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Validity and Practicality of Guided Discovery based E-Module in Facilitating Student Mathematical Creative Thinking Ability at Junior High School

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ABSTRACT. This research aimed to develop a guided discovery-based e-module to facilitate students' mathematical creative thinking abilities at Junior High School/ Islamic Junior High School. It was Research and Development with the ADDIE model, consisting of 5 development steps: analysis, design, development, implementation, and evaluation. The subjects of this research were 22 eighth-grade students at the Private Junior High School of YPPI Perawang. Validity and practicality questionnaires were used to collect data. Validity data were collected from expert validators, and practicality data were collected through questionnaires distributed to students. The research findings showed that the validity score was 90% (very valid) and the practicality score was 86% (convenient). Based on the findings, the Guided Discovery-based e-module was found to be valid and practical in facilitating students' mathematical creative thinking at Junior High School/ Islamic Junior High School.

Keywords: e-module; guided discovery; mathematical creative thinking ability

ABSTRAK. Penelitian ini memiliki tujuan dalam menciptakan e-modul dengan penemuan terbimbing guna memfasilitasi siswa dalam kemampuan berpikir kreatif dan matematis SMP/Mts dengan kriteria valid dan praktis. Penelitian ini memakai metode ADDIE yang memiliki lima tahap pengembangannya, yaitu analisis, desain, pengembangan, implementasi dan evaluasi. Subjek penelitian melibatkan 22 siswa kelas VIII di SMPS YPPI Perawang. Pengumpulan data dilakukan melalui kuesioner validitas dan kuesioner praktikalitas. Data validitas didapatkan dari validator ahli, sedangkan data praktikalitas diperoleh dari hasil kuesioner yang didistribusikan kepada siswa. Hasil penelitian menunjukkan skor kevalidan senilai 90% dengan kategori valid, dan skor praktikalitas sebesar 86% dalam kategori praktis. Dengan begitu, e-modul berbasis penemuan terbimbing telah teruji valid dan praktis memfasilitasi kemampuan berpikir kreatif matematis siswa SMP/MTs.

Kata kunci: e-modul; kemampuan berpikir kreatif matematis; penemuan terbimbing

INTRODUCTION

One focus in education is developing students' thinking skills. At school, teachers are not only channeling knowledge to students, but also helping them to develop more complex thinking skills. In the education curriculum Permendikbud number 21 of 2016, students' creative thinking skills are included in the education objectives (Hamam et al., 2022) . According to the output of the Trends in International Mathematics and Science Study (TIMSS), Indonesian students' achievement in mathematics in terms of creativity is still less than satisfactory (Ruslan et al., 2021). In the 2015 TIMMS study results, Indonesia obtained an average score of 397, while internationally the average score is 500, so that Indonesia ranks 45th out of 50 Countries (Hadi & Novaliyosi, 2019). Previously, researcher Sugilar had conducted research related to aspects of mathematical

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creative thinking skills, consisting of originality, fluency, and flexibility, in one of the Islamic junior high schools, which were still low (Ismara, 2017). In addition, research by Widiani et al. examining the mathematical creativity of high school students is also considered low (Widiani et al., 2016).

Creative thinking is a skill that a person has for capturing problems, processing ideas and information, being open, knowing how to place things, acting quickly to see things as complex units, utilizing critical thinking, and connecting various information and knowledge to a problem (Moma, 2015). Mathematical ability is the ability to solve problems related to mathematics (Ismara, 2017). From these two definitions, it can be concluded that mathematical creative thinking skills refer to a person's ability to solve mathematical problems by considering information and concepts derived from specific situations. The improvement of mathematical creative thinking skills in learning situations cannot be separated from government guidelines, as outlined in the Regulation of the Minister of Education and Culture Number 21 of 2016, which requires that students show a logical, critical, analytical, creative, careful, and responsible attitude when facing mathematical challenges (Hamam et al., 2022).

