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THE DEVELOPMENT OF CONTEXTUAL APPROACH TEACHING MATERIALS TO IMPROVE STUDENTS' HIGHER ORDER THINKING SKILLS (HOTS)

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ABSTRACT

This research was motivated by the low results of the Higher Order Thinking Skill (HOTS) abilities of elementary school (SD) students. The low ability of students' Higher Order Thinking Skills is caused by the learning process carried out by the teacher not being in accordance with the learning characteristics related to learning models or approaches in solving problems related to everyday life. The aim of this research is to develop mathematics learning teaching materials, namely using student worksheets to improve the Higher Order Thinking Skills (HOTS) of class VII middle school students that are valid, practical and effective. This research is development research using 4D design. Data collection instruments used validation questionnaires, student response questionnaires, teacher response questionnaires and Higher Order Thinking Skill (HOTS) test instruments. Next, the data analysis technique is by finding the average assessment score and then converting it to the categories previously determined by the researcher. The results of the research stated that the students' worksheet learning teaching materials got an average score of 82 in the very valid category, and the practicality test of the students' aspects of Higher Order Thinking Skills got a score of 81.00 in the practical category. Then, testing the effectiveness of the Higher Order Thinking Skill, there was an increase of 13%, initially getting a score of 69.00 in the initial ability and increasing to 82.00 in the final score.

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INTRODUCTION

Development and change over time cannot be denied, everyone needs adjustments both to themselves and to their environment. Including people involved in the social, economic and educational fields, one of whom is a teacher. Education is not just a process of transferring knowledge from educators to students. Zamroni (2011) believes that education is not just

storing knowledge, but education is a process of developing all aspects of an individual, so that in the end all abilities or potential possessed by the individual can be developed completely.

One solution to overcome this is for teachers to be able to direct students so that during learning they can apply higher order thinking skills (HOTS). Regulation of the Minister of Education and Culture Number 22 of 2016 concerning content standards explains that there are 14 learning principles, some of which lead to HOTS learning. The learning principles according to Permendikub No. 22 of 2016 are in line with HOTS learning, namely: first students are equipped with knowledge by being given information, then students can find out for themselves, from a contextual approach related to meaningful learning to a learning process aimed at strengthening using a scientific approach, the teacher as the only source of learning for students becomes learning that is based on various or various learning sources, from learning that only emphasizes a single answer to learning with answers whose truth can be multidimensional, from learning that is multidimensional. interconnected or partial to learning that combines all subjects in an integrated curriculum, and from content-based learning or focusing on students' understanding of the material or cognitive to competency-based learning, namely learning that emphasizes students' basic abilities starting from the knowledge, skills stage and attitude.

Human Resources (HR) in the 21st century is required to have 3 important abilities including the ability to think critically, think creatively and solve problems (Pratiwi, 2019: 128). These three abilities are known as higher order thinking skills or HOTS (Higher Order Thinking Skills). As stated by Sani (2019: 52), the important thing that needs to be done is to prepare the younger generation with critical, creative thinking skills and skills in making decisions to solve problems. Meanwhile, Faridah (2019:2) also stated that to adapt to the 21st century, the ability to develop creativity and solve problems is needed. Critical and creative thinking is needed to solve problems, because the rapid development of knowledge and technology has resulted in the challenges and problems that humans will face in the 21st century becoming more complex (Driana and Ernawti, 2019: 110). The rapid development of knowledge and technology in the 21st century does not necessarily increase the ranking of Indonesian students in PISA and TIMSS. It was recorded that in 2015 Indonesia was ranked 64th out of 72 countries participating in PISA and ranked 45th out of 48 countries participating in TIMSS (Nugroho, 2018:11). These low results require the world of Indonesian education to prepare itself to face the rapid development of knowledge and technology in the 21st century, such as equipping students with HOTS in learning.

In fact, in the world of education, HOTS can be applied, because students' high-level thinking abilities can be trained and improved. So many countries use HOTS as an inseparable part of classroom learning (Musrikah, 2018:341). Students' ability to receive learning and the way students solve problems on different mathematics problems also make them have different higher-level thinking abilities. Considering that human nature is created uniquely from each other, the abilities that humans have are also basically diverse. Responding to this, Pratiwi (2019:128) explained that to develop HOTS-based items that are good for students, teacher quality is a very important part in this case. Teachers must have a good understanding of cognitive processes in Low Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS). Moreover, according to Widana (2017:32), teachers play a role in optimizing HOTS assessments, both in daily tests, end-of-semester assessments and school exams. This is intended to train and identify the categories of students' high-level thinking abilities.

However, a research study by Schulz & FitzPatrick (2016) found that teachers showed uncertainty about the HOTS concept and they were not prepared to teach or assess HOTS. The results of a subsequent study by Retnawati (2018) showed that teachers' knowledge about

HOTS, their ability to increase student HOTS, solve HOTS-based problems, and activities to measure student HOTS were still low. Similar findings were obtained by Driana and Ernawati (2019), elementary school teachers who participated in their research did not have a comprehensive understanding of HOTS. So there is a lack of training activities and measurement of students' high-level thinking abilities. The main problem was also found in research observations. In observations carried out at SDN 1 Padang Sambian, the Principal stated that the school is fully aware of the importance of developing students' high-level thinking skills for competitiveness. Teachers at these schools have also attended workshops or seminars regarding the development of HOTS questions and assessments, but the implementation has not been fully optimal. Remembering that daily test questions, or grade promotion assessment questions are still in the realm of C1 to C3 only, there are C4s but not many. Through the results of these observations, it can be interpreted that the category of higher level thinking abilities possessed by each student is not yet known. In a broader sense, this has an impact on students' readiness to face more complex problems in the 21st century. The absence of training activities and ability measurement has an impact on students' low abilities in the cognitive domains of analysis, evaluation and creation, this is based on a study by Yuliati and Lestari (2018). In order for students' HOTS to develop well, students need to get used to measuring through HOTS, otherwise it will cause the HOTS potential in students not to develop Arifin and Retnawati (2017:11).

