Development of Interactive E-Modules Based on Google Sites to Improve Critical Thinking Skills and Agility at SMKN 2 Jember

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Abstract: The purpose of the research is to develop interactive e-modules, product feasibility, and the effectiveness of using Interactive E-modules in class X TAB at SMKN 2 Jember. This research is a Research and Development (R&D), using the ADDIE model approach, which consists of five levels, namely analysis, design, development, implementation, and evaluation. The results of the study indicate that the Interactive E-module media is feasible to use at SMKN 2 Jember. The results of the validation assessment showed a percentage of media component feasibility of 94.67% and material component validation of 95.56%, so it can be categorized as "Very Valid". The results of the product feasibility tested on students had a feasibility percentage of 99.01%, indicating that the Interactive E-module was "Very Feasible" The validation results from media experts show a score of 92.00%, which means "very valid.". The results of the analysis test on the pretest and posttest values showed an average increase of 36.16 with an N-Gain of 70.357 in the moderate category. The results show that class X TAB students at SMKN 2 Jember are more effective when implementing media in the form of interactive e-modules based on Google Sites and can improve creative thinking skills and agility.

Keywords: Agility; Critical thinking; E-modules interactive; Google Sites

Introduction

Physical fitness is the ability to carry out daily activities and adapt to physical stress without causing excessive fatigue (Alamsyah et al., 2017). Moreover, vocational high school students are faced with the demands of the world of work. So physically they must be very ready to do it. This is in accordance with the opinion of Alamsyah et al. (2017), that the higher a person's physical ability, the higher the person's productivity, so physical improvement is needed for vocational high school students. One way to improve physical fitness is to train agility (Azmi & Kusnanik, 2018; Subekti et al., 2021). There is also a significant influence between agility variation training on football dribbling skills in SSB Sidorukun players in Tebo

Regency (Prayoga et al., 2022). This makes training agility important to consider for a person's fitness.

However, the opposite happened to students of SMKN 2 Jember. Based on the researcher's observations, it was found that students of SMKN 2 Jember had low physical fitness. This is evidenced by the calculation of students' VO2Max tending to be low. This is because students' physical fitness decreases due to students' lifestyles that do not reflect a healthy life, such as lack of movement, smoking habits, and staying up late (Januarianto & Warthadi, 2023). In addition, reduced physical fitness can interfere with students' learning activities at school. Students during learning seem less enthusiastic, where they follow the learning process until the end of the learning time (Januarianto & Warthadi, 2023). Therefore, it is necessary to prepare learning tools that are oriented towards the physical

fitness of vocational school students, namely the development of e-modules based on Google sites as an alternative to preparing learning tools in vocational schools. More than that, 21st century skills require someone to have 4C skills (Critical Thinking, Creativity, Communication, and Collaboration) (Legowo et al., 2019; Pratiwi et al., 2020; Dewi et al., 2020). Not only sophisticated infrastructure, but also qualified human resource skills. To train a person's physical fitness, one of which is agility, and to train 4C skills, student-centered learning can be done.

Learning media is a form used to communicate information between teachers and students. E-modules can be interpreted as learning materials that are structured and systematically arranged to achieve certain competencies (Yanuarti et al., 2022). By using e-modules, it is hoped that students will have the enthusiasm to learn and achieve competencies in the field of physical fitness. The use of e-modules can be optimized in providing support for independent learning, based on competencies, structured, and even non-linear (Yanuarti et al., 2022). With independent learning through e-modules, access to Google sites will be carried out. This aims to provide unlimited access to students. On Google sites, a teacher can provide learning materials, assignment forms, include syllabuses, and so on (Adzkiya & Suryaman, 2021; Rahayu et al., 2022; Ratnawati & Wahyuni, 2023; Febrina et al., 2023; Ghozali et al., 2024). The use of Google sites provides several advantages in student access. Because according to Adzkiya & Suryaman (2021), Google sites can be accessed very easily, students only need a gadget/laptop connected to the internet network. It is hoped that teaching materials integrated with Google sites can provide students with enthusiasm for learning.

One of the subjects or work competencies that must be mastered by vocational high school students is the technique of kicking a soccer ball. This material includes several competency units, one of which is analyzing the motor skills of one of the big ball games and preparing an improvement plan. This material is found in the game of soccer. The basic competencies are analyzing the motor skills of the soccer game (Syahriad, 2020). This study also seeks to focus on developing PJOK teaching materials on physical fitness material.

Then, this study will test the E-module product with critical thinking skills and agility. By showing logical and scientific opinions, this is closely related to students' critical thinking skills in the process of discussing in groups (Susanto et al., 2020; Sevtia et al., 2022; Hasbi et al., 2023; Alfizah & Lutfi, 2023; Deswita et al., 2024). The need to use critical thinking variables to show the importance of this component. So, the use

of development products is expected to bring up critical thinking.

