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Development of Learning Modules Based on Metacognition Approaches to Improve Students' Mathematical Problem Solving Abilities

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Abstrak

Penelitian ini bertujuan untuk mengembangkan dan menguji keefektifan modul pembelajaran matematika berbasis pendekatan metakognisi guna meningkatkan kemampuan pemecahan masalah matematis siswa pada materi Sistem Persamaan Linear Dua Variabel. Penelitian ini menggunakan model pengembangan 4D (Define, Design, Develop, Disseminate) yang melibatkan proses analisis kebutuhan, perancangan modul, validasi ahli, uji coba terbatas dan luas, serta analisis keefektifan. Instrumen penelitian mencakup lembar validasi, angket respon siswa, serta tes kemampuan pemecahan masalah.Hasil validasi oleh ahli materi, media, dan model menunjukkan bahwa modul yang dikembangkan termasuk dalam kategori sangat valid. Uji coba kelompok kecil dan besar memperlihatkan bahwa modul dinilai praktis oleh peserta didik, ditunjukkan oleh persentase rata-rata skor angket di atas 80%. Pada tahap penyebarluasan, hasil pretest dan posttest menunjukkan peningkatan yang signifikan dalam kemampuan pemecahan masalah matematis, dengan nilai N-Gain sebesar 0,52 (kategori sedang). Hasil analisis proses jawaban siswa juga menunjukkan peningkatan dalam perencanaan, pemantauan, evaluasi, dan pengaturan diri. Dengan demikian, modul pembelajaran berbasis pendekatan metakognisi ini dinyatakan valid, praktis, dan efektif digunakan untuk meningkatkan kemampuan pemecahan masalah matematis siswa.

***Kata Kunci**: Pengembangan modul, metakognisi, kemampuan pemecahan masalah,*

Abstract

This study aims to develop and examine the effectiveness of a mathematics learning module based on a metacognitive approach to improve students' mathematical problem-solving abilities on the topic of Systems of Linear Equations in Two Variables. The research employed the 4D development model (Define, Design, Develop, Disseminate), which involved needs analysis, module design, expert validation, limited and large-scale trials, and effectiveness analysis. The research instruments included expert validation sheets, student response questionnaires, and problem-solving ability tests. The results of expert validation (content, media, and model) indicated that the module was highly valid. Both small and large group trials revealed that students found the module practical, as evidenced by the average questionnaire score percentage exceeding 80%. During the dissemination stage, the results of the pretest and posttest showed a significant improvement in students' problem-solving abilities, with an N-Gain score of 0.52 (moderate category). Analysis of students' problem-solving processes also demonstrated improvements in planning, monitoring, evaluation, and self-regulation. Therefore, the

metacognition-based learning module is considered valid, practical, and effective for enhancing students' mathematical problem-solving skills.
Keywords: *Module Development, Metacognition, Problem Solving Skills*

A. Introduction

Mathematics is a universal science that underpins technological development and plays a vital role in various disciplines and advances human thought.(Hasratuddin, 2018) argues that mathematics is a product of human intellectual thought. Intellectual thinking is usually driven by problems related to everyday life. Thus, mathematics is also referred to as human life and a means to train thinking. It turns out that not only that, (Ariani, 2020) mathematics is one of the most useful sciences in everyday life, because mathematics can prepare and develop students' abilities to think logically, flexibly, and precisely to solve problems that arise in everyday life.

Problem-solving skills help solve daily issues. (Andayani, F., & Lathifah, 2019) define problem-solving skill as the capacity to solve narrative issues, non-routine problems, and apply mathematics in daily life. Lestari, (Lestari, I., Andinny, Y., & Mailizar, 2019) defined mathematical problem solving ability as the ability to understand a math problem by solving something difficult, especially when working on questions. Solving mathematical issues involves four processes, according to (Polya, 1973) : (1) comprehending the problem, where pupils grasp the context and identify information. (2) planning, where students use mathematical principles to solve problems. (3) applying the plan, where students use a methodical solution technique to reach a conclusion. Re-check allows students to correct their answer outcomes. Actually, Indonesian pupils' mathematical ability to solve issues is poor. The 2019 Trends in International Mathematics and Science Study inspection rated Indonesia 7th from the bottom, 73 out of 79 nations, with an average estimate of 397. Indonesia's PISA score has remained below 400.