An explanation by Budiarta (2018: 103) states that HOTS can be interpreted as the ability of a complex thinking process which includes breaking down material, criticizing and creating solutions to problem solving. Responding to the same thing, Thomas and Thorne (2009) define HOTS as the ability to think by making connections between facts regarding a problem. Problem solving is not just done through the process of remembering or memorizing, but requires making connections and conclusions from problems. Accompanying similar things, Annuuru, et al (2017: 137) explain that HOTS is the ability to combine facts and ideas in the process of analyzing, evaluating up to the creation stage in the form of providing an assessment of a fact that has been studied or being able to create from something that has been studied.

The process of analyzing, evaluating and creating is part of the cognitive taxonomy created by Benjamin S. Bloom in 1956. In the end it was refined again by Anderson and Krathwohl (2001) into C1-memory (remembering), C2-understanding (understanding), C3- applying, C4-analysis, C5-evaluating, and C6-creation. Tanujaya (2017:78) explains that levels one to three are low-level thinking skills or LOTS (Lower Order Thinking Skill) and levels four to six are HOTS (Higher Order Thinking Skill). So, if viewed from the cognitive realm, HOTS is the ability to analyze, evaluate and create.

However, the world of education currently still does not fully implement these learning principles, because learning carried out in schools at both primary and secondary levels currently still uses learning that contains Low Order Thinking Skills (LOTS), where learning still focuses on memorization. and simple understanding. Today's social life demands learning that is capable of higher-level thinking, contextually individuals must be able to survive in society and with increasingly complex problems, learning is needed that directs students to be able to survive in life in society.

One example of student errors in working on mathematics questions based on HOTS questions that previous researchers have made is as follows:

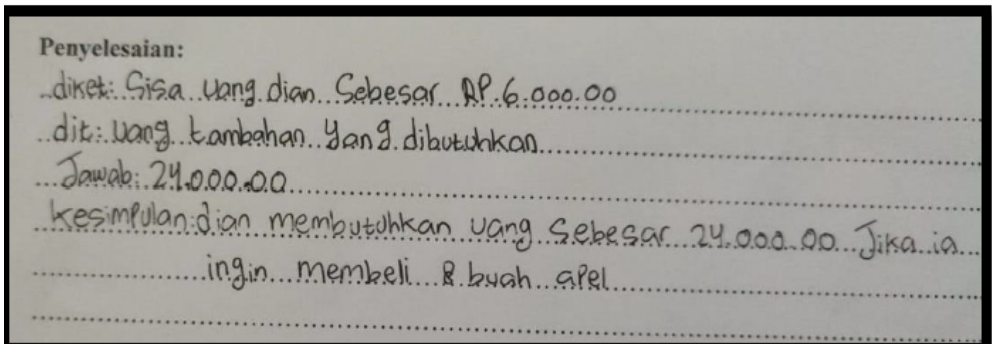


Figure 1. Errors in grouping mathematical symbols

As seen in Figure 1, students make mistakes in the factual dimension by using the cognitive process of ordering and grouping. According to (Gunawan & Paluti, 2017) understanding of labels, verbal and nonverbal symbols (such as words, numbers, signs and images) is called knowledge of facts. In mathematics, knowledge of labels and symbols is often overlooked, even though each sign has a different meaning. It can be seen that students cannot group known questions into mathematical symbols.

Based on the researcher's previous interviews with students, the subjects found it difficult to understand the facts of the problems given, resulting in difficulties in grouping them into mathematical models. The difficulties experienced are caused by students' cognitive factors. Cognitive factors include intellectual abilities and ways of understanding mathematical material (Sumargiyani et al., 2021). So this factual error occurs because students do not understand the material on Linear Equations in One Variable well.

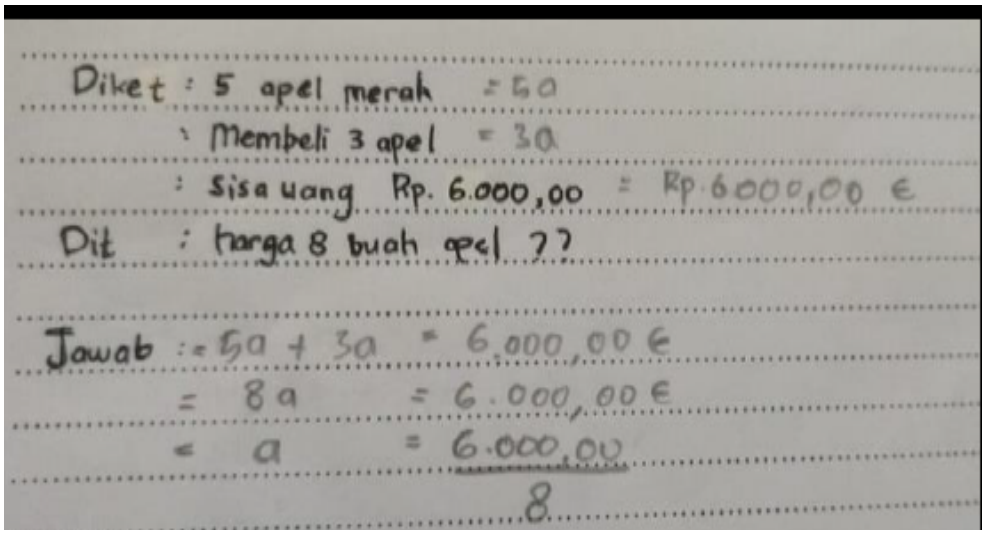


Figure 2. Errors in determining algebraic elements

Figure 2 shows that students' errors in solving HOTS questions lie in the conceptual dimension. The conceptual dimension can be understood as a definition or principle that is the basis for solving a problem (Hidayat & Aripin, 2020).

The results of the interview showed that students gave the example of an apple with variable a, but the students were not able to interpret the problem as a whole. This happens because students do not understand the material well, so students make mistakes in applying concepts, processes or interpretations. Knowledge in the conceptual dimension is very important for students to have in learning mathematics because by knowing the concepts students can analyze, interpret and plan solutions to given problems (Hidayat & Sari, 2019).