Mathematical creative thinking capacity comprises four components: fluency, flexibility, originality, and elaboration (Safaria & Sangila, 2018). Fluency is the ability to generate a variety of ideas, responses, problems, and questions, as well as methods or approaches to various endeavors. Flexibility is the ability to generate diverse ideas, observe problems from multiple or unique perspectives, explore multiple solutions, and change the way they see and think. Originality is the skill of generating new ideas by finding unusual and distinctive ways to combine parts and components. Then the last elaboration is the ability to develop an idea, describe details, or describe the object in order.

Along with the times, the digital era is giving a new face to the world of education, including changes in how teaching materials are presented. Teaching materials are resources that support the teaching and learning process (Kosasih, 2021). Current teaching materials have been adapted to the current era in electronic form. The availability of electronic teaching materials, such as e-modules and e-LKPD, can reduce manufacturing costs, be easy to carry, remain up to date over time, and, most importantly, allow students to interact with images, videos, and audio (Nisa et al., 2020). Modules are included in structured (systematic) teaching materials that allow students to learn independently, use communicative language, and have a positive effect on students (Magdalena et al., 2020). Modules also contain material broken down into smaller units to encourage students to be active learners. Electronic modules, or e-modules, are one form of development for this module. An E-Module is a transformation of the module presentation from print to electronic form (Rismayanti et al., 2022). The module structure consists of an introductory section that includes learning objectives, descriptions of specific facts, concepts, principles, and procedures, visual elements such as tables, formats, charts, maps, and images, activity instructions, exercises, assignments, case studies, summaries, and finally formative tests (Kosasih, 2021). Modules have characteristics such as self-instruction using clear instructions, independent learning materials, stand-alone, and easy to use (Asrial et al., 2020).

In addition to developing teaching materials, it is important to build students' understanding. Learning outcomes are supported by students' active involvement in the learning process. Discovery learning can foster creative and active ways of thinking (Larasati, 2018). Students are encouraged to hypothesize, design, and experiment under teacher guidance, which aligns with the concept of discovery (Jayanto & Noer, 2017). This learning is also called guided discovery.

The learning process encourages students to construct and develop their thinking creatively and actively. This is done through teacher-guided discovery. Students are encouraged to hypothesize, diagnose, and conceptualize from the learning materials they receive. Hanafiah and Suhana argue that guided learning involves deductive reasoning that leads students to conclusions from an investigation (Setiani & Junni Priansa, 2015). The teacher's role here is to guide students through problem-solving, so that, during the guided discovery learning process, students are more creative in solving problems and more independent in their learning. The author develops an e-

module with a guided discovery model for junior high school students that enhances students' creative thinking and mathematical development.

Previous research by Darmayanti et al. on the development of teaching materials in the form of guided discovery e-modules showed that the percentages of display and material experts met the validity criteria. In addition, the questionnaire responses provide interesting criteria that make e-modules appropriate for development as learning materials (Darmayanti et al., 2023). The difference between Darmayanti et al's research and this research is the purpose of use in e-modules. Darmayanti et al.'s e-module research was used to facilitate students' independent learning using the HOTS model. The researcher's e-module is used to facilitate students' creative thinking and mathematical skills. Furthermore, research by Aprianka, Setiani, and Imswatama on the validity of e-modules that facilitate students' mathematical creative abilities shows a validity of 90% (Aprianka et al., 2021). The difference between this research and the researcher's research is the use of an e-module base. Aprianka et al used an open-ended base, while the researcher used a guided discovery base. Then, the previous research related to the researcher's research is by Ferdiani and Pranyata, who developed e-modules on statistical material to improve mathematical creative thinking skills, which proved effective (Ferdiani & Pranyata, 2022). The difference between Ferdiani & Pranyata's research and the researcher's research lies in the basis used. Ferdiani & Pranyata used the PjBL (Project Based Learning) base, while the researcher used the guided discovery base.

METHOD

If traced, the type of research used by researchers is Research and Development (R&D). The subjects in this study were class VIII students at SMPS YPPI Perawang, totaling 22 participants. The selection of subjects in this school is based on the school's permission to use communication devices such as cellphones and laptops. With this availability, students can implement e-modules at school. In addition, the students' academic ability is relatively evenly distributed, including both low- and high-ability students. In addition, there is also no grouping of certain students who are included in the superior class in the distribution.