This suggests that Indonesia should repackage it in education, particularly in math lectures on problem-solving. (Wahyudin, 2016) found that many students struggle to apply mathematical principles to real-world settings and solve issues that need logical reasoning and more sophisticated solutions. According to (Suryadi, 2000), Indonesian students' capacity to apply mathematics to real-world issues, particularly those requiring deep comprehension and strong quantitative reasoning, is still restricted. Math problem solving shows that many pupils just care about the ultimate outcome.

Students often solve issues by using memorized formulas or those taught by the instructor without discussing them. (Agustini, D., & Pujiastuti, 2020) found that students have trouble understanding material, formulas, and problems; are less able to translate problems into mathematical form and plan problem-solving procedures; apply problems to concepts and strategies; and tend not to check solution steps and results. This poor skill shows the need for more effective mathematics study, particularly in problem-solving. MTs Al Washliyah 16 Perbaungan pupils need mathematical problem-solving ability. The abilities involved in

SPLDV learning include understanding fundamental concepts, modelling real-life situations as systems of equations, and evaluating the outcomes of solutions. According to observations in class VIII MTs Al Washliyah 16 Perbaungan, diagnostic examinations with problem-solving problems and two-variable linear equation systems show that pupils have poor mathematical problem-solving ability. Questions are as follows.

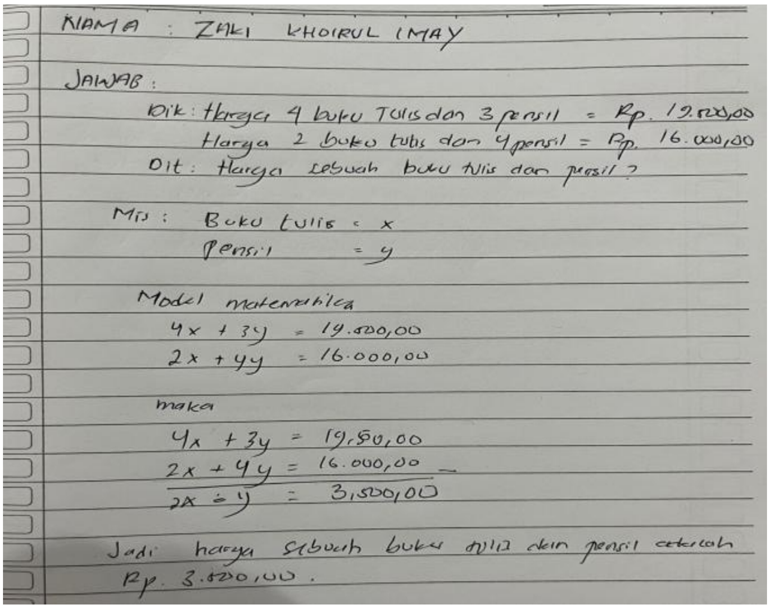

Figure 1.Student Answers on the Student Mathematical Problem Solving Ability Test

Most pupils in the class failed the diagnostic test's problem-solving questions on the two-variable linear equation system. According to the students' answers, they can be grouped as follows: (1) Students who can understand the problem, i.e., what is asked and what data is given (14 students out of 30 students or 48.87%); (2) Students who can plan problem solving, i.e., able to model a problem given to mathematical modelling and determine the solution with the planned method (12 students out of 30 students or 40.37%); (3) Students who According to the description, mathematics problem solving is crucial and should be taught better. Unfortunately, field data shows that kids' problem-solving skills remain inadequate. The initial mathematical problem-solving ability test showed that students are still unable to understand and solve problems according to mathematical problem-solving indicators, indicating low problem-solving abilities (Syahid, 2013). Despite the fact that mathematics needs reasoning and problem-solving, students typically struggle to grasp problems and identify formulas (Ayu, D., & Dita, 2017).

