writing the conclusion, but RMZ does not write anything at the look backstage, which means that RMZ did not re-check the steps that have been done so that RMZ got a score of 0. It can be stated that RMZ did not fulfil the four steps of solving mathematical problems according to Polya's theory because RMZ did not write down the steps for rechecking answers with mathematical procedures.

The second subject is RRF. RRF can understand the problem and can write down what is known about the problem. RRF created a problem-solving strategy by creating three mathematical models based on the problem in the problem, but during the modeling stage, RRF made a mistake in creating the model, which should have been $x + y = 44$, but RRF typed $x + y = 38$. RRF then typed the conclusion, however due to a previous error in the mathematical modeling stage, RRF's final solution was erroneous. So, RRF substituted the value of the wrong equation and affected the final result obtained.

RRF solves the problem using the previously written settlement plan and then records the conclusion of the final results achieved, but RRF does not write anything at the look backstage, which means RRF does not double-check the answers obtained by observing again or looking back. by using mathematical procedures to check. So, it can be concluded that RRF does not meet the problem-solving steps according to Polya's theory, because RRF did not re-check the answer after finding the final result. So, RRF gave an inaccurate final result. The error made by RRF was in the "solve" stage. RRF was wrong in the calculation process.

Based on the conclusions from the two dominant subjects with kinesthetic learning styles above, the two subjects have similarities, namely not checking the answers in the Look Back step. In line with the research results of Anggraini & Fauzan (2020) that the subject of Kinesthetic learning style fulfils 3 stages of problem-solving according to Polya, namely the stage of understanding the problem, the stage of planning the problem, and the stage of implementing the plan. For the review stage, the subject has not fulfilled this

stage. The subject only works according to the plan he has planned without rechecking the steps that have been taken.

The studied conducted by Huda & Suyitno (2017) concludes the results of their research that at the stage of reviewing, the subject of S-07 has not been able to examine and review carefully every step of problem-solving taken. After finishing working on the subject of S-07, he did not re-check the steps that had been done. As a result, McQuade, Wiggins, & Ventura-Medina (2018); Mufarihah, Yuliastuti, & Nurfalah (2019) found that students with kinesthetic learning styles have problem-solving abilities, namely at the second level of understanding the problem, the third level of planning problems, the second level of carrying out plans, and the first level of re-examining the process and the results. Then, according to Hafidzah, Azis, & Irvan (2021), people with strong emotional intelligence and kinesthetic and visual learning styles have good reasoning skills. This is defined by the subject's ability to present reasons or several answers, as well as the subject's ability to examine the validity of an argument and come to a conclusion.

Based on the research discussion above, the novelty in this study is the students' mathematical problem-solving ability in solving math problems in the form of stories (non-routine problems) from the two dominant subjects with kinesthetic learning styles having the ability to understand problems by writing down what is known and what is known. asked, less able to devise the problems by knowing the formula in advance, able to complete the steps or solving the problem, and less able to look back at the results of existing problem solving, One of the main factors is that students are not accustomed to working on non-routine questions such as problem-solving questions that in the form of story questions, so students need to get used to working on non-routine questions, especially those that can practice mathematical problem solving skills.

CONCLUSION

Based on the findings of the study, it can be stated that students with kinesthetic learning styles in Class XI Pharmacy at SMK Muhammadiyah 2 Bontoala Makassar had good mathematical problem-solving skills, with an average score of 77.5. Based on the two students with kinesthetic learning styles in the class, none of the subjects met the problem-solving stages according to Polya's theory because they did not carry out the fourth stage, namely re-checking the answers obtained.

For the next researcher, the researchers recommend to conduct research similar to this research in the future so that there are more scientific references regarding the profile of mathematical problem-solving abilities. During conducting this research, the researchers found no significant obstacles, so other researchers may find it simple to do similar research. Yet, it would be preferable if the following researchers used a different test material from this study.

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