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Development of HOTS Problem Oriented Circle Learning E-Module to Improve Problem Solving Ability of Class VIII Students

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Abstract: Problem solving ability is one of the important skills for students in dealing with problems in everyday life. One effort that is indicated to improve students' problem-solving abilities is to practice questions that are in the realm of High Order Thinking Skills (HOTS). This study aims to develop HOTS problem-oriented Mathematics E-Modules. The E-Module was developed using the Notion application and circle material for class VIII SMP. This study used class VIII students of SMP Negeri 2 Kuta as research subjects. The development method using 4D model stage. Data were collected using expert validation questionnaires, teacher response questionnaires and student response questionnaires as well as tests of problem-solving skills. Data analysis was carried out by calculating the average score of expert validation and the average score of the student response questionnaire. The testing of the problem-solving ability test instrument was carried out by item analysis and the internal consistency of the test items. The validation results from 2 validators obtained an average value of 4.03, which means that the E-Module is in the valid criteria. Based on the teacher's response questionnaire, an average value of 3.39 was obtained which was in the practical criteria, while based on the student response questionnaire, the average value was 3.60 which was in the very practical criteria. Furthermore, the results of the gain score for tests of students' problem-solving abilities obtained an average of 61.72 which is in the effective category.

Keywords: e-module, hots questions, problem solving ability.

Abstrak: *Kemampuan pemecahan masalah adalah salah satu kemampuan yang penting bagi siswa dalam menghadapi permasalahan di kehidupan sehari-hari. Salah satu upaya yang diindikasikan dapat meningkatkan kemampuan memecahkan masalah siswa adalah berlatih soal-soal yang berada pada ranah High Order Thinking Skill (HOTS). Pengembangan E-Modul Matematika berorientasi soal HOTS. E-Modul menggunakan aplikasi Notion dan materi lingkaran untuk kelas VIII SMP. Penelitian ini menggunakan siswa kelas VIII SMP Negeri 2 Kuta sebagai subjek penelitian. Metode pengembangan dilakukan dengan menggunakan tahap 4D model. Data dikumpulkan dengan menggunakan angket validasi ahli, angket respon guru dan angket respon siswa serta tes kemampuan pemecahan masalah. Analisis data dilakukan dengan menghitung skor rata-rata validasi ahli serta skor rata-rata angket respon siswa. Uji coba instrument tes kemampuan pemecahan masalah dilakukan dengan analisis butir dan konsistensi internal butir tes. Hasil validasi dari 2 orang validator diperoleh nilai rata-rata sebesar 4,03 yang berarti E-Modul berada pada kriteria valid. Berdasarkan angket respon guru diperoleh nilai rata-rata 3,39 yang berada pada kriteria praktis sedangkan berdasarkan angket respon siswa diperoleh nilai rata-rata 3,60 yang berada pada kriteria sangat praktis. Hasil dari gain score untuk tes kemampuan pemecahan masalah siswa diperoleh rata-rata61,72 yang berada pada kategori efektif.*

Kata kunci: *e-modul, soal hots, kemampuan pemecahan masalah.*

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▪ INTRODUCTION

The challenges faced by the world of education are getting higher with intense global competition. Therefore education must receive special attention from the government because through good education it is hoped that it will provide quality human resources for the country (Nasution & Siregar, 2019). However, in reality, referring to the results of the international PISA study which was used to measure reading, mathematics and science abilities and in 2018 it was carried out by the Organization for Economic Cooperation and Development (OECD), Indonesia was in 74th position out of 79 countries that administer or complete the PISA test (Siahaan et al., 2021). Based on the results of the PISA itself, Indonesia has a very low ranking, this indicates that students' problem-solving skills in general are still not optimal, because the PISA test is composed of questions that require a problem-solving ability. Especially in the field of mathematics, of course mathematics requires the ability to think critically in solving the problems faced.