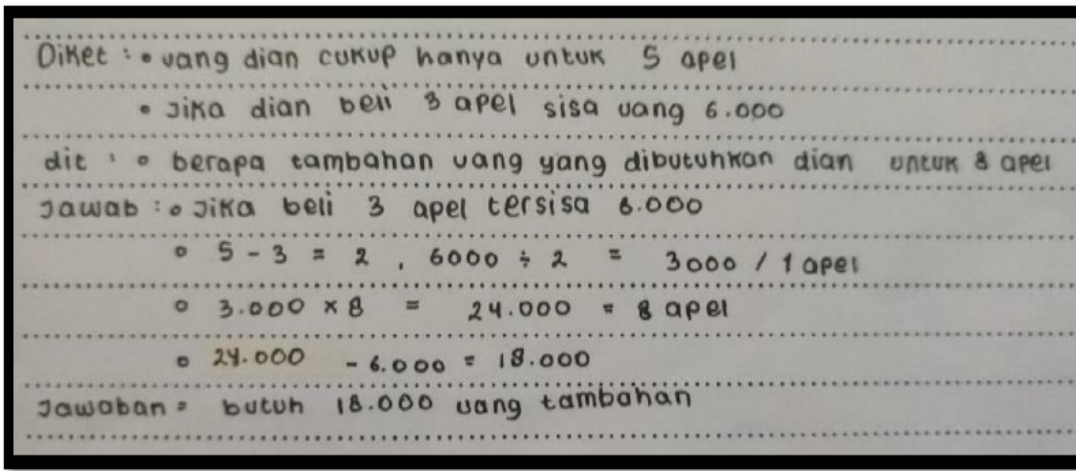


Figure 3. Errors in the procedural dimension

In solving questions, students make mistakes in the procedural dimension. In completing the HOTS question type, students have demonstrated good abilities in the factual and conceptual dimensions. However, in formulating the final solution students were not careful and made mistakes. According to (Kumalasari, 2016) procedural knowledge is knowledge about how to do something using various processes. It can be seen in Figure 3 that students made mistakes in the final calculations because they were not careful. The results of interviews with students showed that the students were not careful in subtracting the results for eight apples from the remaining money that Dian had at the beginning. This error occurs because students are not careful in understanding the meaning of the questions presented. Errors that occur in the procedural dimension are due to students' inaccuracy in understanding the questions, resulting in inaccuracies in calculations. It can be concluded that students' mistakes in working on mathematics problems are due to reading and calculating errors (Salmina, 2017).

From the problems above, one way that can be used is to direct learning to activities that contain HOTS. The National Competency Training Center (2007) in Prastowo (2012:16) explains "teaching materials are all forms of teaching tools used to assist teachers or instructors in carrying out the learning process in class, these teaching materials are in the form of written or unwritten material". Pambudhi and Retnowati (2017) concluded that through teaching materials in the form of modules and worksheets, students are able to direct students to have a nationalist character and can develop high-level thinking skills or HOTS.

Teaching materials are very important in the learning process and have an effective influence in increasing student activity and learning outcomes. Octaviani's research in 2017 stated that "the quality of elementary school students' abilities depends on the teaching materials used, thus influencing the quality of learning." Looking at this opinion, it can be concluded that teaching materials can direct learning to higher level thinking abilities. The development of teaching materials that contain HOTS needs to be developed considering the needs, demands of society today are very complex, and developments over time.

The development of teaching materials aims to make it easier for students to receive teaching materials that are in accordance with curriculum demands and indicators of learning implementation plans, considering the needs of students at school, namely teaching materials that suit students' social characteristics. environment. The development of teaching materials also helps students obtain alternative sources of teaching materials and can make it easier for teachers to carry out learning (Ministry of National Education 2008:9).

According to Ahmad (2010). According to Prastowo (2014), teaching materials are all materials that are arranged systematically, which contain competencieswhich students must master to

achieve the goals of the learning process. In agreement with this, Ilmiwan, et al (2013), stated that teaching materials contain a structured set of material, which is used as a representation of the teacher's explanation in the learning process to achieve competency standards and basic competencies. According to Dick & Gray (2015), teaching materials are a set of learning materials or substances (teaching materials) that are arranged systematically, displaying a complete figure of competencies that will be mastered by students in learning activities. Based on these opinions, it can be said that teaching materials are learning materials that are systematically prepared to be used by educators and students in the learning process, to achieve the goals of the learning process.

A teaching material is designed and written with instructional rules that will be used by educators to help and support the learning process. Educators use teaching materials as guidelines that will direct all activities in the learning process, as well as being the substance of competencies that should be taught to students. Teaching materials as an important thing (Agustina, 2018) must have characteristics that are appropriate to the level of development possessed by students.

The types of teaching materials according to Daryanto and Dwicahyono (in Nurmalia, 2020) are visual teaching materials, namely printed teaching materials such as books; listening teaching materials, such as cassettes; viewing and hearing teaching materials, such as videos and films; interactive multimedia teaching materials such as CAI (Computer Assisted Instruction), CD (Compact disk), and web (web-based learning materials). According to Suryaman (in Ruhiat, 2019), types of teaching materials include learning instructions, competencies to be achieved, content or learning materials, supporting information, exercises, work instructions, evaluations and feedback responses to evaluation results.

Various types of teaching materials can be prepared as digital teaching materials needed in the 4.0 revolution era with the support of technological advances. To overcome the complexity and unclear material during the manual, Information Technology is the solution. Wibawa (2016) stated that digital teaching materials, apart from helping educators, can also increase students' learning motivation. The application of multimedia in presenting the learning process is to increase students' motivation and activeness in carrying out the learning process (Efendi, in Safitri 2018).

The reality in the field shows that the use of digital teaching materials has been widely used in the learning process. The research conducted by Faisal, et al (2020) was to develop independent module teaching materials. The results of this research are that teachers are able to create module teaching materials using the Google Sites platform and combine them with other platforms, such as YouTube and Quizziz. Other research was also carried out by Khamidah, et al (2019), namely developing interactive digital teaching materials with a discovery learning model to improve student learning outcomes. The result is to make students more active in the learning process. Further research was carried out by Maskur, et al (2021), namely developing Android-based digital teaching materials to improve learning outcomes for students with disabilities. From the results of the studies above, unfortunately none of the teaching materials that have been developed contain teaching materials using a contextual approach to develop students' high-level thinking abilities.

The teaching materials used generally only contain theory and do not display contextual facts so that students do not understand the learning. The results of observations obtained from class VII teaching materials at MTs An Naim, Rancamanyar District, Bandung Regency on mathematics learning, found that the teaching materials used by educators were not able to develop students' abilities optimally and in a structured manner, so that in the end students were less active in learning activities. Educators have not developed teaching materials in accordance

with existing curriculum provisions and indicators. The teaching materials used at MTs An Naim do not yet refer to the objectives of developing teaching materials where the teaching materials do not have the character of discovering a concept, and students are expected to be able to apply existing concepts in everyday life, this means that students have not carried out learning activities. actively.

