JURNAL
PENDIDIKAN PROFESI GURU

Jurnal Pendidikan Profesi Guru
Volume 2 (1) 1 – 11 February 2024
E-ISSN: 2985-9220
The article is published with Open Access at: https://journal.ar-raniry.ac.id/index.php/ppg/index

Development of Higher Order Thinking Skill-based Test in Mathematics Learning

Riyan Abdullah ✉, MAN 1 Pohuwato

✉ *riyanoktabdullah@gmail.com*

Abstract: Human thinking abilities in the world of education are generally categorized into two parts, namely the ability to think critically and the ability to think creatively, both of which are included in high-level thinking abilities. This research aims to develop a Higher Order Thinking Skill-based question instrument in mathematics learning. The method involves development studies using Tessmer's Formative Research Design model. This research involved experts from academics and mathematics practitioners as well as class X Madrasah Aliyah Negeri 1 Pohuwato. Data was obtained from the description test and analyzed to measure the validity, reliability, level of difficulty, and distinguishing power of the instrument. The results showed that of the 60 class further to poor higher level thinking abilities. Even though there are no students with very good high-level thinking abilities, the average high-level thinking ability of all class X students at Madrasah Aliyah Negeri 1 Pohuwato is 57.38, indicating that the test instrument is effective. The Higher Order Thinking Skills description test questions that were tested had high validity and reliability, as well as a good level of difficulty and differentiating ability of the questions, making this test instrument suitable for evaluating students' higher order thinking abilities.

Keywords: higher order thinking skills; mathematics learning; tests

Received 14 January 2024; **Accepted** 2 February 2024; **Published** 29 February 2024

Citation: Abdullah, R. (2024). Development of Higher Order Thinking Skill-based Test in Mathematics Learning. *Jurnal Pendidikan Profesi Guru*, *2*(1), 1 – 11.

Published by Program Studi Pendidikan Profesi Guru Fakultas Tarbiyah dan Keguruan Universitas Islam Negeri Ar-Raniry Banda Aceh.

INTRODUCTION

Thinking is a basic human activity, helps understand and solve problems, and is an indicator of brain function. Thinking abilities are divided into two categories in education: critical and creative thinking, both of which aim at solving problems in everyday life. Critical thinking is important because the demands of the times and technology require the ability to search, sort and use information critically so as not to make mistakes. In addition, individuals are always faced with various choices and problems, requiring attitudes and critical thinking skills in responding to conflict (Lubis, 2019).

One way to support students to think is by having literacy competencies. Literacy is one of the fundamental aspects of human life that has a significant impact on individual development, education and society (Dasopang et al., 2023). According to UNESCO, literacy refers to an individual's ability to read, write, interpret and use written or spoken language to communicate and understand information. In Indonesia, where Islamic

religious education has a central role, literacy is also very important in understanding and interpreting Islamic religious teachings, such as the Koran and hadith (Anhar et al., 2023).

Madrasas, as Islamic educational institutions, have a big responsibility in developing students' literacy competencies. Literacy in madrasah includes not only understanding religious texts, but also the ability to read and write well in the national language and critical thinking skills. However, various challenges stand in the way of strengthening literacy competencies in madrasas, including limited access to adequate reading materials, lack of teacher training in literacy, and too much focus on teaching religious texts.

The importance of critical thinking is also related to the preparation of the 21st century generation in facing the complexities of the modern era. Education plays an important role in training students' thinking abilities, especially through learning mathematics. Although some math materials may not seem relevant in everyday life, they provide opportunities for students to practice higher order thinking skills (HOTS). Mathematics learning can create unfamiliar situations, encourage the use of prior knowledge, mathematical reasoning, and flexible cognitive strategies, and provide opportunities for generalization, proof, and evaluation (Lubis et al., 2021).

