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Development of E-Modules Based on Puger Marine Local Potential to Improve students' Creative Thinking Ability in Junior High school Science Learning

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Abstract

Creative thinking ability is the ability of students to generate new ideas and ideas and solve problems by creating innovative solutions. The purpose of this study was to assess the validity, practicality, and effectiveness of e-modules based on the local potential of Puger marine in improving students' creative thinking skills. This research uses the ADDIE development model which includes five main stages, namely analysis, design, development, implementation, and evaluation. The results showed that the percentage of validity of the Puger e-module was 90%, the percentage of practicality of the e-module based on the local marine potential of Puger was 86%, the percentage of effectiveness of the e-module based on the local marine potential of Puger was 91% and the n-gain value was 0.68 so that the e-module based on the local marine potential of Puger was concluded to be valid, practical, and effective to improve students' creative thinking skills in science learning in junior high school. Puger as a marine potential in Jember can be utilized as a learning resource, making it easier for students to understand learning because it is close to everyday life.

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INTRODUCTION

The 21st century is often referred to as an era in which technology develops rapidly, demanding extensive knowledge, abilities, and expertise. This development requires the world of education to prepare students to face the challenges of life, one of which is the ability to think creatively (Imaroh et al., 2022). Creative thinking ability are the ability to generate new ideas and ideas and solve problems by creating innovative solutions and predicting various possibilities that occur (Widodi et al., 2023). Creative thinking ability involve analyzing existing data or information to produce a better current concept and determine various alternative solutions with various innovative ideas. (Siregar et al., 2020).

Creative thinking ability include important abilities that must be possessed by a student, especially in the learning process. By thinking creatively, students are expected to be able to understand, master, and solve the problems they face. When there is a problem faced by students, they are expected to be able to propose various ideas or creative new alternative solutions to analyze so that the problem at hand can be solved (Febrianingsih, 2022). In line with the statement of Widana & Septiari et al., (2021) creative thinking ability are an important ability in the era of the Industrial Revolution 4.0, because changes occur quickly and dynamically, so that unconventional ways of thinking or the ability to generate new ideas are needed. This ability is very important so that students are able to adapt themselves to an environment that is always changing and full of uncertainty.

Previous research from Kurnia et al., (2021) each indicator of students' creative thinking ability was categorized as low, with details of fluency at 39.81%, flexibility at 45.87%, originality at 38.02%, and elaboration at 35.67%. The low level of creative thinking skills is also shown from Kamalia & Ruli's research (2022) where the creative thinking skills test conducted on students obtained results in the high category only by 25%, the medium category by 31.25%, and the low category by 43.75%. In line with the research of Fakhirah et al., (2023) that the results of his research show that in learning science, students' creative thinking skills are in the low category, where only 3 students are creative, 3 students are in the moderate category, and 18 students are in the less creative category, especially in the indicators of flexibility (flexible thinking) and originality (original thinking).

Students' low creative thinking ability are due to the use of teaching materials that are still in the form of package books with a tendency to be less practical. As a result, students' interest in using these teaching materials is reduced because not all teachers develop them (Qonitah et al., 2022). In line with the research of Wijaya et al. (2022), the factor that causes the low creative thinking ability of students is because learning is still focused on using printed books only. Based on research by Romayanti et al., (2020) that package books can only be used during class hours and cannot be taken home, so that when at home students do not have learning materials. Thus, the teaching materials used must be able to attract students' attention, as well as practically used by students at any time so that their creative thinking ability can be improved.

Based on information obtained from the science teacher at SMP Negeri 2 Jember through interviews, science learning at SMP Negeri 2 Puger has not been fully oriented towards creative thinking ability. This is because teachers still adjust students' abilities in creative thinking, so the level of students' creative thinking ability at SMP Negeri 2 Puger is still low. In addition, science learning at SMP Negeri 2 Puger also has not used e-modules, which are only limited to printed books. Teaching materials that can make students' interest in learning increase and can be used practically for the learning process are e-modules. In line with Romayanti's statement, (2020) low creative thinking can be done by making innovations in learning, where students can be supported to learn independently. One way is to develop teaching materials such as e-modules so that students' interest in learning can increase. There is also a statement from Wahyuliani et al., (2022) that teaching materials that meet the needs of students and can provide an increase in their creative thinking ability, one example is e-modules.