Based on preliminary research, it shows that the results of analysis through questionnaires at junior high schools in Bandung Regency targeting 8 educators showed that as many as 75% of educators stated that books were not developed according to students' needs so that the teaching materials used in schools were inadequate. guiding students to gain hands-on experience. 50% of educators stated that educators are aware of contextual learning that can be applied in schools. However, only 25% have implemented contextual learning in its entirety where the material provided is related to students' daily lives. In fact, 80% of educators believe that implementing contextual learning experiences difficulties due to various factors, one of which is a lack of understanding and ignorance of educators regarding contextual concepts and contextual learning steps.

In line with previous research conducted at SD Negeri 2 Sukasada, there were several problems in the use of teaching materials. These problems include the development of teaching materials which has not been carried out much by teachers. The teaching materials used are still textbooks and worksheets. Based on the results of previous interviews and observations of researchers conducted at SMA Negeri 7 Jambi City on Monday, April 3 2017, it is known that at this school students only use printed books and worksheets provided by the school as teaching materials that can be used in the learning process at school or outside school and the number is limited. It can be said that in this school the availability of teaching materials is very minimal. Apart from that, researchers also made observations at SMA Negeri 11 Jambi City and SMA Nusantara Jambi City. Observation results show that at this school students also only use printed books and worksheets as teaching materials used in studying at school and outside school hours. They also do not have independent teaching materials that they can use for studying outside school hours. The lack of teaching materials that can be used in schools is a limitation in achieving learning goals, only a small number of students have printed books, besides that the teaching materials used are less varied, causing students to tend to get bored. The lack of variation in the use of teaching materials also causes low student interest and motivation in learning. This certainly has an impact on the low learning outcomes obtained by students at the school.

In conditions where the variety and quantity of available teaching materials is still very limited, it is necessary to develop and produce teaching materials in stages by educators themselves, in groups, and/or involving other parties (internal and external), students, the community, industry, and educator managers. However, the majority of educators do not develop teaching materials for various reasons. This makes the author interested in developing teaching materials to help students learn and overcome deficiencies and limited supplies of existing teaching materials. Apart from that, it is hoped that the use of teaching materials can create a more meaningful learning experience and can help students at large to achieve their goals. learn it. One of the teaching materials that can be developed is a module.

According to Indriyanti and Susilowati (2010), the advantage of implementing modules in the learning process is that they can increase student motivation, students can find out their level of ability from the evaluation results in each module, and achieve results according to their abilities. Apart from that, the application of modules in learning can make education more effective, because learning materials are arranged according to academic levels.

Andi Prastowo (2013:106) module is a teaching material that is prepared systematically in language that is easily understood by students according to their level of knowledge and age, so that they can learn on their own (independently) with minimal help or guidance from educators.

In line with the 2013 curriculum, researchers want to develop modules, where this strategy is a new way to facilitate the learning process. Thus the contextual approach is a suitable approach to use in the learning process. Students are expected to be more active in building knowledge based on their experience and learning according to their own abilities. Pribadi (2009:161) states that the aim of a contextual approach in learning is that students have the ability to discover, understand and use the information or knowledge learned.

The various field conditions that have been stated above show that the needs and indicators of students have not been fully met, both in terms of materials and the availability of tools and learning materials that support learning. Learning activities do not yet demonstrate a meaningful and contextual learning process so that building complex knowledge is still not optimal. In general, educators are still focused on abstract problem-solving exercises and are lacking in developing high-level thinking skills or HOTS, so that students' critical and creative thinking abilities have not developed optimally, which has an impact on students' learning motivation, namely lack of enthusiasm. Students have difficulty understanding the lessons delivered by educators, students become bored in learning and some students do not have the confidence to ask questions and express opinions.

Teaching materials that can improve critical thinking skills and higher-level thinking are teaching materials that are prepared based on a contextual approach. According to Alwasilah (2014), applying a contextual approach in learning can train students to think critically and creatively in searching for and analyzing information. Meanwhile, according to Sardiman (2007), a contextual approach in learning helps educators to connect teaching materials with students' real-world situations, so that students are able to connect the knowledge they learn with contextual applications in social life and family members. .

Contextual learning is based on the philosophy of constructivism or meaningful learning. According to constructivism theory, real or real knowledge for students is something that is built by the students themselves. Students must be trained to discover something that was previously unknown, apart from that, students must also understand the problem, and be able to think critically and then construct it into real knowledge. Sardiman (2007) states that knowledge is not a set of concepts, facts, or rules that students apply, but knowledge is a set of rules that students build and then give meaning through real experience.

The contextual approach has seven components, namely constructivism, inquiry, questioning, learning community, modeling, reflection and actual assessment. The seven components of contextual learning are very synchronous and related to efforts to find solutions to strengthen students' critical thinking skills, especially in the discovery (inquiry), questioning and reflection components. Through these three components, you can produce and achieve the ability to analyze, evaluate and conclude. In addition, students can build their own understanding (constructivist) from what they have learned previously to gain interpretation skills. Through community learning and authentic assessment, students can express ideas to increase optimism, self-confidence, and train students to explain further and be responsible.

The research results of Setiawan & Hendri (2019) state that the contextual approach can improve students' critical thinking skills in algebra material. Yustina's research (2021) shows that using a contextual approach can improve students' critical thinking abilities and High Order Thinking Skills (HOTS). Based on the facts explained above, an appropriate solution is needed as an effort to meet students' needs in obtaining meaningful learning experiences and how

students can improve their critical thinking and higher-level thinking skills. The effort made is to develop teaching materials in the form of modules, where the modules are arranged based on a contextual approach. According to Setiyadi (2017), modules can be used for independent learning because they are arranged according to the age and level of knowledge of students. Therefore, the development of contextual-based LKPD teaching materials in mathematics learning is expected to be effective in improving students' critical thinking skills and High Order Thinking Skills (HOTS), especially in class VII SMP. Based on this discussion, the aim of this research is to develop mathematics learning teaching materials, namely using student worksheets to improve the Higher Order Thinking Skills (HOTS) of class VII SMP students that are valid, practical and effective.