The researcher's interview with one of MTs Al Washliyah 16 Perbaungan's mathematics teachers revealed that students' mathematical problem-solving abilities are still low because they don't understand the teacher's questions. Students work on problems without first writing down what knowledge is known, what questions are intended, and what formulae are utilized to answer them. Students also instantly answer questions without redoing the processes to see whether they are accurate.

According to preliminary study, class VIII pupils of MTs Al Washliyah 16 Perbaungan have poor mathematical problem-solving skills because their professors utilize ineffective methods. Teachers typically speak and provide examples without engaging pupils. Teachers also don't use a learning process that involves designing problem-solving techniques, monitoring the learning process and recognizing mistakes, and assessing the stages and outcomes. Thus, pupils are passive listeners who don't grasp the subject. This method makes kids more reliant on teachers and less likely to think critically or solve issues independently. (Sanjaya, 2019) agrees that a teacher-centered learning style makes pupils passive by immediately presenting knowledge without offering exploration space.

The lack of creative media and learning methodologies makes children's problem solving more difficult. (Arends, 2018) stated that boring and uninteresting learning practices will demotivate students and reduce their involvement in learning. This suggests a more active and student-centered approach to mathematical problem solving. This challenge requires a learning style that encourages students to actively control their learning. One important method is metacognition. Metacognition is understanding and managing one's cognitive processes. Metacognition is one's awareness of their thinking processes, including metacognitive knowledge and control, according to (Flavell, 2017).

Metacognitive knowledge consists of understanding one's learning techniques, tasks, and capacities, while metacognitive regulation involves planning, monitoring, and evaluating learning activities. A metacognitive approach to mathematical learning can help students (1) plan problem-solving strategies based on their conceptual understanding, (2) monitor the learning process and identify errors, and (3) evaluate the steps and results of the solution. Metacognition helps students understand arithmetic and become more self-aware. This technique can help SPLDV students model actual problems into mathematical equations, identify appropriate solution methods, and evaluate their answers. (Farisi, A., Hamid, A., 2017) found that metacognition-based learning tactics improved mathematical problem solving more than traditional approaches. Students could actively regulate, monitor, and evaluate their learning process thanks to metacognition. This study supports (Davita, P. W. C., & Pujiastuti, 2020), who found that metacognitive abilities improve critical thinking and the application of mathematics in complex situations. (Indariani, A., Ayni, N., Pramuditya, S. A., dan Noto, 2019) found that students' metacognitive talents affect their mathematical problem solving. Metacognitive students are better at identifying difficulties, choosing appropriate methods, and evaluating problem-solving solutions, according to this study.

This research found that metacognition increases mathematics knowledge and promotes reflective thinking abilities needed to solve mathematical difficulties. Students studying the System of Linear Equations of Two Variables use this technique to better model problems, pick the proper solution strategy, and evaluate findings independently. Metacognition-based learning modules may apply metacognition in learning. A learning module is a structured educational material that supports students' autonomous study in and out of class. This module has defined learning goals, instructional materials, exercises, practice questions, and assessments (Hamdani., 2017). Students may study independently at their own speed and requirements utilizing the learning module. The metacognition-based learning module helps students organize their learning, investigate SPLDV autonomously, monitor and assess their comprehension, and solve SPLDV issues step-by-step.

The module is designed to help students grasp the skills presented. The module also helps instructors convey content during learning activities. Besides providing rich learning material, the module may explain itself. Thus, students may utilize the module to assist them comprehend and solve arithmetic issues. Students may study the learning module individually after the learning process if they need to clarify anything or enhance their understanding. (Adinia, A. F., & Simanjorang, 2024) found that the product trial questionnaire answers from instructors and students had an average score of 4.48, indicating that the module was appropriate for usage. According to (Agustini, D., & Pujiastuti, 2020), the questionnaire on students' module interest averaged 46.2 for 10 students. Based on this evaluation, the contextualized module was found to be appropriate for algebra instruction and might boost student attention.