Teachers have a key role in developing students' higher-order thinking abilities. Teachers must understand and master the material and have the latest ideas and ideas to train students according to their subject area. The Republic of Indonesia Law stipulates that teachers are professional educators with the necessary academic qualifications and competencies, including pedagogical, personal, social and professional competencies. However, Indonesia faces challenges in teaching students higher-order thinking skills. The results of international studies such as PISA show that Indonesia's competitiveness, especially in mathematics, is still low, and students are poorly trained in solving HOTS questions. Educational evaluations tend to test lower level thinking abilities and do not train students' higher order thinking skills (Lubis & Dasopang, 2021).

HOTS, an abbreviation for Higher Order Thinking Skills, refers to higher-order thinking abilities. According to various experts, HOTS involves the ability to synthesize, generalize, explain, hypothesize, and conclude. Ministry of Education and Culture (2018) states that HOTS involves specific learning situations, intelligence influenced by the environment, multidimensional understanding, and high-level thinking skills such as reasoning and analysis. This concept was first proposed by American psychologist, Benjamin Bloom, in his work "Taxonomy of Educational Objectives", which emphasized the importance of developing students' cognitive and thinking skills. Bloom (1956) explained that the cognitive domain is related to remembering, recognizing knowledge, and developing students' intellectual abilities and skills.

Research relevant to this topic includes two studies. First, research by Prasetyani et al. (2016) at Sriwijaya University discussed students' high-level thinking abilities in problem-based mathematics learning at SMA Negeri 18 Palembang. The results of the research show that some students have sufficient high-level thinking abilities, with the highest percentage in the analyzing indicator. Second, the study by Setiawan et al. (2014) at the University of Jember explored the relationship between mathematics questions in the PISA exam and students' mathematical literacy and higher order thinking skills. The results show that the PISA questions test students' higher-order thinking abilities up to cognitive level C4-C6. These two studies have similarities with this research in the context of exploring higher order thinking abilities (HOTS). The difference with this research is that this research aims to create a HOTS question instrument for class X mathematics subjects with standard questions that pass good test questions. Through this research, researchers are trying to overcome the problem of low high-level thinking abilities of students at MAN 1 Pohuwato. It is hoped that this research can help improve students' high-level thinking abilities, create evaluation instruments that suit students' psychological needs, and make a positive contribution to the development of education in Indonesia.

METHODS

This research was conducted at Madrasah Aliyah Negeri 1 Pohuwato by complying with a number of certain criteria. This research took place in the Odd Semester of the 2022/2023 Academic Year with the material: Systems of linear equations with three variables. The research method applied is Development Research, or Research and Development (R & D). Sugiyono (2015) explains that the Research and Development method is used to create special products and test their effectiveness. In the context of this research, test instrument development was carried out to create a test of higher order thinking abilities (HOTS). The research subjects were class X students with a sample of class X/1 to X/3 totaling 60 people.

The research design that researchers use in this research is the formative research type development model by Tessmer (1993). In general, this design model has four stages, namely the preliminary stage (preparatory analysis), the self-evaluation stage (test design), the prototyping stage (test improvement), and the field test stage (field trials). The process of developing test instruments using the formative research model by Tessmer involves several stages. The first stage, namely the Preliminary Stage, involves collecting references and preparing for collaboration with schools, including determining research locations and trial subjects. Next, the Self Evaluation Stage involves curriculum analysis, student analysis, and material analysis to design high-level thinking ability test instruments. The test instrument design, including the question grid and answer key, is produced in this stage. The third stage, Prototyping, involves product evaluation through trials with experts (Expert Review), individual students (One-to-one), and small groups (Small Group). Feedback from these trials was used to revise the test instrument design, resulting in prototypes II and III. The final stage, namely the Field Test Stage, involves field trials with class X students based on the revised test instruments. Comments, suggestions, and trial results from the field test are used as a basis for final adjustments to the test instrument design. This process ensures that the test instruments developed are able to measure students' mathematical connection abilities in accordance with the criteria established in this research.

The data collection technique uses test instruments in the form of HOTS questions. Data analysis of student test results includes firstly the percentage of student test results in the form of high, medium and low level ability classifications. Then test the HOTS questions, including testing the validity and reliability of the test, testing the level of difficulty, and testing the differentiating power of HOTS questions.