METHOD

This research is development research. This research model uses a 4-D model. The 4-D model is a development model consisting of stages 1) defining, 2) designing, 3) developing and 4) disseminating.

According to Sugiyono (2009: 297), development research or research and development (R&D) is a basic research activity to obtain information on user needs (needs assessment), then continued with development activities to produce products and assess the effectiveness of these products. Development research consists of two words, namely research (research) and development (development). The first activity is conducting research and literature studies to produce a particular product design, and the second activity is development, namely testing the effectiveness, validating the design that has been created, so that it becomes a product that has been tested and can be used by the wider community. According to Mulyatiningsih (2012: 161), research and development aims to produce new products through the development process.

According to Puslitjaknov-Balitbang Depdiknas (2008) research and development methods contain three main components, namely 1) development model, 2) development procedures, 3) product testing. Meanwhile, according to Anik Ghufron (2007: 2), research and development is a model used to improve the quality of education and learning which can develop various learning products.

Based on the opinion above, it can be concluded that research and development (R&D) is a research model that aims to develop a product that begins with needs research and then develops to produce a product that has been tested. The results of development products include media, learning materials, and learning systems. This research uses research and development (R&D) research. Product development in this research is product development in the form of learning modules.

This research was carried out at Madrasah Tsanawiyah Bandung Regency, with the research subjects being class VII students at MTs Anaiim, totaling 13 students. There are two types of data collection instruments used in this research, namely test and non-test instruments. The test instrument used is the Higher Order Thinking Skill test to determine the effectiveness of the module being developed. Meanwhile, non-test instruments are in the form of interviews and questionnaires, namely validation questionnaires and student response questionnaires.

The results of the interviews were in the form of information regarding learning problems, while to determine the validity of the learning modules, they were validated using content, presentation and language expert questionnaires through student and teacher response questionnaires.

At the definition stage, a needs analysis is carried out in the form of student analysis, teacher analysis and curriculum analysis. At the design stage, the design stages are carried out, namely in the form of material design, layout design and module content design. At the development

stage, module development is carried out. At this stage, a validity test was carried out by experts, namely two mathematics material experts and two media experts. Furthermore, at this stage a practicality test was also carried out on the teacher and student aspects. Meanwhile, the effectiveness test was carried out to measure the HOTS abilities of junior high school students. Next, at the socialization stage, module distribution was carried out in the form of testing the validity of data collection instruments using questionnaires. The questionnaire used is a Likers scale with a value range of 1-5. The purpose of calculating the questionnaire is to get an average score. Next, the average score is converted into a value with criteria. This criterion is carried out based on the following table.

Table 1. Validation assessment score table

Score Presentation	Validity Statement
< 21%	Very invalid
21% - 40%	Invalid
41% - 60%	Fairly Valid
61% - 80%	Legitimate
81%- 100%	Very Valid

A module is said to be suitable for use if it is categorized as valid. Next, a practicality test is carried out. The Practicality Test was carried out on teachers and students using a Likert scale questionnaire of 1 to 5. The questionnaire used an average score. The average score is then converted into a value with criteria. This criterion is carried out based on the following table.

Table 2. Practicality Score Categorization

Score range	Sign	Category
90 – 100	A	Very practical
80 – 89	B	Practical
70 – 89	C	Quite practical
60 – 69	D	Not practical
<60	E	Very impractical

A module is categorized as practical to use if it gets a "B" grade. Next, an effectiveness test is carried out by measuring it using a written test instrument. The test consists of questions adapted to the HOTS indicators, namely analyzing, assessing and creating. The test results were analyzed using the N-Gain formula technique with the formula:

$$g = \frac{skor\ posttest - pretest}{skor\ maksimun - pretest}$$

The measurement results are adjusted to the following criteria values:

Table 3. Improvement Category

Limitations	Category
$g \geq 0.7$	Tall
$0.3 \leq g < 0.7$	At the moment
$g < 0.3$	Low

RESULTS AND DISCUSSION

Results

Development of learning teaching materials in the form of class VII algebra material modules to improve students' high-level thinking abilities (HOTS). The stages of development research carried out are as follows.

Define Stage (Defining)

The initial stage of this research is needing analysis. Needs analysis is carried out with the aim of finding the main basis for developing teaching materials.

(1) Student Analysis

The initial step taken at this stage is to carry out student analysis which aims to determine student characteristics by filling out student response questionnaires and reviewing literature. Based on the results of the student response questionnaire conducted by researchers, it can be concluded that students like and understand the learning process which uses contextual and interesting module teaching materials, for example bright colors, unique pictures and containing motivational words in them. The student stated that he preferred learning that used teaching materials that had been made directly by the teacher rather than having to read books. Apart from that, students also stated that they enjoyed learning by using colorful teaching materials and lots of contextual images. The results of this interview are also supported by the results of the literature review that the researcher conducted

(2) Teacher Analysis

The next step is to carry out teacher analysis which aims to find out teacher problems related to the learning module. This is done by conducting teacher interviews. Based on the results of interviews, it was concluded that teachers rarely use learning modules, this is due to teachers' lack of knowledge in creating interesting module procedures, let alone having to design them using computers, as well as a lack of training and school support. facilities for teachers to create modules that can be used. So, from the results of the analysis of students and teachers it can be concluded that during the learning process teachers have not used modules that are adapted to student development that are concrete operational in nature. Next, a curriculum analysis is carried out.

(3) Curriculum Analysis

Curriculum analysis is carried out with the aim of finding out the right material to use in module development. Teacher analysis was carried out by conducting interviews. Based on the results of the interview, the material developed with this media is KD 3.9 Explaining and calculating operations in algebraic form (addition, subtraction, multiplication and division) and KD 4.4 Solving problems that contain real concepts of operations in algebraic form. Mathematics modules with a contextual approach and containing HOTS are suitable for algebra material.

Design Stage (Designing)

The next stage is the design stage, at the KI, KD design stage, indicators and learning objectives are mapped and the content of the teaching materials is designed according to the data obtained from the definition stage. Furthermore, the teaching materials developed are designed to contain HOTS using a contextual approach and the material prepared therein contains matters related to the real world. At this stage, mathematics teaching materials were also designed using material in the form of algebra for class VII SMP.