Metacognition-based learning modules help students become active and reflective learners. Students learn to solve SPLDV and grasp the rationale behind each step using this session. Students' mathematical problem-solving skills should increase dramatically. In addition, (Mawarni Nehe, Pargaulan Siagian, 2017) found that metacognition boosts students' creativity by 83%. Similarly, (Rudianto, R., Diani, R., Subandi, S., & Widiawati, 2022) discovered that metacognition increased students' mathematical concept knowledge. This research suggests building metacognition-based learning modules to increase students' problem-solving skills, particularly with SPLDV content. This lesson will help grade VIII MTs Al Washliyah 16 Perbaungan students grasp genuine issues and mathematical representations, pick acceptable solution methodologies, and critically assess their results. Metacognition-based modules should increase students' problem-solving and learning results. According to the problems above, metacognitive approach learning can help students improve their mathematical problem-solving skills, so the researcher needs to conduct research on Development of Learning Modules Based on Metacognitive Approaches to Improve Students' Mathematical Problem-Solving Abilities at MTs Al Washliyah 16 Perbaungan.

B. Research Method

Development research was utilized. Using research and development (R&D), a product is created and tested for efficacy (Sugiyono, 2018) The output of this research is a student learning module. Each development stage's actions affect the process. Using the Thiagaradjan Four-D Models (4-D) development approach, this research evaluates the final product's quality. A metacognitive learning module to increase problem-solving abilities in the material of a valid and successful Two-Variable Linear Equation System and all the research instruments required for its creation are the results of this study. This study was done at MTs Al Washliyah 16 Perbaungan in class VIII, Even Semester, 2024/2025 on the Two-Variable Linear Equation System. The researcher picked the school because it had not employed a metacognitive learning module and needed to enhance students' mathematics problem-solving skills. In 2024/2025, 30 class VIII students of MTs Al Washliyah 16 Perbaungan participated in this research. The goal of this project is to create a metacognitive learning module to enhance students' mathematical problem-solving skills. Thus, media development will be examined using study findings. The following section describes the four phases of 4-D learning media development:

Define

The implementation of the research begins with the definition stage, namely with the aim of determining and defining the learning requirements by analyzing the delivery of materials that still do not use learning media that support learning. This define stage includes five main steps, namely 1) front-end analysis, 2) learner analysis, 3) concept analysis, 4) task analysis, 5) formulation of learning objectives (specifying instructional objectives).

Design

At this stage, draft 1 is prepared to design an example of a learning module for SPLDV material. In addition to the learning module, lesson plans, research instruments and questionnaires are also designed. The initial design that will be produced is a learning implementation plan (RPP), student modules, research instruments in the form of tests.

Develop

The purpose of the development stage is to produce a good final module. In draft 1, the learning module and research instrument were validated by experts, then the mathematical problem-solving ability test instrument for students was tested in classes outside the sample. Then a field trial was conducted which aimed to obtain direct input on the learning module that had been prepared so as to produce the final device.

Disseminate

The development of the learning module reaches the final stage if it has received a positive assessment from experts and through a development test. The learning module is then packaged, distributed, and set for a wider scale. The learning module based on the metacognition approach in this study was distributed on a limited basis only to class VIII MTs Al Washliyah 16

Perbaungan, totaling 30 students. At this stage, the effectiveness of the learning module that had been effective at the development stage (draft III) was re-tested. This is to see whether other classes using the learning module are still effective by being tested on students with more diverse abilities.