RESULTS

Data from the results of the high-level thinking ability test carried out by 60 students were seen based on the final score. Then the data is analyzed, processed and converted into qualitative data to determine students' high-level thinking abilities. The test results are contained in table 1. Then the question criteria and test results are contained in tables 2, 3, 4, and 5.

TABLE 1. HOTS Test Result Score Data for SPLTV Material

Student grade data	*Frequency*	*%*	*Criteria*
76 ≤ x ≤ 100	*0*	*0*	*Veri good*
51 ≤ x ≤ 76	*32*	*53*	*Good*
26 ≤ x ≤ 50	*25*	*42*	*Sufficient*

0 ≤ nilai ≤ 25	*3*	*5*	*Bad*
Jumlah siswa	*60*	*100*	
Rata-rata nilai	*57,38*		

Based on the data above, it can be concluded that the 60 class X students of Madrasah Aliyah Negeri 1 Pohuwato show variations in high-level thinking abilities. Of the total test subjects, 32 students (53%) had good high-level thinking abilities, 25 students (42%) had sufficient high-level thinking abilities. However, there are 2 students (5%) who still need more practice because their high-level thinking skills are not good. Even though there are no students who have reached the highest criteria, namely very good in high-level thinking abilities, the average high-level thinking ability of class X students is 57.38. This average falls within good criteria, indicating that the test instrument is effective for measuring students' higher-level thinking abilities.

TABLE 2. Construction Validity Test Results Data

Number	***Validator 1***	***Validator 2***	***Validator 3***	***Li***
1	*4*	*4*	*4*	*4*
2	*4*	*4*	*5*	*4,33*
3	*4*	*4*	*4*	*4*
4	*4*	*4*	*4*	*4*
5	*4*	*4*	*4*	*4*

From the results of expert validation, it can be concluded that all question items, starting from question 1 to question 5, have high validity values. Even though the question instrument in the prototype is considered valid, it still requires several minor revisions or improvements before it can be used more widely.

TABLE 3. Empirical Validity Test Results Data

Number	***r***	***Criteria***
1	*0,737*	*Valid*
2	*0,317*	*Valid*
3	*0,603*	*Valid*
4	*0,789*	*Valid*
5	*0,517*	*Valid*

Furthermore, the validity test of the question items was carried out based on the results of field trials involving class X students of Madrasah Aliyah Negeri 1 Pohuwato. Analysis using the Pearson product moment correlation formula shows the following results: for item 1, the calculated r value (0.737) is higher than rtable (0.25), so it can be concluded that item 1 is valid. For question item number 2, rcount (0.317) also exceeds rtable (0.25), indicating the validity of question item 2. Likewise with question item number 3, the rcount value (0.603) which is greater than rtable (0.25) shows its validity. Question number 4 is also valid with rcount (0.789) exceeding rtable (0.25).

Finally, for question item number 5, rcount (0.517) is also higher than rtable (0.25), confirming the validity of this question item. Thus, this question instrument can be used as a tool to measure students' high-level thinking abilities.

TABLE 4. Difficulty Level Test Results Data

Number	*Difficulty Level*	*Criteria*
1	*0,831*	*Easy*
2	*0,503*	*Medium*
3	*0,598*	*Medium*
4	*0,484*	*Medium*
5	*0,3*	*Difficult*

According to standards, a question is considered good if it is neither too difficult nor too easy. The results of the analysis show that item number 1 has a low level of difficulty (0.831), while item number 2 has a medium level of difficulty (0.503). Questions number 3 and number 4 also have a medium level of difficulty with values of 0.598 and 0.484 respectively. However, question number 5 is considered difficult with a difficulty level of 0.3. From these results, it can be concluded that question items number 2, number 3, and number 4 are good questions for measuring students' high-level thinking abilities.