The design stage is the stage of designing a product by processing data from interviews and analytical studies that have been carried out previously and then developing it into learning media. The design stage begins with creating a flowchart and story that will be developed to simplify the development process. A flow diagram is a chart that describes the steps and

sequence of mapping KI, KD, indicators, as well as learning objectives and material content. Next, develop the module according to the flowchart that has been created. The link to google sites can be find on this link: https://sites.google.com/view/media-pembelajaran-kesi/home.

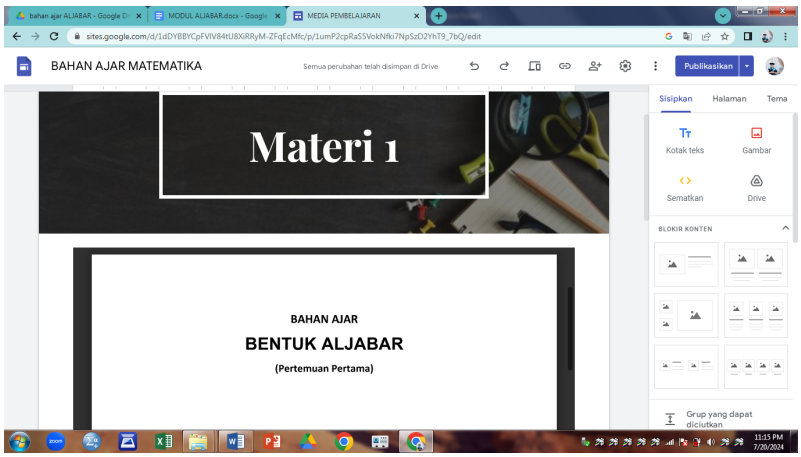
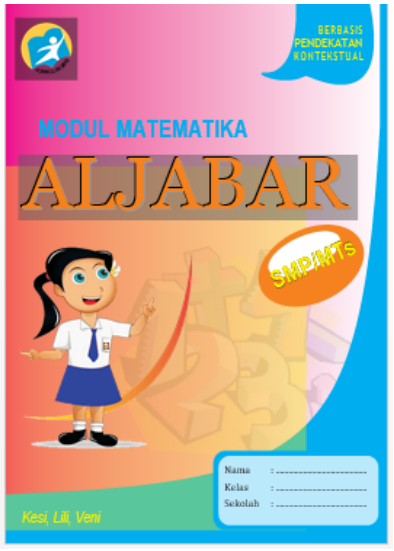


Figure 4. The display of google sites



Front Cover

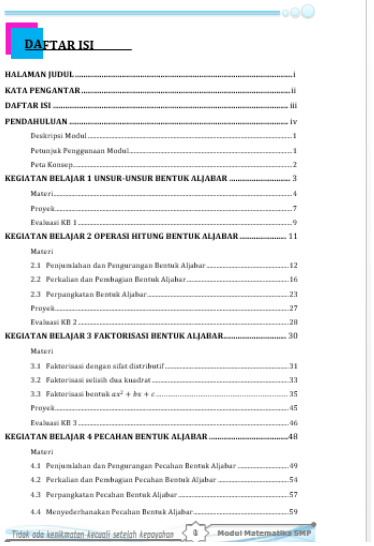
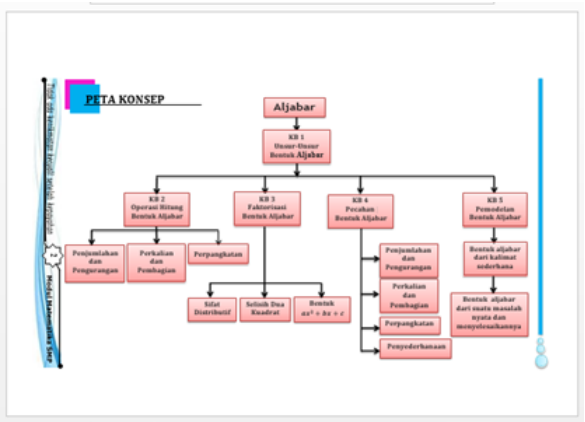
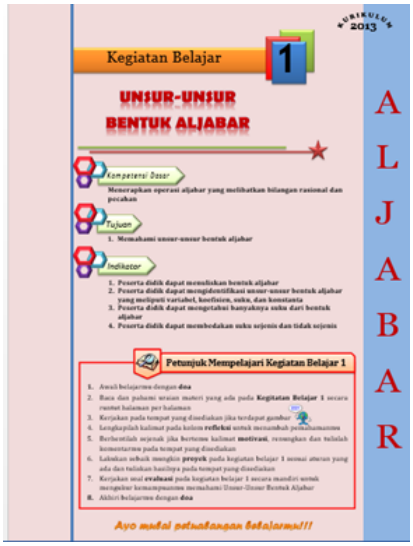


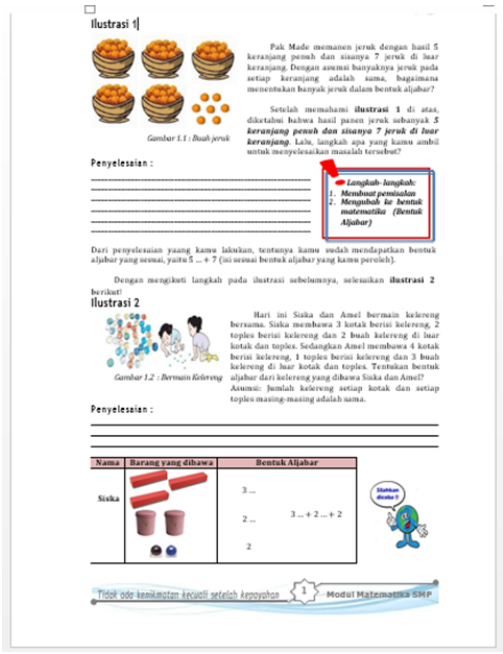
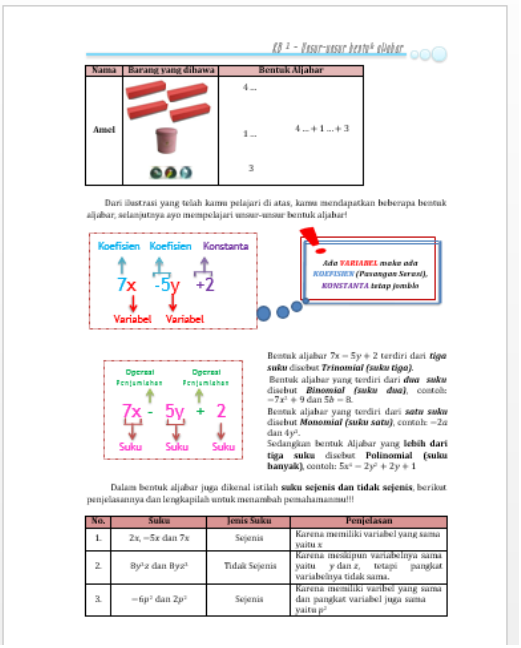
Table of Contents