The e-modules used in the learning process can be further developed to support students' understanding of concepts, one of which is by developing e-modules based on local potential. In line with the statement of Nuryah et al. (2022) that learning that utilizes local potential can provide

students with a more real experience. The purpose of local-based learning is to train students who are always connected to the real conditions around them so that it is easier to understand the material (Laily *et al.,* 2024).

Indonesia is known as a maritime country so that it has abundant marine potential. One of the marine potentials in Indonesia is in Jember Regency, more precisely in Puger District. The most prominent marine potential in Puger Regency is in the fisheries sector (Ulfa & Muhammad, 2023). This local potential can be read by teachers to be used as a learning resource for students by including some of the results of Puger's marine potential. By integrating local potential into learning, various concepts learned by students will be easy to understand because they are close to their lives (Rahmi et al., 2023). Therefore, the researcher intends to conduct a study "Development of E-Modules Based on Local Potential of Puger Waters to Improve Students' Creative Thinking Skills in Junior High School Science Learning". This study aims to develop an e-module that utilizes the local potential of Puger waters that is valid, practical, and effective.

METHODS

This research is included in the type of research and development or Research and Development. The development model used is ADDIE with the aim of assessing the validity, practicality, and effectiveness of e-modules based on the local potential of Puger marine. The development of the ADDIE model can be seen as shown below which consists of 5 stages.

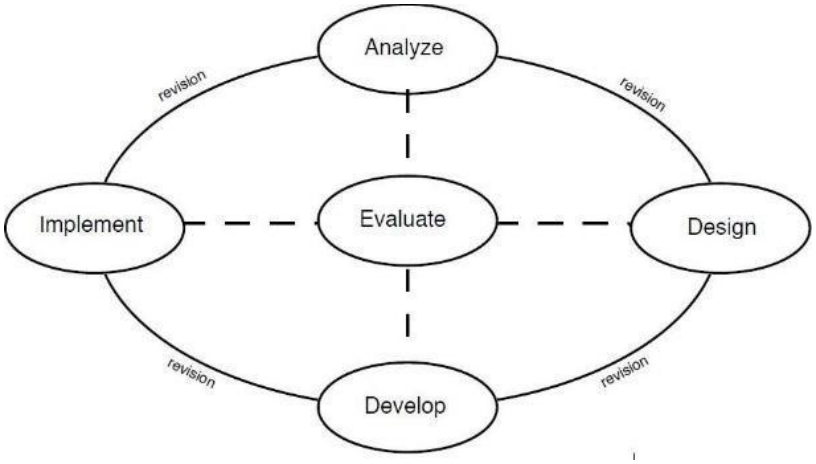

Figure 1. Research design of ADDIE development model (Branch, 2009)

At the Analyze stage, researchers conducted an analysis to identify needs before starting product development. This analysis includes student needs, curriculum, and products to be developed. At the Design stage, researchers compiled an outline design format of e-modules based on the local potential of Puger marine which was adjusted to the results of the previous stage analysis, namely making covers and templates first. At the Develop stage, researchers developed the e-module further by adding materials, images, videos, and others. The results of product development in the form of e-modules will be validated by validators before being implemented. At the Implement stage, researchers implement the local potential-based e-Modules that have been tested for validity to students in the learning process. This stage includes pretest, learning by using e-modules based on local potential, and posttest after learning. The Evaluate stage revises the local potential-based e-module based on suggestions and input from validators. The suggestions and input are considered in revising the e-module to further improve the e-module.

The ADDIE development model was chosen as the research design because in the ADDIE model, evaluation is conducted throughout the development process (not just at the end). This allows for improvements and adjustments that can improve the quality of learning in a sustainable manner. Based on this research, the evaluation stage is carried out after the develop stage, this is because after validation in the develop stage, the validator provides some suggestions and input to improve the content of the e-module developed by the researcher.

The evaluation is carried out in the form of revising the e-module based on suggestions and input from the validator.

Research Subject

The samples used in this study were students of class VII A SMP Negeri 2 Puger in the 2024/2025 school year with the curriculum used, namely the independent curriculum to test the improvement of students' creative thinking skills.