The research methodology used is ADDIE, which consists of 5 stages: analyze, design, develop, implement, and evaluate. During the analysis stage, the focus is on performance and needs analysis. In the design stage, the e-module cover design is carried out, including identifying and analyzing the basic competencies and indicators of competency achievement implemented in learning activities, and compiling the e-module writing format. In addition, during this process, instruments used to validate the e-module are developed, including validation instrument sheets, validation material sheets, validation technology or display sheets, and practicum sheets for e-module development. Furthermore, during development, submit the e-module to the validator for review and provide suggestions to improve it. After that, the implementation stage was continued. After making revisions based on the validator, proceed with the e-module product trial for students in small groups. After that, test the product with a small group and make revisions based on their trials. Moreover, finally, the evaluation stage is carried out at each previous stage. This evaluation process aims to identify the advantages and disadvantages of the developed teaching materials.

The data collection method used is a questionnaire. This method is used to obtain data on validity and practicality from students and validators. The feasibility of the expected product is assessed using the product validity questionnaire. Meanwhile, to assess the product's practicality, a questionnaire was administered to students in small, limited groups. The instruments used to test the validity of the developed product are validation questionnaires for the material and display/technology sections. The indicators used in the e-module validity test are content feasibility, presentation feasibility, language, and graphics. The following is a grid of the validity questionnaire for the material and technology section.

Table 1. Questionnaire Grid for E-Module Material Expert Validity

No	Aspects	Indicators	Statement Number	Number
1	Content Suitability	Material Suitability Material Accuracy Learning Material Support	1,2,3 4,5,6,7 8,9,10,11,12,13,14	14
2	Presentation Suitability	Presentation Techniques Learning Presentation Presentation Completeness	15,16 17 18,19,20	6
3	Language Suitability	Suitability for Students Communicative Coherent and Integrated	21 22,23 24	4
4	Suitability of Guided Discovery Basis	Suitability for Guided Discovery Steps	25,26,27,28,29,30	6
5	Suitability of Mathematical Creative Thinking Ability Indicators	Suitability for Mathematical Creative Thinking Ability Inddicatotrs	31,32,33,34,35,36,37, 38	8
		Number of Statements		38

Table 2. Questionnaire Grid Expert Validity Display/Technology E-Module

No	Aspects	Indicator	Assessment Items	Statement Number	Number
1	Graphic Suitability	Page Display Size of the E-Module	The Suitability of the E-Module Page Size with The Content Design	1	1
		Cover Design	Layout Suitability	2,3,4,5	7
			Cover Writing Style	6,7	
			Use of Words	8	
		Content Design	Reflection of Content	9,10,11	9
			Layout Suitability	12,13,14	
			Layout Completeness	15,16	
			Layout Comprehension	17,18	
			Content Writing Format	19,20,21,22,23	
			Illustration of Contents	24.25.26.27	
		Number of Statements			27

For instruments that test practicality, student response questionnaires are used. The indicators used to assess the practicality of e-modules are ease of implementation, ease of assessment, and clear instructions. The following is an outline of the practicality questionnaire used.

Table 3. Practicality Questionnaire Grid for E-Modules

No	Aspects	Indicator	Statement Number	Sum
1	Presentation of Material	Ease of instructions and information	1	9
		Packaging and relevance of materials	2	
		Ease of understanding the material	3,4	
		Clarity of terms	5,6,7	
		The relevance of exercises and evaluation questions to the material	8,9	
2	Media / Display	Cover	10,11,12	15
		Text	13,14	
		Availability of examples, illustrations, and images	15,16	
		Completeness of module components	17,18,19,20,21,22,23, 24	
3	Learning with E-Modules	Teaching and learning activities	25,26,27,28,29	5
4	Benefits	Ease of learning	30	3
		Interest in using e-modules	31	
		Motivation to learn	32	
		Number of Statements		**32**

The data analysis process includes descriptive analysis, qualitative analysis, and descriptive quantitative analysis. Qualitative data analysis includes evaluating suggestions and comments from validators and students. Meanwhile, quantitative data analysis aims to assess the validity and practicability of the e-modules developed.