Because mathematics is very synonymous with solving a mathematical problem, besides that the most important goal of an education is so that the participation of students can solve mathematical problems which is of course the direction given to solving problems in everyday life (Anisah & Lastuti, 2018). The ability to solve problems mathematically is an ability possessed by individuals to solve mathematical problems in accordance with predetermined goals (Pereira et al., 2021). However, based on observations carried out at SMP Negeri 2 Kuta, the results of the initial analysis on the math problem solving abilities of Grade VIII students at SMP Negeri 2 Kuta were still low. This is evident from the average value of the Middle Semester Assessment (PTS) of students' mathematics which is below the KKM score, which is 75 which has been set.

The ability to solve problems is an important aspect of high order thinking skills (HOTS). The ability to solve student problems can be improved by implementing learning with media specifically designed to make a student play an active role in the learning process (Verawati et al., 2022). Higher-order thinking ability or commonly called HOTS is a student's thinking process at a larger cognitive level that has been developed from various cognitive methods and concepts as well as a taxonomy of assessment, teaching, and learning. This HOTS includes the ability to make decisions, the ability to argue, think critically, the ability to think creatively (Simamora et al., 2022). Based on this, classroom learning will take place effectively to increase problem-solving skills if the evaluation is carried out by applying HOTS principles, especially in dealing with changes in learning culture due to the emergence of a pandemic.

The world of education is increasingly experiencing setbacks with the emergence of the Covid-19 pandemic that has attacked Indonesia (Utomo et al., 2021). Meanwhile, referring to the data from the Corona Handling Task Force in Indonesia, positive cases in Indonesia have reached 4.26 million cases. This condition urges the government to implement a policy of limiting community activities (Wijaya, 2020). One of those affected by this policy is the education sector. Minister of Education and Culture issued circulation letter No. 4 of 2020 concerning "Implementation of Education Policy in an Emergency Period of the Spread of Corona Virus Disease (Covid-19)" (Ariawan et al., 2021).

The emergence of a pandemic causes changes with the increasing use of digital media in learning (Hanifah & Sari, 2021). Based on this, teachers and students must make adjustments to changes in the digital era which are increasingly developing with the rapid development of information technology (Istianah et al., 2020). This adjustment turns out to require assistance from technological advances, because of the need for gadget assistance in the learning process so that teachers and students must be able to make maximum use of this technology so that learning objectives can be achieved (Rohiman & Anggoro, 2019).

Conventional learning has several weaknesses in students, including boredom due to lack of interaction in learning, and the difficulty of understanding the material being explained (Mahyuddin et al., 2017). There are several digital media that are used in learning such as power points, videos and so on, but these media are not relevant enough in improving the ability to solve a student's problems. As evidenced by the results of interviews with several VIII students of SMP Negeri 2 Kuta, it was found that students felt bored with mathematics because the learning tools were monotonous and difficult. This shows that there is no innovative and interesting learning media for students, especially in mathematics.

Mathematics is a field of knowledge that is important for students in dealing with problems in everyday life (Agusdianita et al., 2021). Making E-Modules is one of the important innovations in an effort to make it easier for students to understand math material (Fauzia et al., 2021). The limitations of a book as a medium for the learning process are as follows: 1) due to its perishable nature, books require special care; 2) the narrative of an intonation which makes it a separate problem to understand a sentence, this usually results in a gap between information in a textbook and something that is perceived by a reader so that it is not uncommon for a reader to make mistakes in interpreting pronunciation only through a printing media model; 3) difficult books provide guidance to readers who experience problems in understanding certain parts which results in the presence of a teacher being indispensable; 4) the presence of various materials presented is able to provide a tendency to satisfy the interests of the readers and make them feel bored; 5) books are difficult to show animation on a page, while the display of colorful photos, pictures or illustrations requires a relatively more expensive cost (Susanti, 2020).

Based on some of the weaknesses of conventional books, it is important to develop an E-Module based on HOTS questions, or a digital module with HOTS questions in it. E-Module is a tool in the learning process that will be designed to achieve a certain competency that is inside by containing the limitations, methods, and learning process material and ways to carry out a measurement of the learning outcomes that have been structured and the presentation process is carried out by utilizing information and communication technology in the form of electronic devices and the internet (Sidiq & Najuah, 2020). E-Modules based on HOTS questions are relevant learning tools used in this modern, all-digital era, so that E-Modules are expected to attract students' interest in learning. In addition, the demands of the times require students to have high-order thinking skills, so it is important to integrate HOTS questions with the E-Module.