C. Result and Discussion

This study uses the type of Research and Development (R&D) with the product developed in the form of a learning module for the material of two-variable linear equation systems to improve problem-solving skills. The development model used in this study is 4 D, with the stages of Define, Design, Develop, Disseminate. Based on the research and development conducted, the following research results were obtained:

Define

The development process begins with defining and designing learning requirements based on empirical and theoretical study. This step is critical for targeting learning modules to challenges, student characteristics, and curricular and process demands. This step involves initial-final analysis, student characteristics analysis, idea analysis, task analysis, and learning aim design. Each analysis complements the design direction and content of the learning modules. To assess mathematics learning at MTs Al Washliyah 16 Perbaungan, especially Systems of Linear Equations in Two Variables, an initial study was undertaken. Based on this data, learning modules should match student profiles and learning objectives. This analytical technique comprised a learning process research, instructor interviews, and student ability diagnostic tests. Grade 8 math is still teacher-centered and uses lecture and practice, according to first observations. Students are usually instructed to memorize problem-solving steps without analyzing or evaluating their ideas. This suggests that higher-order thinking abilities, notably strategic and introspective mathematics problem-solving, are still developing.

To understand the research students' backgrounds, beginning talents, and cognitive potential, student characteristics were analyzed. Teaching resources, such as metacognitive learning modules, must be adjusted to student requirements, skills, and learning styles by understanding student characteristics. This research included eighth-graders of MTs Al Washliyah 16 Perbaungan. According to Piaget's theory, pupils at this level are in the formal operational cognitive development stage, when they reason rationally about abstract ideas and solve problems deductively. In practice, arithmetic learning has not completely aided these talents. Concept analysis examined the breadth and depth of the learning module's information. This study verified that every module material was related to the curriculum's key competencies and learning goals and could be utilized to enhance metacognitive mathematical problem-solving abilities.

Design

The design stage is a continuation of the definition stage, where the results of the previous analysis serve as the basis for developing the initial learning tools. At this stage, researchers develop Draft One, which consists of learning modules, a Learning Implementation Plan (RPP), a mathematical problem-solving ability test instrument, and a student response questionnaire. Activities in this stage focus on four main components: test development, module format selection, media selection, and initial plan development

The learning module is designed with a systematic and interactive structure, consisting of three learning activities. Each learning activity in the module contains components of learning objectives, competency achievement indicators, material descriptions, metacognitive-based learning activities (including planning, monitoring, and evaluation), exercises, summaries, and competency tests. The material is presented using communicative and contextual language, accompanied by story problems that require higher-order thinking skills. The module's appearance reflects an attractive and educational design. The module's home page consists of.