Data Analysis Technique

1. Validity of e-modules

The data analysis techniques applied include validity, practicality, and effectiveness analysis. The validity results were obtained from the validity sheet that had been filled in by three validators and then calculated according to the following formula.

$$V = \frac{Total\ score\ obtained}{Total\ maximum\ score} \times 100\%$$

Description:

V = Percentage of e-module validity

The percentage of validity of the e-module obtained is then adjusted to the validity criteria in table 1 below.

Table 1. E-module validity category

Validity percentage	Category
85%<V≤ 100%	Very valid
70%<V≤ 85%	Valid
50% <V≤ 70%	Less valid
V≤ 50%	Invalid

(Nesri & Kristanto, 2020)

2. Practicality of e-modules

The acquisition of the e-module practicality score that has been filled in by all VII B class students is calculated based on the following formula.

$$P = \frac{Total\ score\ obtained}{Total\ maximum\ score} \times 100\%$$

Description:

P = Percentage of practicality

Furthermore, the percentage of e-module practicality obtained is adjusted to the criteria in table 2 below.

Table 2. E-module practicality category

Percentage of practicality	Category
85%<P≤ 100%	Very practical
70% <P≤ 85%	Practical
50% <P≤ 70%	Less practical
$P \leq 50\%$	Impractical

(Wahyuni *et al.*, 2022)

3. Effectiveness of e-modules

The data analysis technique for the effectiveness of e-modules based on the local potential of Puger marine was carried out by calculating the n-gain score from the pretest and posttest as well as the student response questionnaire. The n-gain score is calculated using the following formula.

$$g = \frac{(Average\ posttest) - (Average\ pretest)}{Maximum\ score - (Average\ pretest)}$$

Description :

g = Average n-gain score

Next, the scores from the n-gain test obtained are adjusted to the criteria in table 3 below.

Table 3. Kriteria efektivitas e-modul

N-Gain	Category
$g \geq 0{,}7$	High
$0{,}30 \leq g \leq 0{,}7$	Medium
$g \leq 0{,}30$	Low

(Hake, 1998)

The data analysis technique from the student response questionnaire was carried out using the following formula.

$$RS = \frac{number\ of\ students\ who\ chose}{total\ number\ of\ students} \times 100\%$$

Description:

RS = Percentage of student response

Next, the percentage of student response questionnaires that have been obtained is adjusted to the criteria in table 4 below.

Table 4. Student response questionnaire criteria

Percentage	Category
$85\% \leq RS$	Very good
$70\% < RS \leq 85\%$	Good
$50\% < RS \leq 70\%$	Medium
$RS \leq 50\%$	Low

(Khairiyah, 2018)

RESULTS AND DISCUSSION

This research aims to develop a product in the form of e-modules based on the local potential of Puger marine which is valid, practical, and effective to improve students' creative thinking ability in junior high school science learning. This e-module is designed by integrating local elements that are relevant to students' daily lives and refers to the local potential of Puger marine. The researcher started the research process by conducting observations and interviews to the target school directly, namely SMP Negeri 2 Puger. This aims to obtain the necessary information about the situation and conditions of the school as the basis for product development. The target of analysis includes the curriculum applied, student characteristics, and challenges or obstacles in the learning process.

The analysis was continued by observing the fish auction and beach in Puger and interviewing one of the fish traders there. This aims to collect information needed in product development and prepare content related to the local marine potential of Puger. Based on the results of these observations and interviews, the most abundant marine potential of Puger is fish and other marine biota such as shellfish and squid. These marine biota reflect the marine potential that can be utilized and become an icon of the local potential of the marine sector in Puger Sub-district.

Figure 2. Local marine potential of Puger

The preparation of products based on the local marine potential of Puger was initially in the form of a community training module on the utilization of shell waste applied to the Puger community through training activities. This is because clams, which are the local potential there, produce quite a lot of shell waste. Therefore, training on the utilization of shell waste was conducted to find out that waste derived from Puger's marine potential, namely shells, can be utilized into something of value, such as decorations on frames. In addition, to identify obstacles that may arise during implementation to be used as evaluation material for improving the e- module. The training activity on the utilization of clam shell waste was included as part of learning activity 3 in the e-module developed and applied in science learning in class VII A.