In addition, the right learning media will provide students with creative experiences and cause mathematics to be learned more easily by students (Sari, 2021).

On the other hand, learning mathematics is still one of the sciences that is feared by students (Armiati & Febriani, 2021). Moreover, learning systems that change culturally, of course, teachers must always choose innovative learning models (Wijaya et al., 2021). But along with the development of digital technology, there are several learning media that can be applied to make an interesting and innovative presentation of the mathematics learning process. An application that can be applied as a creative medium is the E-Module with the notion application.

Research conducted by Irawati & Setyadi (2021) is the development of a math E-Module with comparative material coverage, but does not use HOTS questions in its development. Research carried out by Istikomah et al (2020) examined the mathematics E-Module in a realistic way capable of causing an increase in students' creative thinking abilities. Research carried out by Rizqiyani et al., (2022) namely developing codular-assisted E-Modules from a smartphone to increase the mathematical literacy skills of a junior high school student. Research conducted by Maniq et al., (2022) researching about E-Module mathematics on fractional material. Research by Mahfudhah et al., (2022) esearch on E-Modules interactively lecturera inspire.

Research conducted by Ambiyar et al., (2023) designed a study using flipped classroom learning to increase student HOTS in the industrial era 4.0. This study found that the use of the flipped classroom learning model could improve students' HOTS abilities, but this research did not examine problem solving abilities, because problem solving abilities are related to HOTS so they should not be separated in the study. Research conducted by Herianto (2020) shows that e-learning is currently still minimally oriented towards HOTS, especially in higher education. Even though online learning based on HOTS is very important in increasing students' creativity and increasing their higher order thinking skills. However, this research has not been able to show how the results or impacts of using HOTS-based e-learning have on students' problem-solving abilities which are an important unit. Research conducted by Dewi et al., (2019) shows that the importance of learning using digital media in the current disruptive era, however this research has not examined students' abilities to reach the realm of HOTS, only specifically to their literacy.

Based on the empirical studies conducted, the development of learning media using E-Modules has been carried out, but not many have developed E-Modules combined with HOTS questions. This condition indicates the importance of deeper development related to the combination of digital media with HOTS questions, so that an innovative learning media can be produced to improve the problem solving ability of a student. This development will seek to perfect digital learning media, in this case the E-Module.

E-Modules cannot be used just like that without innovation, given the importance of problem-solving skills to be improved, learning media must be adapted and creatively oriented to HOTS questions. The goal is to be more optimal in improving students' problem-solving skills. Research conducted by Suliyanah et al., (2021) explained that in an effort to improve learning outcomes and students' problem-solving skills, an innovative and creative learning media is needed. Research results from Gea et al., (2022) shows that the development of digital technology-oriented learning media is able to improve students' problem-solving abilities. The same thing was conveyed by

Purwitasari et al., (2019) shows that the development of digital technology-oriented learning can cause students to be motivated because learning becomes more interesting.

▪ METHOD

Participants

The subjects in this study were all components involved in this research. Research subjects play a role in determining the validity, practicality, and effectiveness of learning tools. These subjects include experts, students, and teachers. The role of experts is needed when testing the validity of the product being developed. Experts come from the lecturers based on the expertise of each expert. The students who were used as the subject of this research were class VIII students of SMP Negeri 2 Kuta. The sample was selected by one class with a total of 32 students to take field tests and student responses by simple random sampling method, as well as 3 teachers for teacher response tests.

Research Design and Procedures

This research method uses research and development methods or commonly called R&D/Research and Development (Sugiyono, 2019: 407). To be able to provide a result of a development research product, a needs analysis is needed which can then be tested whether a product that has been achieved can be used by a large part of the public, carried out effective testing research of a product that will be developed. The model in this research uses the Four-D Model, which is a model composed of four stages, in which this research will limit the development of a product and test its effectiveness, so that in accordance with the development of a Four-D Model, this research can be carried out at the development stage.