The guidelines for interpreting the validity and practicality of the data can be seen in the following consecutive Table (Mawaddah & Muhandaz, 2023).

Table 4. Criteria E-Module Validity Results

Idealization Percentage	Criteria
$80 \leq V \leq 100$	Highly Valid
$60 \leq V < 80$	Valid
$80 \leq V < 60$	Moderately Valid
$20 \leq V < 40$	Less Valid
$0 \leq V < 20$	Invalid

Table 5. Criteria for E-Module Practicality Results

Idealization Percentage	Criteria
$80 \leq V \leq 100$	Highly Practical
$60 \leq V < 80$	Practical
$80 \leq V < 60$	Moderately Practical
$20 \leq V < 40$	Less Practical
$0 \leq V < 20$	Impractical

RESULTS AND DISCUSSION

The results of this study are teaching materials in the form of e-modules based on guided discovery, designed to facilitate students' creative thinking and mathematical skills in junior high school/Islamic junior high school. The e-module developed is based on the ADDIE procedure, which can be detailed as follows: analysis, design, development, implementation, and evaluation. The analysis stage is the first step in examining learning in schools. The work analysis consists of performance analysis and needs analysis. At the design stage, the components include a cover, introduction, Table of Contents, description and objectives of the e-module, instructions for using

the e-module, competency achievement indicators, learning models, specific skills, concept maps, learning stages, summaries, and exercises.

The next stage of development is the assessment of the e-module by subject matter experts and display/technology experts. The following are the validation results.

Table 6. Learning Material Validation Results

No	E-Module Validity Variable	Score Obtained	Maximum Score	Percentage
1	Content Suitability	323	350	93%
2	Presentation Suitability	140	150	93%
3	Language Sutability	93	100	94%
4	Guided Discovery Suitability	139	150	93%
5	Mathematical Creative Thinking Skills	178	200	89%
	Total	**873**	**950**	**92%**

Based on Table 6, it can be seen that the overall validation obtained from the validator is 873 with a percentage of 92%. The suggestions for improvement obtained from the validator are as follows.

Table 7. Learning Material Validation Suggestions

No	Advices	Description
1	Adding more exercises to each learning activity	has been fixed
2	Correcting ambiguous words in e-modules	has been fixed
3	Correcting writing errors	has been fixed

The results of the technology expert survey calculated by the validator can be seen as follows.

Table 8. Display Validation Results

No	E-Module Validity Variables	The Score Obtained	Maximum Score	Percentage
1	Graphic Suitability	356	405	88%
	Total	**356**	**405**	**88%**

Based on the table, it can be seen that the overall validation value is 356 with a category of highly valid. With a maximum score of 405 and a validity percentage of 88%. The next stage of implementation was carried out by testing the product on a small group first. The following are the results of the small group practicality questionnaire calculations.

Table 9. Small Group Practicality Questionnaire Results

No	E-Module Practicality Variables	The Score Obtained	Maximum Score	Percentage
1	Presentation of material	743	950	78%
2	Display Media	1132	1425	80%
3	Learning with E-Modules	366	475	77%
4	Benefits	226	285	79%
	Total	**2467**	**3135**	**79%**

Furthermore, in a limited group experiment, the following results were obtained:

Table 10. Limited Group Practicality Results

No	E-Module Practicality Variables	The Score Obtained	Maximum Score	Percentage
1	Presentation of material	827	990	83%
2	Display media	1440	1650	88%
3	Learning with e-modules	479	550	87%
4	Benefits	275	330	85%
	Total	**3021**	**3520**	**86%**

Based on the Table above, the e-module's practicality score is 86%, placing it in the convenient category. In the final stage, namely evaluation, improvements were made to the analysis, design, development, and implementation processes based on suggestions from validators and students to enhance the e-module.