TABLE 5. Discriminating Power Test Result Data

Number	*DP*	*Criteria*
1	*0,204*	*Sufficient*
2	*0,102*	*Bad*
3	*0,217*	*Sufficient*
4	*0,331*	*Good*
5	*0,168*	*Bad*

The next step after testing the validity, reliability and difficulty level of the questions is to test the differentiating power of each item on the high-level thinking ability test instrument. This test aims to assess the extent to which the questions are able to separate students who have a good cognitive classification from students who have a poor or weak cognitive classification. The results of the analysis of the differentiating power test from the high-level thinking ability test instrument show that for item number 1, the differentiating power is sufficient with a value of 0.204. For item number 2, the discriminating power is not good with a value of 0.102. Likewise, question number 3 has poor differentiating power with a value of 0.217. However, for item number 4, the discriminating power is good with a value of 0.331. Finally, item number 5 has poor differentiating power with a value of 0.168.

TABLE 6. Reliability Test Results Data

Number	**r11**	**Criteria**
1	0,96	Very high
2	0,925	Very high
3	0,945	Very high

4	0,933	Very high
5	0,901	Very high

After conducting an empirical validity analysis using the product moment correlation formula, test of difficulty level of questions, and power difference test, the test instrument for high level thinking abilities of class Trustworthiness was tested (reliability test) using the Alpha Cronbach formula. The reliability test results show that the test instrument as a whole is reliable, with a very high level of reliability. For item number 1, the reliability value (r11) is 0.96, indicating very high reliability criteria. Likewise for question number 2, the reliability value is 0.925, for question number 3 the reliability value is 0.945, for question number 4 the reliability value is 0.933, and for question number 5 the reliability value is 0.901, all of which show very high reliability criteria. Thus, it can be concluded that this test instrument can be trusted as a data collection tool to measure the high-level thinking abilities of class X students at Madrasah Aliyah Negeri 1 Pohuwato.

DISCUSSION

History records that the term Higher Order Thinking Skills (HOTS) was first introduced by American psychologist, Benjamin Samuel Bloom, through his famous work, "Taxonomy of Educational Objectives". In his book, Bloom details the levels of thinking and explains that education includes three main aspects: cognitive, affective, and psychomotor. Bloom's Taxonomy is the basis for understanding and developing higher-order thinking abilities
According to several experts, Higher Order Thinking Skills refer to the ability to combine facts and ideas, synthesize, generalize, explain, make hypotheses, or conclude (Newman and Wehlage, 2013).

HOTS also includes the ability to use thinking to solve problems (Onosko & Newmann, 1994). Resnick (1987) states that HOTS involves complex thinking processes such as describing material, making conclusions, building representations, analyzing, and forming relationships by involving basic mental activities. This ability involves the critical ability to evaluate information, draw conclusions, and make generalizations.

According to the Ministry of Education and Culture (Kemendikbud, 2018), HOTS is triggered by four conditions. First, certain learning situations require specific learning strategies that cannot be used in other learning situations. Second, intelligence is no longer considered a fixed ability, but rather as knowledge that is influenced by various factors including the learning environment, strategies, and learning awareness. Third, understanding of views has shifted from unidimensional, linear, hierarchical, or spiral towards multidimensional and interactive understanding. Fourth, specific higher order thinking skills such as reasoning, analysis, problem solving, as well as critical and creative thinking skills are also involved. In this research, after going through the stages of developing the questions and testing the suitability of the questions, the HOTS question format for the SPLTV material was obtained, namely:

Number	Questions
1	A coffee powder seller mixes three types of coffee. The first coffee mixture consisted of 6 grams of type A, 3 grams of type B and 1 gram of type C, which was sold for IDR. 3,520.00. The second coffee mixture consists of 3 grams of type B, and 1 gram of type C is sold for IDR. 1,180.00. The third mixture consists of 2 grams of type B and 8 grams of type C, sold for Rp. 2,400.00. From the data above, which type of coffee is the most expensive?
2	Three carpenters Irvan, Fiqi, and Udin working together were able to complete a cupboard in 4 days. Irvan and Fiqi's experience was that they had worked on a cupboard with the same model and size and finished it in 6 days. The three of them had made a similar cupboard for 1 day, after that Fiqi and Udin had other jobs suddenly.