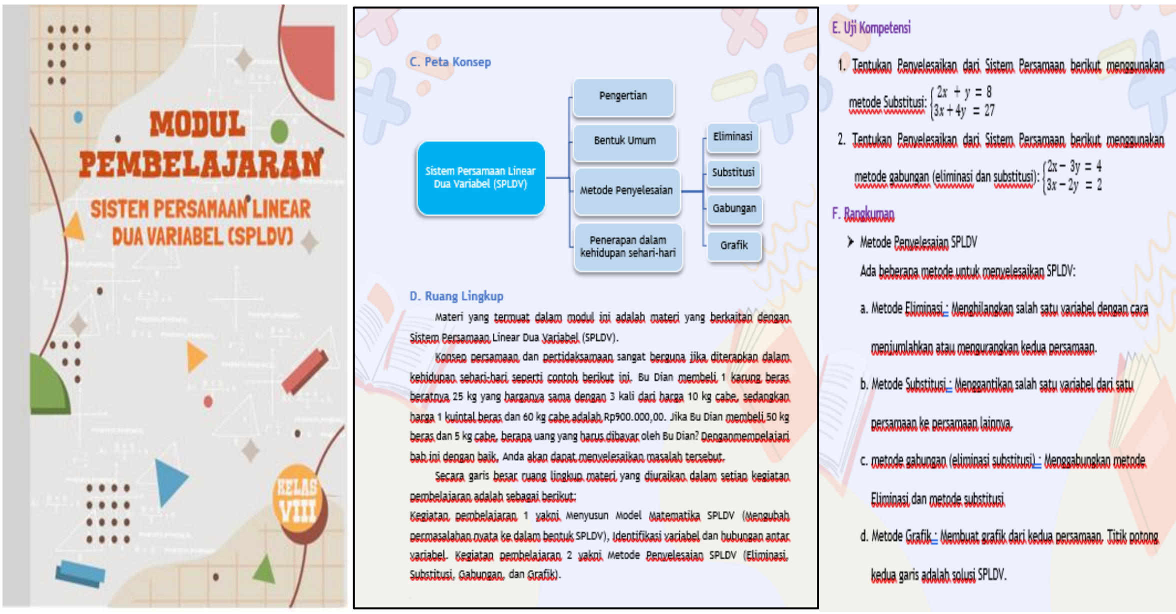

Figure 2. Learning Module

Develop

The development stage is a crucial phase in the learning module development process, aiming to refine the initial product (Draft 1) before wider implementation. At this stage, researchers carry out a series of systematic activities that include validation by experts, product revisions based on validator input, and limited trials to assess the module's initial acceptability and practicality.

The primary focus of this stage is to obtain empirical data related to the validity and practicality of the metacognitive-based learning module. Evaluations are conducted on the quality of the content, presentation structure, readability, appropriateness of the approach, and suitability for use in classroom learning contexts. The validators who validated the developed learning module numbered 5 people, including 3 UNIMED mathematics education lecturers, 2 teachers from MTS Alwasliyah 16 Perbaungan.

Table 1. Recapitulation of Learning Device Validation Results by Experts

No	Objects being assessed	Average total validation value	Validation Level
1.	Learning Module	4,36	Valid
2.	Problem solving skills	4,35	Valid

Based on the data shown in Table 1, the average validity of the overall learning device is in the range of three to four. It can be ascertained that the resulting learning device is "Valid" based on the applicable validity criteria. Based on the learning implementation criteria, it can be concluded that the implementation of the learning module at the first meeting had a learning implementation level of 4.5, which is considered a high criterion, with four or less IP occurrences of less than five. In this particular Trial, the learning device had a learning implementation level of IO = 4.5, which is considered significant. As a result, the learning module has met the requirements for empirical practical knowledge. The revisions to the module development before and after the module was ready for use can be seen in table 2 below.

Table 2. Before and after module development

No	Before revision	After revision
1	The media expert validator suggested improvements to the title and cover's visual appearance to make it more communicative and engaging. The module title was clarified to: "Learning Module for Two-Variable Linear Equation Systems Based on a Metacognitive Approach for Grade VIII MTs Students." The cover design was also revised to reflect the institution's identity, educational level, and learning approach. The colors and layout of the visual elements were adjusted to be more proportional and educational.	
2	Subject matter experts and learning model experts provided input for this module to include a concept map showing the interrelationships between subtopics within the SPLDV topic. This addition aims to help students develop a systematic framework for thinking and understand the interrelationships between learning components. The researchers added a concept map to the module's opening page as an introduction to the learning content structure.	

Results of Analysis of Students' Mathematical Reasoning Ability Tests in the Trial

In the trial, the level of student mastery is reviewed from the mathematical reasoning ability using a mathematical reasoning ability test. The description of the results of the mathematical reasoning ability test is shown in table 2:

Table 2. Level of Mastery of Mathematical Reasoning Ability in the Trial

No	Interval Nilai	Trial Class	Category
		Number of students	
1	$90 \leq KPM \leq 100$	5	Very high
2	$80 \leq KPM < 90$	17	Tall
3	$70 \leq KPM < 80$	7	Enough
4	$60 \leq KPM < 70$	3	Low
5	$0 \leq KPM < 60$	0	Very Low

Based on table 2, it shows that in the trial, the results obtained were that 5 students (12.5%) had a level of mastery of mathematical problem solving skills in the very high category, 17 students (53.13%) had a level of mastery of mathematical problem solving skills in the high category, 7 students (21.88%) had a level of mastery of mathematical reasoning skills in the sufficient category, 3 students (9.38%) had a level of mastery of mathematical reasoning skills in the low category, while the level of mastery of mathematical problem solving skills in the very low category was 0 students (0%). For more details, see the following picture.