Figure 3. Training activities in Puger community

Based on the needs analysis, the curriculum used, and the local marine potential of Puger, it can be concluded that teaching materials are still limited to package books, while the utilization of learning technology such as e-modules has not been optimally utilized in the learning process. This shows the need for more innovative and contextual teaching materials to support students' deeper understanding. As a response to this need, researchers developed an e-module integrated with

the local marine potential of Puger. This e-module is designed so that students can learn using learning resources that are more relevant to their surrounding environment, so that the material becomes easier to understand.

After the analysis stage is complete, it is continued with the design stage which aims to produce an e-module design according to the results of the previous analysis. The initial design of the e-module is using the Canva application by creating a format first which is then followed by the preparation of the material systematically. The e-module format is designed in accordance with science learning based on the local potential of Puger marine, so that it can reflect the context and characteristics of the material being taught. In the design process, there are several main aspects that are considered, including a neat and attractive layout, the selection of appropriate font types and sizes, and the use of colors that support visual appeal. In addition, supporting elements such as images and videos are also added to increase students' understanding of the material presented. The initial part of the e-module begins with a contextually designed cover, which reflects the identity of the e-module and provides an initial overview of the contents of the e-module.

Result and analysis of e-module validity

The validity of the e-module is obtained at the develop stage, so at this stage the e-module is validated by the validator. After the initial design stage was completed, a local potential-based e-module was developed by referring to the local potential of Puger marine and associated with indicators of creative thinking skills. This e-module was designed for grade VII with the material Characteristics and Classification of Living Things integrated with the local potential of Puger marine. This e-module based on the local potential of Puger marine includes four learning activities, namely learning activity 1 (living things or inanimate objects), learning activity 2 (grouping living things), learning activity 3 (diverse living things), and learning activity 4 (development of classification of living things).

Each learning activity in the e-module includes various elements, such as stimulus, learning materials, images, videos, and activities. The images and videos available in the e-module are specifically designed to provide interesting information, so that students seem to be able to see directly without imagining abstractly. In addition, the activities available are tailored to the indicators of creative thinking skills so that they aim to train students' creative thinking skills. With these activities, students' involvement in learning can increase as well as encourage greater curiosity about the material being studied. The following is the appearance of the e-module that has been developed and ready for validation.

Figure 4. E-module display that is ready to be validated

Table 4. Results of the validity analysis of the e-module

Assessment aspect	Validator percentage (%)			Percentage (%)	Kategori
	Validator 1	Validator 2	Validator 3		
Content Validity	97	100	97	98	Very valid
Construct Validity					
a. Graphics	75	81	94	83	Valid
b. Language	88	81	94	88	Very valid
Score average	87	87	95	90	Very valid

Based on the validation results in table 4.1, the validity of the Puger marine potential-based e-module validated by three validators has an average percentage of 90% which is included in the very valid category. Each aspect of the assessment reached valid and very valid criteria, with details of the percentage of content aspects of 98%, 83% grammatical aspects, and 88% language aspects. These results indicate that the e-module based on the marine potential of Puger is feasible to use in learning, although it still needs a little revision to be more optimal. Therefore, at this stage of development, the evaluation stage is also carried out by considering the suggestions and input from the validators so that the product is more optimal when applied in the science learning process.

The content validation aspect obtained a percentage of 98% which was included in the very valid category. This shows that the content of the e-module developed by researchers is in accordance with applicable curriculum standards. In line with Zaputra et al., (2021) the valid e- module content shows that the exercises contained in it are in accordance with the material that must be taught. The designed e-module needs to meet the demands of the curriculum and adjust to the characteristics of the teaching material. In addition, the content of the material presented in the e-module is supported by various images and videos that are in accordance with the local marine potential of Puger. The local potential aims to facilitate students' understanding because it is close to their surrounding environment. In line with Pratama et al. (2018), the e-module developed must be in accordance with the students' living environment so that it can help their understanding become easier.