	Irvan needed an additional 6 days to complete the cupboard. How long does it take for each craftsman to work on the cupboard alone?
3	A t-shirt convection factory has 3 machines A, B, and C. If all three machines work, 6000 t-shirts will be produced in one week. If only machines A and B work, then 4300 t-shirts will be produced in a week. If only machines A and C work, then 3900 shirts can be produced in one week. The total number of t-shirts produced by each machine in one week is?
4	Tuti, a cake maker, received an offer from a cake shop to make a package of cakes consisting of 20 pancakes and 30 panada cakes. Tuti is assisted by her two younger siblings, Fani and Leni. If Tuti and Fani make these cakes, they are usually finished within 2 hours. If Tuti works with Leni, it can be completed in 3 hours. Meanwhile, if Fani and Leni work together, they can complete the work in 4 hours. How many packages of cakes can Tuti and her siblings make if they work together in 12 hours?
5	A sandal factory sells 320 pairs of sandals to stores A, B, and C in the first month. Shop A bought 1 pair of sandals for IDR 25,000.00. Shop B bought 1 pair of sandals for IDR 15,000.00 and shop C bought 1 pair of sandals for IDR 20,000.00. Shop B managed to sell 4/5 times the number of sandals sold by shop A. The company's revenue for that month reached IDR 6,540,000. In the following month, demand for sandals by each shop increased by 50% from the previous month's demand and so on. To increase the selling power of each shop, the company gives bonuses to shops that successfully sell sandals, with the condition that for every 50 pairs of sandals, the shop will give a bonus of 5% of the price of the sandals purchased. The bonus that the company will issue if the sandal shop can fulfill the above requirements for 3 months is?

Question number 1 can be categorized as a Higher Order Thinking Skills question because it requires in-depth understanding and application of complex mathematical knowledge to solve it. (Silvia et al., 2023). To answer this question, first of all, problem solving requires an understanding of proportions and linear equations, as well as the ability to identify the relationship between quantity and price.

In solving this problem, we need to create a system of linear equations based on the coffee content and price for each blend. After that, we must use the elimination or substitution method to find the value of each type of coffee. This process involves critical analysis of data and the ability to solve systems of linear equations, which are high-level mathematical skills (Hazrullah & Lubis, 2023).

In addition, this question invites students to understand the concept of relative value and identify solutions to systems of linear equations. By combining basic mathematical knowledge and complex problem solving skills, students are challenged to think critically, analyze, and make decisions based on a deep understanding of mathematical concepts. Therefore, this question requires high-level thinking skills and is a real example of a HOTS question. The questions above can be categorized as HOTS questions because they require students to solve complex problems and require high levels of analytical and logical thinking (Lubis & Dasopang, 2020). Students not only need to add numbers or remember formulas, but also need to understand complex situations, identify patterns, and apply their knowledge to find solutions.

For question number 2, students need to elaborate on the information provided, understanding the relationship between the time needed by carpenters when working together and when working alone. They need to use their knowledge of mathematics and logic to construct equations or mathematical models that represent the situation. Students also need to identify the variables involved, such as the time required by each carpenter when working alone, the time required when working together, and the additional time required by Irvan when working alone (Lubis & Wangid, 2019).

After constructing a mathematical equation or model, students need to solve the equation to find the value of the time required by each carpenter when working alone. In this process, students need to apply mathematical knowledge, such as the concept of linear equations, and perform analytical steps to arrive at the correct answer. By requiring analytical thinking, complex problem solving, and the application of mathematical

knowledge in real contexts, this question can develop students' high-level thinking skills, so it is included in the HOTS question category.

Question number 3 can be categorized as a HOTS (Higher Order Thinking Skills) question because it requires high analytical thinking to find a solution. Students not only need to add numbers, but also understand the complex relationship between working machines and t-shirt production.