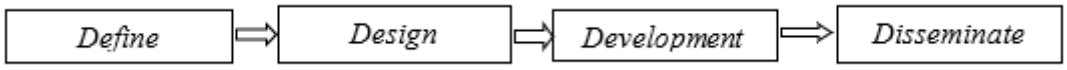

Figure 1. Staged four-d model

The development stage is an implementation stage of the design that was implemented in the previous stage. This stage is the stage where expert appraisal or evaluation activities from an expert and developmental testing or limited trials on students are carried out.

Instrument

The instruments used in data collection were assessment questionnaires and mathematical tests in the cognitive domain. Assessment questionnaires were used to obtain review data from content, media and design experts, individual math teacher trials, as well as HOTS question-oriented E-Module assessments by students. The math test is a test given to measure students' problem-solving abilities in the cognitive domain (pretest-posttest). The problem-solving test was made in the form of a description test totaling 5 items, the test was made through the stages of content validity, difficulty level test, differential power test, item internal consistency test, and test reliability. The problem-solving ability test used was self-developed based on the material selected and indicators of problem-solving ability.

Data analysis

HOTS Problem Oriented Circle E-Module Validity:

The media developed in this research are an E-Module and E-Module mathematics learning media. The level of validity of the E-Module can be shown through the results of an analysis of development trial activities carried out with a review by a material expert and a media expert. The first stage is an analysis of the results of each stage of the expert test as material for product revision.

Practicality of HOTS Problem Oriented E-Modules:

Looking for the practicality of E-Modules and HOTS problem-oriented mathematics learning media based on student and teacher responses to media. According to Nieveen (1999) practicality data from student questionnaires on HOTS question-oriented E-Modules used in learning use an assessment instrument in the form of an assessment questionnaire.

The Effectiveness of HOTS Problem-Oriented E-Modules:

The research design used for this research is a research design that is in the pretest before the treatment is given and the posttest after the treatment is given. For this reason, it can be obtained accurately, because it is able to make comparisons with those held before giving a treatment (Sugiyono, 2019: 64).

Table 1. Research design

Pretest	**Treatment**	***Posttest***
O_1	X	O_2

Information:
O1: pretest; X: treatment in the form of the application of HOTS-oriented E-Modules; O2: posttest

The analysis is performed by calculating using the gain score. The results of the normalized gain score show the achievement of a level of student ability in seeing their initial abilities. The calculation results are obtained by

$$(g) = \frac{posttest\ score - pretest\ score}{maximum\ score - pretest\ score} \times 100\%$$

The criteria for improving the ability to solve a student's problem are determined by referring to a criterion in Table 2.

Table 2. Interval gain score

Presentase (%)	**Category**
(<g>) < 40	Ineffective
40 < (<g>) ≤ 55	Less effective
56 < (<g>) ≤ 75	Effective
(< g >) > 76	Very effective

▪ RESULT AND DISSCUSSION

The learning device developed in this research is in the form of an E-Module. The material in the E-Module is focused on circles for class VIII students at SMP Negeri 2 Kuta. The learning tools developed are oriented towards HOTS questions. At the beginning of the E-Module KD is presented, indicators in achieving competence, along with the objectives of a lesson to be achieved in circle material. These three components are very important to be included in HOTS question-oriented learning tools, so that students understand in which direction learning will take place and what competencies they want to achieve. If students have been able to understand the objectives of the learning they will learn, then they will be able to provide convenience to students in achieving the goals themselves.

The E-Module in this research has several special features and characteristics. First, this HOTS question-oriented E-Module was developed using Notion. The E-Module file format is supported with the standard file format for digital books (ePub). The Notion reader software on the E-Modul is capable of using laptops and Android. The E-Module contains the cover of the E-Module, KD, the objectives of a lesson, concept maps, sub-learning materials, summaries, self-assessments, evaluations and bibliography. The developed e-module is stand-alone or does not depend on other teaching materials. Learning activities in the E-Module are equipped with videos, audio, illustrations, and pictures. The quality of learning tools in this research is seen through several aspects, namely effective, practical, and valid. The results of the validity, practicality, and effectiveness of a learning tool in the form of a HOTS question-oriented E-Module on the subject of the developed circle are described as follows.