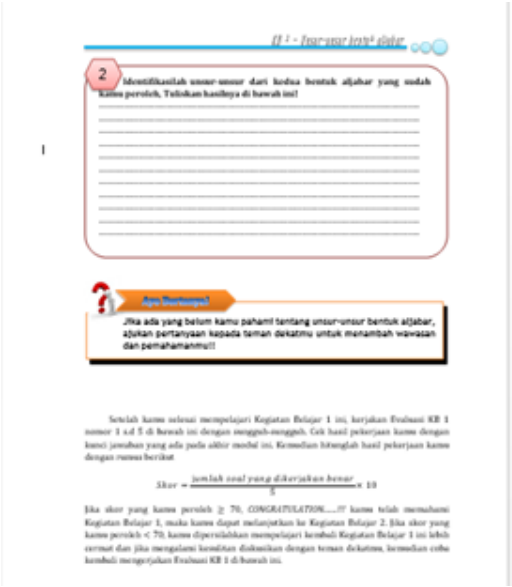
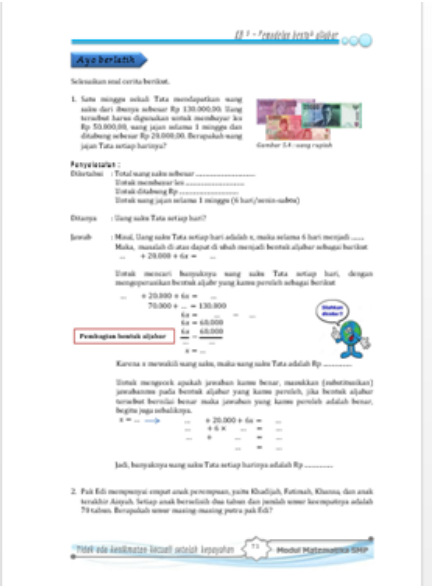
Mind Map



KI, KD, Objectives and Instructions

Contextual Material

HOTS Question

Development Stage (Development)

The next stage is the development stage, namely the mathematics learning module is developed based on the needs analysis and design that has been carried out previously. After the teaching materials are developed, they are validated by content experts and presentation experts. Finally, the content expert and presentation expert carry out validation using a validation sheet, namely 2 times. The following summary of experts can be seen in the table:

Table 4. Validity Recapitulation Table

No	Validation	Validator 1		Validator 2	
		Score (%)	Information	Score (%)	Information
1.	Content eligibility	50	Fairly Valid	88	Very Valid

2.	Presentation	55	Fairly Valid	75	Legitimate
3.	Language	52	Fairly Valid	82	Very valid

Table 4 proves that in validation activity 1, in terms of suitability, the content received a score of 50% in the quite valid category, the presentation received a score of 55% in the quite valid category and linguistics received a score of 52%. in the quite valid category. Media experts provide suggestions and input regarding the questions used to measure HOTS so that revisions are made so that the HOTS questions are adjusted to the indicators, because there are still questions that are not in accordance with the HOTS questions. Then the presentation expert also provided revisions to the researcher. Several revisions made to the content, presentation and language of the learning module can be seen in table 5 below:

Table 5. Revision of content, presentationand language

Revision Column	Before Revised	After revision
Content eligibility	▪ The material presented is not complete and precise, the depth of the material is still lacking so that not all learning indicators are achieved. ▪ It is recommended that the accuracy of the images and illustrations be continuous with each other, with more variations in the images to illustrate the material. ▪ The images are contextual, but there are still few of them. ▪ The content of the material does not stimulate students in group interaction ▪ Not all sub-materials are prepared in accordance with KD and contextual problems	▪ The depth of the material is complete and in accordance with the material indicators ▪ There are many variations of images in the content of the material ▪ All material and images are contextual so that students can easily understand the material ▪ This material has stimulated students to discuss ▪ The material presented must include material contained in Basic Competencies (KD), namely compiling elements of algebraic forms of contextual problems and solving contextual problems

Presentation	▪ The presentation of the layout elements contained in the introduction and conclusion of the module in a harmonious manner lacks consistent rhythm and unity ▪ The color of the material lacks contrast ▪ The letter combination is less attractive ▪ The presentation of concepts is still presented randomly ▪ There is no answer key to the evaluation questions at the end of each learning activity ▪ The list of books used as a source of reference material does not comply with writing rules	▪ The layout of the introductory and closing menus is correct and harmonious ▪ The color of the material is contrasting and varied ▪ The letter combinations are getting more interesting ▪ The presentation of concepts is presented sequentially from easy, medium to difficult, from simple concepts to complex concepts, and from concrete to abstract. ▪ The answer key to the evaluation questions is found at the end of each learning activity complete with assessment methods and guidelines ▪ The list of books used as reference material in writing the module is appropriate, starting from the author's name (sorted alphabetically), year of publication, title of book/magazine/paper/article, place, name of publisher, internet site location and site access date (if using references who owns the site).
Language	▪ The terms used are not in accordance with the KBBI (Big Indonesian Dictionary) ▪ The language used to explain a concept is not appropriate to students' cognitive development	▪ The terms used are in accordance with the KBBI (Big Indonesian Dictionary) or in accordance with standard technical terms ▪ The language used to explain a concept is

		appropriate to the student's level of cognitive development.
Contextual	▪ The material in the module is not yet knowledge building	▪ The material in the module is about constructing knowledge and not the process of receiving knowledge.