Next, students need to use mathematical knowledge about systems of linear equations. They must understand that t-shirt production can be represented in the form of a system of linear equations with three variables (machines A, B, and C) and three equations. Next, students need to identify the variables involved, namely the number of t-shirts produced by each machine, and construct a system of linear equations that corresponds to the information given in the problem.

After constructing a system of equations, students must use knowledge of methods for solving systems of linear equations, such as substitution or elimination methods, to find the value of the variable (number of t-shirts) for each machine. This process involves deep analytical thinking and the ability to apply mathematical concepts to real contexts.

By requiring an understanding of complex mathematical concepts, analysis of real situations, and application of methods for solving systems of linear equations, this question challenges students to think at a higher level, so it can be categorized as a HOTS question. Question number 4 can be categorized as a HOTS question because it requires analytical thinking and the application of complex mathematical concepts to solve it. Students not only need to count the number of cakes in each package, but also understand the relationship between the number of cakes, work time, and various combinations between Tuti, Fani, and Leni. In solving this problem, students need to understand mathematical concepts related to work rate. They must understand that work rate is the quotient of the amount of work done by the time required to complete it. In the context of this question, students must identify the variables involved, namely the amount of work (pancakes and panadas) and the time required to complete it.

After identifying the variables, students must use knowledge of systems of linear equations with three variables (pancakes, panadas, and time) to construct a system of equations that fits the information given in the problem. This process involves deep analytical thinking and the ability to apply mathematical concepts to real contexts.

Next, students must use methods for solving systems of linear equations, such as the substitution or elimination method, to find the variable values (the number of pancakes and panada cakes) and the time needed to complete the work within 12 hours. By requiring an understanding of complex mathematical concepts, analysis of real situations, and application of methods for solving systems of linear equations, this question challenges students to think at a higher level, so it can be categorized as a HOTS question.

Finally, question number 5 can be categorized as a HOTS (Higher Order Thinking Skills) question because it involves understanding complex mathematical concepts and requires high level thinking to solve it. Students are not only asked to carry out simple arithmetic calculations, but also have to understand the concept of calculating prices, income, bonuses, and sales percentage increases from month to month.

First, students must understand the information on sandal sales to each store in the first month, calculate the total income from these sales, and then understand the 50% increase in demand for sandals in the following month. Next, students must understand the concept of bonuses given to shops based on the number of pairs of sandals sold. This involves calculating a bonus of 5% of the price of the sandals, which is given for every multiple of 50 pairs of sandals. Students need to understand when and how much bonuses are given to each store. Apart from that, students must also understand that increasing sales in the following month will have an impact on income and bonuses given by the company. Thus, students are expected to be able to combine knowledge about the

concepts of percentages, bonuses, and sales to calculate the total bonuses that will be issued by the company for 3 months.

Solving this problem requires in-depth analytical thinking, the ability to apply various mathematical concepts simultaneously, and a deep understanding of the sales-based bonus mechanism. Therefore, this question triggers high-level thinking and can be categorized as a HOTS question.

The five HOTS questions above can strengthen students' literacy competencies in madrasas because they encourage students to develop various literacy skills, including reading, understanding, analyzing, interpreting and presenting information effectively. Several reasons why these questions can improve students' literacy competence in madrasas include (1) Encouraging Understanding of Complex Content, because these questions involve complex mathematical concepts and require in-depth understanding of these topics. Students need to read and understand the information provided, and apply it in real situations. (2) Improve Reasoning and Analysis Skills, because students must be able to analyze information, identify patterns, and draw logical conclusions from the data provided. This involves the ability to understand the context of the problem and apply logical reasoning in solving problems. (3) Developing Critical Abilities, because students are invited to think critically in solving these problems. They must be able to assess relevant information, make assumptions, and consider the implications of decisions taken. (4) Involves problem solving, because these questions are problems that require systematic problem solving. Students need to plan an effective approach to solving the problem, identify the necessary steps, and find the right solution. (5) Requires Presentation of Results, because the question involves the presentation of results in written form or clear mathematical calculations. Students must be able to present their answers in a way that is systematic and easy for readers to understand. (6) Encourage Collaboration and Discussion, as these questions can also be used as a basis for group discussions or collaborative projects. Students can discuss different approaches, share ideas, and work together to solve these problems.