HOTS Problem Oriented E-Module Validity

The researcher validated the learning device after producing the HOTS question-oriented E-Module in the form of prototype I. The validation was carried out by 2 experts, namely 2 Masters of Mathematics Education Lecturers at Ganesha University of Education. The two experts/experts provide assessments and input on learning tools by filling out HOTS question-oriented E-Module validation sheets. The following is a summary of the results of the validation of the circle material learning tools from each expert.

Table 3. Summary of e-module validation results

Expert 1 Total Score	56
Expert 2 Total Score	65
Average Total Score	4.03
Criteria	Valid

In table 3 above, it is obtained that the average score of the validity of this E-Module is 4.03 which is included in the valid criteria. At the validation stage, experts or experts provide comments and suggestions in improving this E-Module. As for suggestions or comments from the validator, namely, "Based on observations of the Circle E-Module made, there are many elaborations, especially in the form of appearance, have shown many changes that can attract students' interest in learning, apart from that in terms of content, there are many collaborations between Law, Middle

and Hot Thinking which makes this E-Module almost perfect." Based on this, suggestions from the validator include: 1) E-Modules need to make attractive covers; 2) the features of the E-Module need to be highlighted in the contents of the E-Module.

Based on the comments and suggestions from the validator, the researcher carried out several revisions to the E-Module that the researcher developed, namely: 1) adding an attractive cover; 2) adding contextual practice questions to further highlight the features of the HOTS question-oriented E-Module. The results of the validation of the developed E-Module have received a valid category with several notes that must be corrected, the developed E-Module must at least reach a valid category. This is in accordance with research conducted by Yusuf et al., (2020) that an E-Module must be able to measure what it is supposed to measure, in this case how the E-Module can help students think HOTS and measure their problem solving abilities. Research conducted by Sun et al., (2022) also shows that an E-Module must pay attention to systematics and is easy to use so that based on this, the E-Module developed by Sudha is feasible to use.

In addition to the E-Module, the experts/experts also validated the material experts as follows.

Table 4. Summary of material expert validation results by experts/experts

Expert 1 Total Score	68
Expert 2 Total Score	74
Average Total Score	4.18
Criteria	Valid

Based on Table 4 above, the mean of the material expert validity score is 4.18 which is included in the valid criteria. In the validation process, experts/experts also provide comments and suggestions for improving this E-Module. Several suggestions from the validator, including: 1) Digital learning media needs to be made an attractive cover; 2) it is necessary to fill in an introductory word explaining the features of digital learning media; 3) instructions for using digital learning media need to be detailed.

Based on the comments and suggestions given by experts/experts, the researchers revised the digital learning media that was developed. As for some of the improvements that the author has made are: 1) adding covers to digital learning media; 2) add a preface; 3) more detailed instructions for using digital learning media on the subject of circles. These results indicate that an E-Module must have an attractive appearance so that both students and teachers are interested in using the device. This is in accordance with research conducted by Mahardika et al., (2021) which shows that students tend to be more active and interested in learning when the E-Module used contains pictures, videos or other interesting things. This is in line with research conducted by Safitri et al., (2021) that E-Modules that are made based on interesting digital applications can make students more enthusiastic about learning.

The reasons that support the E-Module that the researcher has developed meet valid criteria, including learning tools in the form of E-Modules already contain lessons that are contextual in accordance with higher order thinking learning (HOTS). The problems and learning activities presented are able to facilitate students to make

improvements to students' problem solving abilities. This learning tool has been adapted to the curriculum currently implemented in Class VIII of SMP Negeri 2 Kuta. This can be seen from the KD linkages that need to be achieved in mathematics learning activities that are in accordance with the syllabus, so that learning tools can be used properly. The components of the learning tool that the researcher has developed have been adjusted to the components contained in a validation sheet and adapted to the revision of the validator. The E-Module validation sheet can be applied to various aspects such as content presented and constructively. In an aspect of the content it is possible to show the clarity of the formulation of indicators, the suitability of the content with the learning objectives, the mathematical problems presented. In the construct aspect, it can be seen from the orientation of activities focused on students, the language used is in accordance with the EYD, the sentences used are clear and the pictures or tables presented are clear.