Before discussing the validity and practicality of the developed e-module, it is essential to outline the procedures involved in its creation. The first step in the ADDIE procedure is analysis. The performance analysis section is conducted to detail the material's general content. This performance analysis comprises structural and conceptual analyses. The content structure analysis consists of core competencies, basic competencies, and competency achievement indicators. The concept analysis consists of dividing meetings during learning into sub-topics: flat-sided spatial elements, the perimeter of flat-sided spatial elements, the surface area of flat-sided spatial elements, the volume of flat-sided spatial elements, and combined flat-sided spatial elements.

Next, analyze the needs by looking at the availability of teaching materials in the schools studied. In this case, the schools have teaching materials in the form of printed books and question collections as support. In this case, e-module teaching materials are not yet used, especially since students are allowed to bring mobile phones to class, but they can only be used during study time and under teacher supervision. During the design stage, several points need to be considered, such as the design of the cover and e-module, the sequence of the e-module content, the use of colors, font types, images, and content that describes material on flat-sided shapes. The design must be made attractive so that students get a positive impression during the learning process.

At this stage of development, we examined changes in the creation of e-modules across various aspects. During the material validation process, three critical points needed improvement: adding more practice questions to each learning activity, correcting ambiguous words in the e-modules, and correcting writing errors. The addition of questions in each subchapter of the lesson aims to help students better understand the material through various question types and to gain a broader understanding of flat-sided shapes, particularly by facilitating creative mathematical thinking. Sentence or word corrections were made due to ambiguity and writing errors. This could lead to misunderstandings in the material, which is why corrections are needed. As a result, the score obtained in the validation of this material was 92%.

Furthermore, the display/technology validation obtained a validity score of 88%. The improvements included adjusting the colors in the images and the cover, reducing the size of the name on the cover, and adding a prayer for learning. Adjustment of colors used in the e-module because the colors used are too contrasting and do not match other colors, especially on the cover. In addition, the author's name is too large and disproportionate to the cover, making it uncomfortable to read. And the last improvement is the addition of a prayer at the beginning of the e-module to prepare students before learning and build spiritual values before learning begins.

The fourth stage of ADDIE is implementation. The implementation stage begins with testing the product on a small group first. In the process, students are given a sample e-module and then asked to understand its contents. After understanding the contents, students are given a practical questionnaire to complete and provide suggestions for the e-module. In small group trials, the images in the e-module were blurry, so the questions were not clearly conveyed. In addition, there were only a few questions in the e-module, so more queries and variations should be added to improve students' understanding of the material and ensure the e-module yields satisfactory evaluation results. After revising the e-module, a practicality test was conducted across different classes, yielding a practicality percentage of 86%, categorized as very practical.

In practice, this e-module makes it easier for students to understand flat-sided shapes because its detailed yet easy-to-understand steps guide them through each stage. The questions provided also encourage students to find varied, flexible, unique, and detailed solutions, as the e-module's questions incorporate components of creative mathematical thinking.

In conducting this research, there were certainly imperfections. There were several shortcomings, such as the material in this e-module being limited to flat-sided shapes, and the fact

that the students had never been introduced to or used e-modules for learning, so it took time to teach them how to use them and to help them adjust to them.

One of the studies that discusses the validity and practicality of teaching materials that use guided discovery bases is the work of Zakiamani et al., whose research related to the validity and practicality of mathematics learning devices in the form of LKPD at the junior high school level obtained results that were very valid and practical for the LKPD tested (Zakiamani et al., 2020). This output aligns with research conducted using the same teaching materials, but with different types. In addition research on the development of student worksheets (LKPD) based on problem-based learning towards mathematical creative thinking skills presents results that are significantly valid and very practical, so that they can encourage students to improve their skills in mathematical creative thinking in schools (Astiwi & Siswanto, 2024; Nurmala et al., 2021; Saqilah et al., 2023).

CONCLUSION

According to the results and discussions presented in this study, the development of e-modules yields validity percentages of 92% for learning materials and 88% for learning technology aspects. Furthermore, the practicality in limited groups is 86% and is categorized as very practical. Based on the results, the e-module, which uses guided discovery to facilitate junior high school/Islamic junior high school students' mathematical creativity, is feasible to use.