By involving students in solving complex mathematical problems, the HOTS questions above not only develop their mathematical skills but also increase their literacy in reading, understanding, and presenting information in a systematic and logical way. Therefore, the HOTS questions created by researchers can significantly strengthen students' literacy competencies in madrasas.

CONCLUSION

The research results show that the test instrument developed meets good quality criteria for measuring high-level thinking abilities. This test instrument has been proven to be valid, reliable, has a balanced level of difficulty (neither too easy nor too difficult), and has adequate differentiating power. As a final result, this research produced 5 quality final prototype question products. For scientific reasons, the five HOTS questions are considered to be a means of increasing students' literacy competence in madrasas.

REFERENCES

1. Abbas, Nurhayati. (2002). *Pengembangan Perangkat Pembelajaran Matematika Berorientasi Model Pembelajaran Terbalik (Reciprocal Teaching) di SMU*. Gorontalo: IKIP Negeri Gorontalo.
2. Anderson, Lorin dan Krathwohl, David. (2001). *A Taxonomy for Learning, Teaching and Assesing ; A revision of Bloom's Taxonomy Of Education Objectives*. New York : Addison Wesley Lonman Inc.
3. Anhar, Dasopang, M. D., Lubis, A. H., Pane, A., Nijar, A., & Harahap, I. (2023). How do the Concept Design and Pancasila Study Integrate Islamic Vision and Nationality Towards