The construct validation aspect consists of the graphics and language used in the e-module. Graphics are included in the valid category with a percentage of 83%, thus indicating that the design e-modules developed by researchers are good and attractive. The colors displayed in the e- module are dominated by blue with the aim of highlighting its marine potential. In addition, the font type used is open sans with size 16, so it can be easily read by students. In line with Iklina & Fadilah (2022), making teaching materials there are several important things to consider in order to motivate students in the learning process, such as the color composition of the display, as well as the type and size of the font used. The language aspect obtained a percentage of 88% with a very valid category, this shows that the sentences in it are clear, easy to understand, and do not cause confusion so that it will make students understand the material listed in the e-module easily. In accordance with Octiana (2020), that one of the criteria for good learning must have clarity in the use of language and the language for students is certainly not difficult to understand. In addition, the use of appropriate vocabulary and the application of correct punctuation are needed in writing so that the meaning of writing can be conveyed clearly (Sukirman, 2020).

Result and Analysis of E-Modul Practicality

E-modules to know their practicality are tested in learning. E-modules that are tested in learning produce data related to the implementation of learning which is used as practicality data. This data is collected through observations by three observers for four meetings, which illustrates the extent to which e-modules can be used practically in real learning situations. Data on the practicality of using e-modules based on the marine potential of Puger can be seen in the table below.

Table 5. Results of the analysis of the implementation of learning using e-modules

Activities	Meeting (%)				Percentage (%)	Category
	1	2	3	4		
1. Using e-modul in learning	91	75	100	91	89	Very practical
2. Do the activities in the e-module	83	83	91	100	89	Very practical
3. Submit the result of their work	75	83	83	-	80	Practical
Average score	83	80	91	96	86	Very Practical

Data on the practicality of e-modules based on the local potential of Puger marine showed an average percentage of 86% from four learning meetings. The average percentage obtained is included in the very practical category. According to Yuliastuti & Soebagyo (2021) the purpose of the practicality assessment is to assess how practical the teaching materials developed and used in the learning process are. Meanwhile, to determine the level of practicality of teaching materials, it can be through the implementation of learning using these teaching materials (Jiwa, 2022). In detail, the practicality value at each meeting, namely meeting 1 has a percentage of 83%, meeting 2 has a percentage of 80%, meeting 3 has a percentage of 91%, and meeting 4 has a percentage of 96%. By obtaining a percentage of 86% which is included in the very practical category, it reflects that the learning carried out using e-modules based on the local potential of Puger marine runs well. In line with the statement of Wahyuni et al., (2021) the "very practical" category shows that teachers do not face difficulties when applying development products in learning activities.

Practicality refers to the level of ease of a product when used in the learning process. According to Widiastuti (2020), the practicality of teaching materials can be seen from two main aspects, namely efficiency in the use of time and user responses to these teaching materials. The practicality of teaching materials is reflected in the ease with which teachers and students can use them, according to the time allocation that has been set. In addition, the tools, materials, and learning media used are easy to access and use, so that teachers and students give positive responses to the learning process carried out. In line with Abdi et al. (2023) the practicality of learning can be said to be achieved if the development product is used effectively during the learning process.

The high and low level of practicality indicates the success of the e-module used in the learning process. The 2nd meeting was the meeting with the lowest percentage of practicality, which was 80% with a very practical category. However, despite including very practical criteria, the 2nd meeting also experienced obstacles, such as the lack of students' responsible attitude in participating in learning using e-modules. Some students tended to access other applications or sites besides the e-module, so they were less focused on completing the assigned tasks. In line with Syifa et al., (2022) obstacles in task completion can arise due to a lack of student responsibility and the ease of students losing focus.

Result and Analysis of E-Modul Effectiveness

The effectiveness of e-modules based on the local marine potential of Puger in improving creative thinking ability was obtained from tests, namely pretest and posttest, as well as scores from student response questionnaires. According to Mayresta (2022), the level of effectiveness of a teaching material can be seen from the n-gain value through the analysis of pretest and posttest scores. Data on pretest-posttest scores from students were analyzed to determine the increase in test scores before and after learning, so that its effectiveness can be known. Data analysis was carried out using the n-gain test to see the increase in pretest and posttest scores (Salma & Aini, 2023). The pretest and posttest scores obtained by students were analyzed using the N-gain test, with the following results.