REFERENCES

Aprianka, S., Setiani, A., & Imswatama, A. (2021). Validitas E -Modul Berbasis Open Ended Meteri Sistem Persamaan Linear Dua Variabel Pada Pembelajaran Daring untuk Siswa SMK. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(3), 3111–3122. https://doi.org/10.31004/cendekia.v5i3.896

Asrial, A., Syahrial, S., Maison, M., Kurniawan, D. A., & Piyana, S. O. (2020). Ethnoconstructivism E-Module to Improve Perception, Interest, and Motivation of Students In Class V Elementary School. *JPI (Jurnal Pendidikan Indonesia)*, *9*(1), 30–41. https://doi.org/10.23887/jpi-undiksha.v9i1.19222

Astiwi, W., & Siswanto, D. H. (2024). Pengembangan e-LKPD pada Materi Relasi dan Fungsi dengan Model PAKEM untuk Meningkatkan Kemampuan Berpikir Kreatif. *Jurnal Praktik Baik Pembelajaran Sekolah Dan Pesantren*, *3*(03), 118–132. https://doi.org/10.56741/pbpsp.v3i03.684

Darmayanti, R., Utomo, D. P., Choirudin, C., & Usmiyatun, U. (2023). E-Module Guided Discovery Learning Model In The HOTS-Based Independent Learning Curriculum. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *12*(1), 1–10. http://dx.doi.org/10.24127/ajpm.v12i1.6256

Ferdiani, R. D., & Pranyata, Y. (2022). E-Modul Berbasis STEM PjBL untuk Meningkatkan Kemampuan Berpikir Kreatif Selama Pandemi Covid-19. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *11*(3), 1875. https://doi.org/10.24127/ajpm.v11i3.5141

Hadi, S., & Novaliyosi, N. (2019). TIMSS Indonesia (Trends In Internasional Mathematics and Science Study). *Prosiding Seminar Nasional & Call For Papers*. https://jurnal.unsil.ac.id/index.php/sncp/article/view/1096

Hamam, N., Abdullah, I. H., & Angkotasan, N. (2022). Analisis Kemampuan Berpikir Kreatif Matematis Siswa SMP IT Albina Kota Ternate pada Materi Operasi Bilangan Bulat. *Jurnal Pendidikan Guru Matematika*, *2*(1), 24–32. https://doi.org/10.33387/jpgm.v2i1.4125

Ismara, L. (2017). Kemampuan Berpikir Kreatif Matematis Siswa dalam MenyelesIKn Soal Open Ended di SMP. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa (JPPK)*, *6*(9), 1–8. https://doi.org/10.26418/jppk.v6i9.21696

Jafnihirda, L., Suparmi, S., Ambiyar, A., Rizal, F., & Pratiwi, K. E. (2023). Efektivitas Perancangan Media Pembelajaran Interaktif E-Modul. *Innovative: Journal Of Social Science Research*, *3*(1), 227–239.

Jayanto, I. F., & Noer, S. H. (2017). Kemampuan Berpikir Kreatif dengan Pembelajaran Guided Discovery. *Prosiding Seminar Nasional Matematika dan Pendidikan Matematika*.

Kosasih, E. (2021). *Pengembangan Bahan Ajar*. Bumi Aksara.

Larasati, S. (2018). Desain Pengembangan Modul Pemahaman Konsep Berbasis Metode Penemuan Terbimbing. *UNION: Jurnal Pendidikan Matematika*, *6*(2), 185–196. https://doi.org/10.30738/.v6i2.2224

Magdalena, I., Prabandani, R. O., Rini, E. S., Fitriani, M. A., & Putri, A. A. (2020). Analisis Pengembangan Bahan Ajar. *NUSANTARA: Jurnal Pendidikan Dan Ilmu Sosial*, *2*(2), 180–187. https://doi.org/10.36088/nusantara.v2i2.805