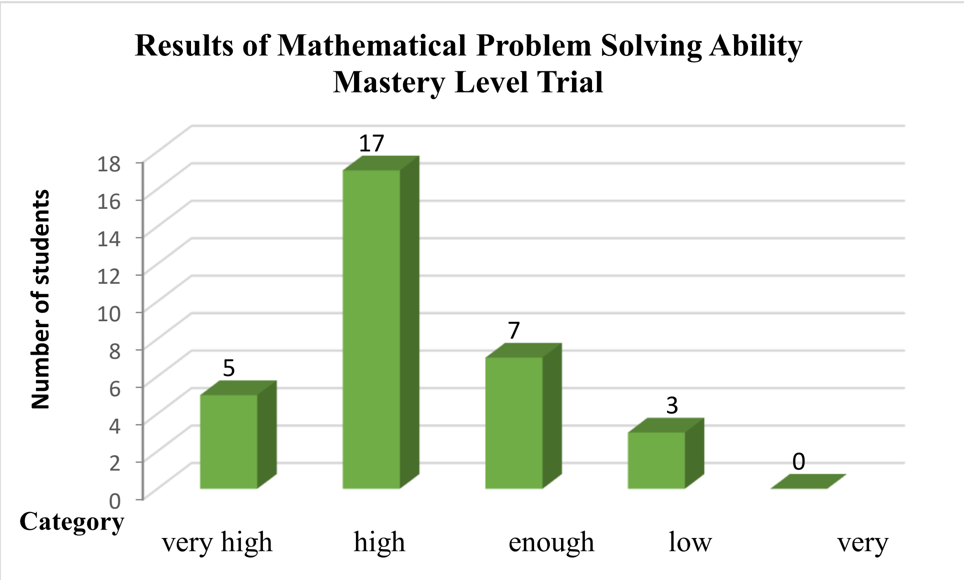

Figure 2 Diagram of Results of Problem Solving Ability Mastery Level in Trial

Based on Figure 2, it can be seen that the level of mastery of students' mathematical problem solving abilities in the most dominant trial is the high category. Based on the results of the analysis of students' mathematical problem-solving ability tests in the trial, 3 students received incomplete results. This happened because the three students were used to asking their friends for help in answering practice questions so far, so that when the mathematical problem-solving ability test was carried out and under the supervision of the teacher and researcher, the three students were unable to ask their friends for help in answering the test given. To eliminate this habit is to provide guidance to students to become more independent in completing the exercises given by the teacher in the future, thus creating new habits for students that have positive values.

Based on the pretest and posttest results of 25 students in the experimental class, the average pretest score was 46.25 and the average posttest score was 78.60. The maximum score used as a reference is 100, so the average N-Gain value can be calculated as follows.

$$N - Gain = \frac{78{,}60 - 46{,}25}{100 - 46{,}25} = \frac{32{,}35}{53{,}75} = 0{,}60$$

The calculation results show that the N-Gain value of 0.60 is classified as moderate to high, based on the N-Gain classification according to Hake (1999), namely 0.3 ≤ N-Gain < 0.7: Moderate. Thus, it can be concluded that the use of a metacognitive approach-based learning module can effectively improve students' mathematical problem-solving abilities.