Table 6. Result of analysis of pretest and posttest scores through the N-gain test

Component	Pretest	Posttest	N-gain	Category
Lowest score	25	69	0.68	Medium
Highest score	63	94		

The results of the analysis of pretest and posttest scores using the N-gain test in the table show a value of 0.68 which is included in the moderate category. This shows that e-modules based on the local potential of Puger marine can improve students' creative thinking skills. Pretest- posttest data from students is analyzed to determine the increase in test scores before and after learning, so that its effectiveness can be known. According to Mutmainnah et al., (2021) effectiveness refers to the impact resulting from an action. The effectiveness test is used to measure the level of success in learning activities. E-modules are considered effective if they can have a positive impact on student learning outcomes, which can be seen from the increase in student learning outcomes between before and after using e-modules.

Table 7. Result of analysis of pretest and posttest n-gain values for each indicator

Indicators of creative thinking ability	Average		N-Gain	Description
	Pretest	Posttest		
Fluency	58.33	89.58	0.75	High
Flexibility	52.77	84.02	0.66	Medium
Originality	34.72	91.66	0.87	High
Elaboration	26.38	60.41	0.46	Medium

Based on the analysis of the calculation of each indicator of creative thinking ability, the results show that the originality indicator has the highest N-Gain value of 0.87 and is included in the high category. The N-Gain value of the fluency indicator is in second place at 0.75 with a high category. This shows that students are able to solve problems and answer questions fluently. The N-Gain value of the flexibility indicator (flexible thinking) was 0.66 with a medium category. This shows that students are not fully able to answer questions by looking at the problem situation in various angles. The N-Gain value on the elaboration indicator is 0.46 which is in the medium category. It can be seen that some students are not fully able to answer questions in detail on this indicator of creative thinking ability. Based on the results of each indicator, for further research on creative thinking, researchers recommend focusing more on training flexibily and elaboration indicators in order to produce high n-gain values.

Table 8. Student response questionnaire analysis results

Aspect	Percentage (%)	Category
Attraction	90	Very good
Material	90	Very good
Language	93	Very good
Average	91	Very good

Student response questionnaires refer to student reactions and responses as measured through the results of questionnaires given regarding teaching materials (Maharani & Hakim, 2022). The results of the analysis of the student response questionnaire show that the average value of the student response questionnaire is very good. This indicates that the responses given by students are very positive in learning using e-modules based on the local potential of Puger marine. The value of the student response questionnaire in more detail, on the aspect of interest, obtained a percentage of 90% which was included in the very good category. E-modules can attract students' interest because they are equipped with images and videos, this is in

accordance with Nilai & Mustika (2022), that the advantage of e-modules is their higher attractiveness because they are equipped with features such as images, audio, and video, thus creating an interactive student learning experience, including in science learning.

A The material aspect in the student response questionnaire obtained a percentage of 90% in the very good category. This is because the material presented in the e-module can be easily understood by students because it is in accordance with the local potential in their area. In accordance with Sahil et al. (2023), the material in the e-module is arranged by connecting it to the values of local potential around students, so that they more easily understand the material through the surrounding natural environment. The language aspect obtained the highest percentage of 93% with a very good category. This is because the language used in the e-module can be easily understood by students. In line with Muzijah et al. (2020), e-modules function as teaching materials that support students using communicative and interactive language, making it easier to understand the subject matter.

CONCLUSION

The validity of the e-module based on Puger's local marine potential obtained a percentage of 90% with a very valid category, so this e-module is suitable for use in the science learning process of junior high school students. The practicality of the e-module based on Puger's local marine potential obtained a percentage of 86% with a very practical category, so the e-module is said to be very practical to use in science learning. The effectiveness of the e-module based on Puger's local marine potential obtained a percentage of student response questionnaires of 91% with a very good category and an n-gain value of 0.68 with a moderate category, so the e-module is said to be effective to use in junior high school science learning.

REFERENCES

Abdi, A., Aristya, P. D., & Budiarso, A. S. (2023). Pengembangan modul flipbook digital berbasis stem materi sistem pencernaan manusia untuk meningkatkan literasi sains. *Lensa (Lentera Sains): Jurnal Pendidikan IPA, 13*(1), 57-66. https://doi.org/10.24929/lensa.v13i1.294

Branch, R. M. 2009. *Instructional Design: The ADDIE Approach*. Springer Science Business Media, New York.

Febrianingsih, F. (2022). Kemampuan berpikir kreatif siswa dalam memecahkan masalah matematis. *Mosharafa: Jurnal PendidikanMatematika*, *11*(1), 119-130. https://doi.org/10.31980/mosharafa.v11i1.692

Florida, R., Mellander, C., dan King, K. (2015). *The Global Creativity Index, Martin Prosperty Institute*. Rotman School of Management.

Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, *66*(1), pp. 66-74. https://doi.org/10.1119/1.18809

Iklina, T., dan Fadilah, M. (2022). Validitas e-modul berbasis project based learning (pjbl) tentang materi sistem imun kelas xi SMA untuk meningkatkan kreativitas peserta didik. *Journal on Teacher Education, 4*(1), 250-262. https://doi.org/10.31004/jote.v4i1.6031

Imaroh, R. D., Sudarti, S., dan Handayani, R. D. (2022). Analisis korelasi kemampuan berpikir kreatif dengan model problem based learning (PBL) pada pembelajaran IPA. *Jurnal Pendidikan MIPA*, *12*(2), 198-204. https://doi.org/10.37630/jpm.v12i2.580

Jiwa, I. N. (2022). *Cara Sukses Mengembangkan Bahan Ajar Berbasis Keterampilan Proses Sains*. CV Bintang Semesta Media.

Khairiyah, U. (2018). Persepsi mahasiswa terhadap penggunaan sistem remote lab untuk praktikum otomasi industri. *AL-MURABBI: Jurnal Studi kependidikan dan Keislaman*, *5*(2), 197-204. http://dx.doi.org/10.23960/mtk/v9i4.pp456-466

Kurnia, A., Sukarmin, dan Sunarno, W. (2021). Profil kemampuan berpikir kreatif siswa menggunakan soal tes pilihan ganda pada pembelajaran ilmu pengetahuan alam. *Indonesian Journal of Educational Science*

(IJES), *4*(1), 27-32. https://doi.org/10.31605/ijes.v4i1.1147

Laily, Y. N., Ramadhani, A. U., Dimyati, M. F., & Wijayanti, A. (2024). OLGA: Innovative local wisdom-based marine ecology learning media for fifth-grade students. *Journal of Innovative Science Educatoin*, *13*(3), 134-146.

Maharani, A., dan Hakim, D. L. (2022). Responsi siswa terhadap bahan ajar e-LKPD matematika dalam materi persamaan garis lurus. *Jurnal Pendidikan Dan Konseling (JPDK),* *4*(6), 6321-6325. https://doi.org/10.31004/jpdk.v4i6.9294

Mayresta, R. (2022). Efectivieness of integrated powerpoint-ispring multimedia prompting questions on learning electrolyte and nonelectrolyte solutions based on guided discovery learning on the learning outcomes of class X high school students. *Journal of Educational Sciences*, *6*(4). 603-612.

Nesri, F. D. P., dan Kristanto, Y. D. (2020). Pengembangan modul ajar berbantuan teknologi untuk mengembangkan kecakapan abad 21 siswa. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *9*(3), 480-492. https://doi.org/10.24127/ajpm.v9i3.2925

Nuryah, D. F., Nuha, U., dan Wahyuni, S. (2022). The development of de djawatan loacl potencial- based e-module for scince learning to improve sciences process skills of junior high school students. *Jurnal Phenomenon*, *12*(1), 63-76. https://doi.org/10.21580/phen.2022.12.1.11822

Octiana, N., Rahmawati, D., dan Relsas, Y. (2020). Validitas booklet pada materi pola pewarisan sifat pada hukum mendel sebagai suplemen pembelajaran genetika di SMA. *Atrium Pendidikan Biologi: Jurnal Pendidikan Biologi*. *5*(3), 2656-1700.

Qonitah, S., Berlian, L., dan Biru, L. T. (2022). Validitas e-lkpd berbasis PBL tema energi dan makanan dalam menumbuhkan kemampuan berpikir kreatif peserta didik. *Jurnal Pendidikan MIPA*, *12*(3), 443-454. https://doi.org/10.37630/jpm.v12i3.636

Rahmi, M., Nurhidayati, S., dan Samsuri, T. (2023). Pengaruh bahan ajar berbasis potensi lokal terhadap kemampuan berpikir kritis dan sikap peduli lingkungan siswa. *Bioscientist: Jurnal Ilmiah Biologi*, *11*(1), 685-695. https://doi.org/10.33394/bioscientist.v11i1.7692