The results of the second validation were seen from the suitability of the content, getting a score of 88% in the very valid category, presentation getting a score of 75% in the valid category, and linguistics getting a score of 82% in the valid category. very valid category, meaning that the learning module is valid and suitable for use because the questions are HOTS based and in accordance with the contextual indicator approach, the presentation of the material is also in accordance with the indicators. The next stage is to carry out practicality and effectiveness tests.

The practicality test aims to determine the practicality of the learning modules developed by researchers. Meanwhile, for the practicality test results, students obtained a score of 81.00 in the practical category. This proves that the learning module developed is in the practical category when viewed from the student aspect.

The next stage is the effectiveness test. The effectiveness test aims to determine the effectiveness of the teaching materials being developed. The effectiveness test was carried out using HOTS questions. The measurement results can be seen in the following table:

Table 5. Recapitulation of HOTS Measurements

Pre-test average	Maximum post-test average score	
69.00	82.00	100

From table 5, there was an increase in the scores of students' HOTS ability test questions by 13 points. This score is obtained after using the module during the learning process. These results were then analyzed using the N-Gain test, after carrying out the N-Gain test, a score of 0.42 was obtained. This proves that there is an increase in HOTS for secondary school students who use contextual modules in the moderate improvement category. Therefore, it can be said that the use of learning modules can improve the HOTS abilities of junior high school students. Furthermore, overall, it can be concluded that to improve the HOTS abilities of middle school students that are valid, practical and effective, the solution is to develop mathematics learning media using modules with a contextual approach.

Discussions

In general, this research has several stages, the first stage begins with analyzing the needs of students and teachers in learning mathematics, followed by designing and developing contextual-based mathematics teaching modules containing HOTS, then validating teaching materials, limited trials, conducting research and finally data analysis. This development research explains and describes the use of teaching materials, namely contextual-based mathematics modules that can increase students' HOTS. Contextually based teaching materials that contain HOTS aim to familiarize students with always thinking at a higher level. So, by thinking at a higher level, students can have good problem-solving skills.

Based on the results of the analysis of teachers and students, it can be concluded from the results of the questionnaire that teachers need mathematics teaching materials that are easy to use during learning, adapted to the conditions and development environment of students, and contain learning materials because they can help students prepare for exams. Existing teaching

materials must contain clear instructions so that teachers can implement HOTS-based learning well. The books or teaching materials currently used can be said to be appropriate and good. However, this is not in accordance with the context of the culture and environment around the school. The conclusion from the student analysis is that junior high school students are students who are in the transition period from elementary school, meaning that learning must be concrete operational in nature. In this transition phase, students must learn to use real objects, especially mathematics lessons, to facilitate students' understanding of the information provided. The learning process can be carried out using learning teaching materials. So, it can be concluded that a contextual module is needed that is suitable for junior high school students

The research results show that the development of contextual-based teaching materials can improve mathematics HOTS. This is in line with the opinion of Zohar (2013) who states that by having HOTS a person will be able to learn, be able to think creatively. able to give the right reasons (reasoning), make decisions (making decisions), solve problems (problem solving), and (Creative Thinking). This opinion explains that HOTS can improve several competencies, one of which is mathematical problem-solving ability. This theory is in line with the opinion of Dinni (2018) who states that through HOT, students can solve problems, differentiate ideas or concepts clearly, are able to construct explanations, argue well, are able to hypothesize and understand complex things better. clear, where this ability is clearly visible how students' reason.

Of two This opinion can be said to be so designing HOTS-based learning will improve mathematical problem-solving abilities student. During the research, the use of HOTS-based teaching materials was provided significant influence on activity studied middle school students. Learn to be more productive, especially in interactions socio-cognitive, for example in terms of: (1) increasing students' ability to explain the concept of results discussion, (2) students dare to ask questions, (3) high curiosity, (4) collaboration and discussion groups between students are increasing,(5)students become happier solve questions or problems given, and (6) completing assignments and exercises Healthy. All these positive influences have a direct impact on students, namely by increasing problem solving abilities Students' mathematics also has an impact student learning outcome.

The success of this research is supported by the research that has been carried out Previously, this included research conducted by Fanani (2018), namely the benefits of HOTS assessment is to increase student learning motivation because the HOTS assessment connects the material classroom lessons with real world context so that learning becomes more meaningful. Besides that, HOTS assessment can improve student learning outcomes because it can train students to think critical and creative, namely the ability to think that does not simply restate, remember, or refer to without it carry out processing (reading). Apart from that, HOTS capabilities with problem solving abilities mathematics is also supported by the results of research conducted by Sumaryanta (2018) which states that assessments involving students' HOTS abilities include: critical, reflective thinking skills and logical.

Teaching materials play an important role in learning. There are various forms of teaching materials, such as books, LKPD, modules, media, and so on. Increasingly advanced developments in various fields, especially education, require educators to be able to carry out new innovations in the learning process so that students' cognitive abilities and potential can increase (Indariani et al., 2019). Students need to be equipped with critical thinking skills so that students can adapt competitively in society (Rusman, 2010). For this reason, the teaching materials given to students should be able to improve critical, creative, analytical, metacognitive thinking, non-routine problem solving, creating, non-algorithmic, involving "concept formation, evaluation, and creativity/brainstorming".

According to Roekel in (Chukwuyenum, 2013) critical thinking skills are needed by students to develop skills, increase concentration, and expand thinking processes. If the teaching materials developed are contextually based, then they automatically contain high-level thinking skills. Thus, it can be concluded that the development of contextual-based teaching materials can increase students' HOTS in solving mathematical problems.

CONCLUSION

This research states that the validity test of learning teaching materials using modules obtained a final score in the content suitability aspect of 88% in the very valid category, in the presentation aspect the score was 75% in the valid category, and in the presentation aspect the score was 75% in the valid category. . the linguistic aspect is 82% in the very valid category. In the practicality aspect test, students obtained a score of 81.00 in the practical category. The results of the effectiveness test show an increase in student HOTS by 13 points with an N-Gain value of 0.42. So overall it can be concluded that the mathematics teaching materials developed using contextual modules to improve HOTS for junior high school students are valid, practical and effective. This research recommends the need for elaboration of HOTS indicators so that HOTS material can be developed further. This research also recommends that junior high school teachers can utilize learning teaching materials using this module to improve the quality of HOTS learning for junior high school students.

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