Diseminate

The dissemination stage is the final phase in the 4D development model, serving as the comprehensive implementation of learning products that have gone through the design, validation, revision, and trial processes. This stage aims to test the effectiveness of the metacognitive approach-based learning module in a real-life classroom context. The module, which has been declared valid and practical, was implemented in the experimental class on the subject of Two-Variable Linear Equation Systems. This implementation process was carried out in accordance with the developed learning tools, namely the module, worksheets, and problem-solving ability tests. To assess the extent to which the module's use improved students' mathematical problem-solving abilities, a pretest was administered before the lesson began and a posttest after the lesson was completed. The pretest and posttest consisted of six descriptive questions structured based on indicators of mathematical problem-solving abilities, covering aspects of model integration, SPLDV solutions, application of solutions in context, evaluation of solutions, and conclusions. Next, an N-Gain analysis was conducted to quantitatively determine the level of improvement in student learning outcomes. In addition, students' thought processes in solving problems were analyzed to identify metacognitive thinking patterns that developed after using the module. Thus, the dissemination phase provides final data regarding the effectiveness and impact of module use in learning and serves as the basis for a final evaluation of the success of developing a metacognitive-based module.

Discussion

Materials were validated for Core Competencies (KD), conceptual correctness, and presentation sequence. This program methodically, clearly, and relevantly addresses SPLDV learning markers in students' real-life settings, according to the validator. Content validity, according to (Arikunto, 2018) is the material's suitability for educational goals and student traits. (Branch, 2009) stressed that legitimate information must help students achieve quantifiable learning goals. Media-wise, the module scored well in visuals, readability, typography, and layout. According to (Supiarmo, M. G., 2022), beautiful and simple learning media design may help pupils learn. Media specialists validated that the module's colours and visual organization helped pupils concentrate on the learning material. In metacognition, validation showed that the module incorporated planning, monitoring, assessment, and self-regulation. According to (Flavell, 2017) metacognitive theory, meaningful learning requires self-reflection. These metacognitive phases support (Zimmerman, 2018) claim that metacognitive learners solve academic issues more independently and reflectively. Students also liked the module's design. The clean structure and contrasting colours helped children read and comprehend noted that module graphics and visuals greatly impact knowledge comprehension. This module evaluated students' pedagogical and psychological characteristics, since (Majiid, 2020) advised that appropriate learning medium must match students' cognitive growth. Simple, conversational language helps pupils absorb the topic. According to great readability helps children acquire profound conceptual comprehension. Thus, actual data and applicable theory make this learning module suitable for junior high/Islamic junior high school mathematics education on Systems of Linear Equations in Two Variables.

According to experimental class statistics, the average student pretest score was 47.20 and the posttest score was 78.40. A moderate N-Gain score of 0.59 was achieved, as per (Hake, 2014) classification: $0.3 \leq$ N-Gain < 0.7 = moderate. This score rise shows that metacognitive approach-based modules considerably improve students' problem-solving skills. This supports Polya's (1973) view that problem-solving abilities rely on material mastery, introspective thinking, and strategic cognitive skills. The module's metacognitive approach lets students organize, coordinate, and apply problem-solving actions. Schraw & Dennison (1994: 460) agree that metacognitive methods help manage thinking.

D. Conclusion

The 4D development paradigm (Define, Design, construct, Disseminate) was used to construct a metacognitive learning module based on SPLDV. The defining stage analyzes needs, criteria, student traits, and material ideas. The design step creates a module strategy, assessment tools, and presenting format. The development stage comprises expert validation, progressive modifications, small and large group trials, and instrument testing. Module implementation in the experimental class evaluates efficacy and student reactions during dissemination. Developed module was valid and practical. Expert evaluations of the module's content, media, and learning methods yielded "Very Good" ratings in practically all areas.

Student response surveys in limited and wide testing demonstrated that the module was simple to grasp, entertaining, and relevant to SPLDV learning demands, proving its usefulness. Students' mathematics problem-solving skills improved using the metacognitive module. Posttest scores increased compared to pretests, and the N-Gain value was 0.52, which is moderate. Planning, monitoring, assessing, and self-reflection during problem-solving show pupils' thinking processes improving. The metacognitive approach in this program promotes autonomous and reflective learning. Students concentrate on comprehending and solving mathematics problems better when they actively manage their thoughts.

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