The factors described above have supported the learning tools that the researchers developed have reached the criteria of being feasible or valid to be applied to student learning activities.

The Practicality of HOTS Problem-Oriented Learning Devices

Student responses to the E-Module related to HOTS questions can be seen in the summary as follows:

Table 5. Summary of student response questionnaire results

No	Trials	Average Score	Criteria
1.	Limited Trial	3.59	Very Practical
2.	Field Trials 1	3.61	Very Practical

Based on the table above, the average student response questionnaire to the E-Module in the limitations trial was 3.59 and in the trials conducted in Field I, the average value was 3.61. So based on the practicality criteria in Chapter III, the HOTS question-oriented E-Module is in a very practical criteria. In general, the E-Module developed in this study has met the practical criteria, but it is necessary to make some improvements based on the suggestions given by the students. Improvements to the E-Module that were carried out based on the results of the analysis of suggestions from students were correcting spelling mistakes and reducing colors that were too flashy. Writing with a background color that is too conspicuous reduces the comfort of students when using the E-Module. The results of this study are supported by research conducted by Setiaji et al., (2021) that students are very interested in the display of full-color teaching modules and pictures, because for children this makes learning not boring, but the pictures and colors used must be relevant to the material to be conveyed.

The results of the analysis of the teacher's response data to the E-Module were taken using a questionnaire from the teacher's response regarding the product being developed. The teacher's response to this E-Module can be seen in the following summary.

Table 6. Summary of teacher response questionnaire results

No	Trials	Average Score	Criteria
1.	Limited Trial	3.31	Practical
2.	Field Trials 1	3.47	Practical

Based on the table above, the average teacher's response questionnaire to the E-Module in the limited trial was 3.31. Meanwhile, in the trials conducted in field 1, the mean score of the teacher's response questionnaire was 3.47. So this product belongs to the practical category.

In addition, the researcher also conducted an interview to ensure the results obtained in the questionnaire were as follows:

Table 7. Interviews with students

Researcher	Is the E-Module provided able to help you carry out the learning process independently?
Student	Yes, ma'am, I can study it at home anytime
Researcher	What do you think about the questions in the E-Module?
Student	The types of questions varied and analyzed a lot so I had to study harder.
Researcher	Are there any obstacles that you encounter while using this E-Module?
Student	So far there have been no problems ma'am, maybe the challenges that exist are in solving questions, especially contextual questions.

The results of the interviews show that students are interested in being given math problems based on contextual learning because students feel challenged to solve them. Students also learn to analyze a problem and draw conclusions.

Meanwhile, according to the teacher's opinion, the E-Module product is very practical to use in a lesson. It can be seen from the results of the teacher's response questionnaire that many chose the strongly agree option as well as the interview results which gave a positive impression on the learning tools being developed. An example is that teachers are very happy to carry out learning activities using E-Modules, the contents of E-Modules that have been adapted to the syllabus and curriculum in the subject matter of circles, as well as opinions about E-Modules that are able to encourage students to increase their understanding of concepts and student activity.

Based on the results of the teacher and student response questionnaires to the products being developed, the learning tools are in accordance with the expectations of the researchers, namely practicality criteria are met. The practicality of a learning tool is very important, because the more practical it is, the easier it will be for users to understand and use it. This is in line with research conducted by Utama et al., (2020); Hikayat et al., (2020) and Aziza & Supriatna (2021) which explain that a module used in learning must be practical, meaning that the module is not complicated and simple but does not reduce the quality of the material contained therein.

The Effectiveness of HOTS Problem-Oriented Learning Devices

The summary of the test results for the ability to solve problems in mathematics for class VIII students of SMP Negeri 2 Kuta is as follows.