Romayanti, C., Sundaryono, A., dan Handayani, D. (2020). Pengembangan e-modul kimia berbasis kemampuan berpikir kreatif dengan menggunakan kvisoft flipbook maker. *Alotrop Jurnal Pendidikan dan Ilmu Kimia*, *4*(1), 51-58. https://doi.org/10.33369/atp.v4i1.13709

Salma, A., dan Aini, S. (2023). Efektivitas media pembelajaran power-poit interaktif berbasis inkuiri terbimbing pada materi larutan penyangga terhadap hasil belajar peserta didik. *Jurnal Pendidikan MIPA*, *13*(2), 514-519. https://doi.org/10.37630/jpm.v13i2.1097

Siregar, R. N., Mujib, A., Hasratuddin, dan Karnasih, I. (2020). Peningkatan kemampuan berpikir kreatif siswa melalui pendekatan matematika realistik. *Edumaspul: Jurnal Pendidikan*, *4*(1), 56-62. 10.33487/edumaspul.v4i1.338

Syifa, U. Z., Ardianti, S. D., dan Masfuah, S. (2022). Analisis karakter tanggung jawab anak dalam pembelajaran daring. *Jurnal Educatio FKIP UNMA,* *8*(2), 568-577. https://doi.org/10.31949/educatio.v8i2.2071

Ulfa, M., dan Muhammad, I. N. (2023). Peningkatan sektor perekonomian masyarakat Puger Kulon kabupaten Jember melalui pemanfaatan sumberdaya perikanan dengan penerapan konsep minapolitan. *ORGANIZE: Journal of Economics*, *2*(1), 18-27. https://doi.org/10.58355/organize.v2i1.14

Wahyuliani, D., Danial, M., dan Sanusi, W. (2022). Pengembangan e-modul pada materi koloid untuk meningkatkan kemampuan berpikir kreatif peserta didik. *Chemistry Education Review*, *5*(2), 207-215. https://doi.org/10.26858/cer.v5i2.32732

Wahyuni, K. S. P., Candiasa, I. M., dan Wibawa, I. M. C. (2021). Pengembangan E-LKPD berbasis kemampuan berpikir tingkat tinggi mata pelajaran tematik kelas IV sekolah dasar. *PENDASI Jurnal Pendidikan Dasar Indonesia,* *5*(2), 301-311.

https://doi.org/10.23887/jurnal_pendas.v5i2.476

Wahyuni, S., Wulandari, E. U. P., Rusdianto, Fadilah, R. E., dan Yusmar, F. (2022). Pengembangan mobile learning module berbasis android untuk meningkatkan literasi digital siswa SMP. *Lensa (Lentera Sains): Jurnal Pendidikan IPA*, *12*(2), 125-134. https://doi.org/10.24929/lensa.v12i2.266

Widana, I. W., dan Septiari, K. L. (2021). Kemampuan berpikir kreatif dan hasil belajar matematika siswa menggunakan model pembelaaran *project-based learning* berbasis pendekatan STEM. *Jurnal Elemen*, *7*(1), 209-220. https://doi.org/10.29408/jel.v7i1.3031

Widiastuti, N. L. G. K. (2020). Pengembangan bahan ajar IPA berbasis kontekstual dengan konsep tri hita karana untuk meningkatkan pemahaman konsep siswa. *Jurnal Ilmiah Pendidikan dan Pembelajaran, 4*(3), 479-490. https://doi.org/10.23887/jipp.v4i3.28436

Widodi, B., Darmaji, dan Astalini. (2023). Identifikasi ketrampilan proses sains dan kemampuan berpikir kreatif siswa. *Jurnal Pendidikan dan Pembelajran IPA Indonesia*, *13*(1), 1-8. https://doi.org/10.23887/jppii.v13i1.57131

Wijaya, A. J., Pujiastuti, H., dan Hendrayana, A. (2022). Tingkat kemampuan berpikir kreatif siswa dalam menyelesaikan soal open ended. *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, *11*(1), 108-122. https://doi.org/10.25273/jipm.v11i1.10866

Yuliastuti, R., dan Soebagyo, J. (2021). Pengembangan bahan ajar matematika berbasis matematika terapan pada materi matriks. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *5*(3), 2270-2284. https://doi.org/10.31004/cendekia.v5i3.811