Mawaddah, M., & Muhandaz, R. (2023). Lembar Kerja Siswa Berbasis Pendekatan Open-Ended Pada Materi Relasi dan Fungsi. *Juring (Journal for Research in Mathematics Learning)*, *6*(2), 195–204. http://dx.doi.org/10.24014/juring.v6i2.18712

Moma, L. (2015). Pengembangan Instrumen Kemampuan Berpikir Kreatif Matematis untuk Siswa SMP. *Delta-Pi: Jurnal Matematika dan Pendidikan Matematika*, *4*(1), 27–41. https://doi.org/10.33387/dpi.v4i1.142

Nisa, H. A., Mujib, M., & Putra, R. W. Y. (2020). Efektivitas E-Modul dengan Flip Pdf Professional Berbasis Gamifikasi Terhadap Siswa SMP. *Jurnal Pendidikan Matematika Raflesia*, *5*(2), 13–25. https://doi.org/10.33369/jpmr.v5i2.11406

Nur Aeni, W., & Widodo, W. (2022). Penggunaan E-ModulInteraktif untuk Meningkatkan Hasil Belajar Siswa SMP pada Materi Kalor. *Pensa E-Jurnal: Pendidikan Sains*, *10*(2), 193–202. https://doi.org/10.26740/pensa.v10i2.44740

Nurmala, R., Fikriani, T., & Ayu, C. (2021). Pengembangan lembar Kerja Peserta Didik Berbasis Problem Based Learning terhadap Kemampuan Berpikir Kreatif Matematis. *PYTHAGORAS: Jurnal Program Studi Pendidikan Matematika*, *10*(2), 140–147. https://doi.org/10.33373/pythagoras.v10i2.3194

Rismayanti, T. A., Anriani, N., & Sukirwan, S. (2022). Pengembangan E-Modul Berbantu Kodular pada Smartphone untuk Meningkatkan Kemampuan Berpikir Kritis Matematis Siswa SMP. *Jurnal Cendekia*, *6*(1), 859–873. https://doi.org/10.31004/cendekia.v6i1.1286

Ruslan, R., Hamda, H., & Rahayu, N. (2021). Deskripsi Kreativitas dalam Menyelesaikan Soal Berbasis Timss Ditinjau dari Kemampuan Awal Matematika Siswa SMPN 2 Barombong. *IMED: Issues in Mathematics Education*, *5*(1), 56–61. https://doi.org/10.35580/imed44856

Safaria, S. A., & Sangila, M. S. (2018). Kemampuan Berpikir Kreatif Matematis Siswa SMP pada Materi Bangun Datar. *Al-TA'DIB: Jurnal Kajian Ilmu Kependidikan*, *11*(2), 73–90. https://doi.org/10.31332/atdb.v0i0.986

Saqilah, E., Kurniati, A., & Rahmi, D. (2023). Pengembangan Lembar Kerja Siswa Berbasis Problem Based Learning untuk Memfasilitasi Kemampuan Berpikir Kreatif Siswa. *Suska Journal of Mathematics Education*, *9*(2), 93–102. http://dx.doi.org/10.24014/sjme.v9i2.22138

Setiani, A., & Junni Priansa, D. (2015). *Manajemen Peserta Didik dan Model Pembelajaran Cerdas, Kreatif, dan Inovatif*. Alfabeta.

Widiani, T., Rifat, M., & Ijuddin, R. (2016). Penerapan Pendekatan Saintifik dan Pengaruhnya terhadap Kemampuan Komunikasi Matematis dan Berpikir Kreatif Siswa. *JPPK: Jurnal Pendidikan Dan Pembelajaran Khatulistiwa*, *5*(1), 1–14. https://doi.org/10.26418/jppk.v5i1.13550

Zakiamani, A., Zulkarnain, Z., & Maimunah, M. (2020). Validitas dan Praktikalitas Perangkat Pembelajaran Matematika: Studi Pengembangan di SMPN Islam Teknologi Rambah. *Juring (Journal for Research in Mathematics Learning)*, *3*(3), 211–224. http://dx.doi.org/10.24014/juring.v3i3.10285