Indonesian Moslem in Millennium Era. *2nd Paris Van Java International Seminar on Health, Economics, Social Science and Humanities (PVJ-ISHESSH 2021)*, 116–124. https://doi.org/https://doi.org/10.18502/kss.v8i4.12889.
4. Arikunto, Suharsimi. (2012). *Dasar-dasar Evaluasi Pendidikan*. Jakarta : Bumi Aksara.
5. Arifin, Zainal. (2013). *Evaluasi Pembelajaran*, Cet V. Bandung : PT Remaja Rosdakarya
6. Aris, Kartikasari dan Djamilah Bondan. (2015) . *Pengembangan Perangkat Pembelajaran Matematika Berbasis Howard Garner's Multiple Intelligences Berorientasi Pada Kemampuan Koneksi Matematis Siswa Kelas VIII SMP*. Jurnal , h.1034.
7. Asep, Jihad. dan Abdul, Haris. (2012). *Evaluasi Pembelajaran. Yogyakarta* : Multi Pressindo.
8. Bloom, Benjamin Samuel., (Ed). (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goal. Handbook I: Cognitive Domain*. New York: Longman.
9. Dasopang, M. D., Nasution, I. F. A., & Lubis, A. H. (2023). The Role of Religious and Cultural Education as A Resolution of Radicalism Conflict in Sibolga Community. *HTS Theological Studies*, *79*(1), 1–7.
10. Hamid, Abdul. (2019). *Penyusunan Tes Tertulis (Paper and Pencil Test)*. Jawa Timur : Uwais Inspirasi Indonesia.
11. Hazrullah, & Lubis, A. H. (2023). The Interactive Multimedia Based on Theo-Centric Approach as Learning Media during the Covid-19 Pandemic. *JPI (Jurnal Pendidikan Indonesia)*, *12*(2), 210–222.
12. Kasturi,dkk. (2015). *Pengembangan Perangkat Pembelajaran Problem Posing Berorientasi Penerapan HOTS pada Materi Kesebangunan Kelas IX*, Jurnal. h. 18
13. Kementerian Pendidikan dan Kebudayan. (2018). *Buku Pegangan Pembelajaran Berorientasi pada Keterampilan Berpikir Tingkat Tinggi*. Jakarta : Tim Desain Grafis
14. Lubis, A. H. (2019). Upaya Peningkatan Hasil Belajar Siswa Sekolah Dasar melalui Model Cooperative Learning Tipe Numered Heads Together. *FORUM PAEDAGOGIK*, *11*(2), 127–143.
15. Lubis, A. H., & Dasopang, M. D. (2020). Pengembangan Buku Cerita Bergambar Berbasis Augmented Reality untuk Mengakomodasi Generasi Z. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *5*(6), 780–791.
16. Lubis, A. H., & Dasopang, M. D. (2021). Online Learning during the Covid-19 Pandemic: How is It Implemented in Elementary Schools? *Premiere Educandum: Jurnal Pendidikan Dasar Dan Pembelajaran*, *11*(1), 120–134.
17. Lubis, A. H., & Wangid, M. N. (2019). Augmented Reality-assisted Pictorial Storybook: Media to Enhance Discipline Character of Primary School Students. *Mimbar Sekolah Dasar*, *6*(1), 11–20. https://doi.org/10.17509/mimbar-sd.v6i1.16415
18. Lubis, A. H., Yusup, F., Dasopang, M. D., & Januariyansah, S. (2021). Effectivity of Interactive Multimedia with Theocentric Approach to the Analytical Thinking Skills of Elementary School Students in Science Learning. *Premiere Educandum: Jurnal Pendidikan Dasar Dan Pembelajaran*, *11*(2), 215–226.
19. Maulana. (2017). *Konsep Dasar Matematika dan Pengembangan Kemampuan Berpikir Kritis-Kreatif*. Sumedang: UPI Sumedang Press.
20. Onosko & Newmann. (1994). *Creating More Thoughtful Learning Environment. In J. Mangieri, & C. C. Blocks (Eds.), Creating Powerful Thinking in Teachers and Students Diverse Perspectives* (pp. 27-49). Forth Worth: Harcourt Brace College PublishersCohen, Louis, et al. 2012. Research Methods in Education. Great Britain: TJ International Ltd, Padstow, Cornwall.

21. Ridwan. (2009). *Metode dan teknik menyusun tesis*. Bandung: Alfabeta.
22. Safithry, Esty Aryani. (2018). *Asesmen Teknik Tes dan Non Tes*. Malang : CV IRDH.
23. Silvia, I., Oviana, W., & Lubis, A. H. (2023). Improving Learning Outcomes of Elementary School Students by Using Mind Mapping Models with Audio Visual Media: A Classroom Action Research. *Jurnal Pendidikan Profesi Guru*, *1*(2), 41–53.
24. Sudjana, N. (2009). *Penilaian Proses Hasil Belajar Mengajar*. Bandung : PT Remaja Rodakarya.
25. Sudjiono, Anas. (2003). *Pengantar Evaluasi Pendidikan*. Jakarta : PT Raja Grafindo Persada.
26. Sugiyono. (2016). *Metode Penelitian Pendidikan*. Bandung : Alfabeta.
27. Swarto. (2003). *Pengembangan Tes Diagnostik dalam Pembelajaran*. Yogyakarta : Pustaka Pelajar.
28. Tessmer, Martin. (1993). *Planning and conducting formative evaluations: Improving the quality of education and training*. London: Kogan.
29. Uno, Hamzah & Satria, Koni. (2014). *Assessment Pembelajaran. Jakarta : Bumi Aksara*
30. Utari, Retno. (2011). *Taksonomi Bloom, Apa dan Bagaimana Cara Menggunakannya ?* Jakarta : Pusdiklat KNPK.
31. Wicha, Dafik, dkk. (2012). *Pengembangan Perangkat Pembelajaran Matematika Berbasis Karakter Pada Pembelajaran Quantum Pokok Bahasan Persamaan Garis Lurus SMP Kelas VIII*, Kadikma 3 No.3. h.161-164.