Table 8. Summary of student test results

Information	Pretest	Posttest
Highest Score	56	98
Lowest Score	14	32
Average	36.31	75.06
Criteria	Not Completed	Complete
Completeness	0.00	78.13

Based on the table above, the average test score for the ability to solve mathematical problems for class VIII students of SMP Negeri 2 Kuta was 75.06 with a completeness percentage of 78.13%. Based on the categories described in Chapter III, the results themselves are able to provide an illustration that the results of students' mathematical problem-solving ability tests can be in the "Completed" category. The results of the pretest and posttest indicated that students had met competency standards for problem solving abilities, especially in the mathematics material used in this study. In addition, these results indicate an increase in student scores from before so that this increase indicates a change in problem-solving skills which are getting better after students learn with the HOTS E-Module that was developed. Research conducted by Erlina et al., (2022) supports the results of this study, that a module must be created by analyzing student needs and developed based on student responses to learning. This research has attempted to develop e-Modules that fit these criteria, so as to improve students' problem-solving abilities.

The results of the normalized gain score show an increase in student achievement by looking at their abilities at the beginning. The summary of the results of the Pre-test and Post-test of the mathematical problem-solving ability of class VIII students of SMP Negeri 2 Kuta to see the increase in product effectiveness is in Table 9 below.

Table 9. Gain score results summary

Class	Average Gain	Category
VIII Class	61.72	Effective

The data above shows that the average gain score on students' mathematical problem-solving ability tests in class VIII SMP Negeri 2 Kuta is 61.72. Based on the categories described in Chapter III, these results indicate that the gain scores on students' mathematical problem-solving ability tests are categorized effective".

The results showed that the gain score on this learning device was effective in increasing students' understanding of mathematical concepts, this was due to several indicators of mathematical problem solving that had been achieved by students, namely as follows.

1. Students are proficient in understanding or solving problems.
2. Students are able to plan a solution well.
3. Students are able to carry out the solution correctly.
4. Students are able to re-examine the results of their work carefully.

Improvement of learning tools from development limited trials to field trials I was also able to show the effectiveness of using learning tools both E-Modules. In the

limited development trial, many students were still confused about associating a correct concept to carry out the completion of activities and problems contained in the E-Module and many students were still unable to give a logical reason through an answer given. After carrying out revisions to the E-Module device, in field testing 1 the number of students who were still confused about linking a concept decreased. So that this has an impact on effectiveness in increasing problem solving abilities that are done mathematically from Class VIII students of SMP Negeri 2 Kuta.

▪ CONCLUSION

Research that has been conducted in class VIII SMP Negeri 2 Kuta has succeeded in developing learning tools including E-Modules oriented to HOTS questions that are effective, practical, and valid in improving the ability to solve mathematical problems for students in class VIII SMP Negeri 2 Kuta . This is supported by the results of the validation score from the experts of 4.03 with a valid category. The students' responses to the E-Module obtained an average of 3.6 which is in the very practical category. The response that a teacher has to the E-Module is 4.20 which is in the practical category. The results of the gain score on students' mathematical problem solving ability test were 61.72 in the "effective" category. So referring to the results themselves, it can be said that the HOTS question-oriented E-Module is able to meet the criteria of being effective, practical, and valid. This learning device in the form of an E-Module also has characteristics that distinguish it from other learning devices. The characteristics are a) The images contained in the E-Module learning activities are interesting with some HOTS practice questions so that they are able to provide encouragement to students in improving their thinking skills at a higher level than a student by constructing their own knowledge through pictures and learning videos, b) The problems presented in the E-Module are contextual in nature so as to encourage students to increase HOTS, c) The evaluation questions for the E-Module have been adapted to HOTS indicators, namely analyzing, evaluating, creating.

The results of this study can be useful in increasing the number of innovative learning media in the world of education. Seeing the conditions that are still not maximal in using HOTS-based digital learning media in schools, the development of this E-Module has become a positive contribution to the development of learning systems in schools by teachers and students. The learning tools that the researchers developed were limited to class VIII circle material at SMP Negeri 2 Kuta, so that interested education practitioners were able to develop similar learning tools by covering a wider range of material. The subject of this research is only limited to a class VIII student at SMP Negeri 2 Kuta, so practitioners who have an interest are able to develop similar products covering a wider subject. The research carried out is limited to the development stage only so that it allows other researchers to continue this research and develop it to the disseminate stage. It is possible that the teacher or any party who uses products developed in other learning models can find actions or alternatives that have not been included in this developed product, which then alternative actions can be used as guidelines by teachers in carrying out the learning process by applying the products in this research.

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