Second, namely agility, is the ability to change position and direction quickly, precisely and without losing balance (Rahayu & Khasanah, 2017; Supriadi, 2019; Govendaa et al., 2020). Because through dexterity, students are expected to improve physical fitness to support the world of work. Therefore, it is necessary to test the effectiveness of dexterity in the development of this e-module.

In this research and development, the problem formulations can be described as: How is the process of developing e-modules based on Google sites on physical fitness material at SMKN 2 Jember?; and How effective is the e-module based on Google sites on physical fitness material at SMKN 2 Jember in improving critical thinking skills and agility for students?

This research was conducted to address various educational issues in the 21st century or in the era of globalization which is full of challenges like today, specifically for SMK students, whose graduates are expected to be able to absorb the needs of the industrial and business world. Therefore, it is necessary to conduct development research with the title "Development of e-modules Based on Google sites to Improve Critical Thinking Skills and Agility at SMKN 2 Jember".

Method

This research is a type of research and development research. This research has a definition, namely a research method to develop and test the product of the work that will later be developed in the world of education. There are several research models that can be used as a reference as a basis for development research. One of them is the ADDIE development model. According to Branch (2009), the ADDIE development model is an acronym for Analyze, Design, Develop, Implement, and Evaluate. This model is a concept of product development, which is suitable for research and development of teaching materials. In the research and development procedure, several stages are carried out. Research and development uses the ADDIE model.

First, Analyze, namely analyzing the gaps that occur in the research. The steps taken in this analysis are: validating the gaps in the research, determining the instructional objectives of the research, confirming with students to see the gaps directly, identifying the resources needed, determining the estimated costs needed to develop the product, and preparing a project management plan for teaching materials (Branch, 2009).

At this stage, it is planned to create an interactive e-module.

Second, Design, which is verifying performance and testing according to the development method. In its implementation, according to Branch (2009) the design stage consists of several parts, namely: carrying out inventory tasks, compiling development objectives, formulating testing strategies, and calculating return on investment. At this stage, designing interactive e-modules based on Google sites, includes compiling product development instruments.

The third stage is Develop, which is producing and validating resource needs. The following are several stages of development, namely: producing content, selecting or developing supporting media, developing student guides, developing teacher guides, conducting formative revisions, and conducting product trials (Branch, 2009). Development of product drafts is carried out by implementing interactive E-modules and instruments that have been validated by experts.

The fourth stage is Implement, preparing the learning environment and involving students in testing the product. The stages of implementation include: preparing teachers and students for product development. At this stage, the use of interactive e-modules based on Google sites has been developed on a wider scale.

The fifth stage is the Evaluate, assesses the quality of the process and product, which is before and after implementation (Branch, 2009). Results of implementation When product improvements are needed, the product is improved according to expert advice.

The subject of this study is Heavy Equipment Engineering Expertise Competence (TAB). The research population taken was class X TAB 1 and X TAB 2 at SMKN 2 Jember in the 2024/2025 academic year. The sample in this study were 10 class X TAB students. The trial subjects were selected based on the suitability between the problem and the solution offered in this development research.

After all the required data has been collected, data analysis is carried out, where the results of the data analysis will be used as a basic reference for revising/improving the learning tools developed to match the previously determined criteria. Data analysis is carried out after the entire research data collection process has been completed. Data analysis is carried out by organizing data, describing data, categorizing data, so that conclusions can be drawn from the data obtained (Sugiyono, 2019).

In this study, two types of data were used, namely qualitative and quantitative. First, qualitative data analysis is a data processing technique that combines and analyzes information from the data obtained, such as criticism, suggestions from questionnaires. Qualitative data will be converted into systematic and structured data. Second, quantitative data analysis is a method of processing data based on information about research subjects that are systematically arranged in the form of percentages and numbers.

Learning device validity data was obtained using a validation sheet containing aspects and assessment indicators, which were then filled in by expert validators to assess the quality of the learning device being developed (Arikunto, 2017). The validity tested in this study was material validity and media validity. The validity test functions to determine whether an instrument can be used to measure an aspect to be measured correctly (Arikunto, 2017).

The validity test carried out by the validator was also analyzed to obtain data that the learning device being developed was valid or not (Sugiyono, 2019). The validity test carried out in this study was carried out to determine the quality of the media and material of the learning device by two validators. The validator provides an assessment on the validation sheet that has been provided for each aspect as a whole. The results of the assessment that have been given are called validation result data.

An instrument is said to be valid if it can be used to measure what should be measured (Sugiyono, 2019). Meanwhile, the reliability test of the instrument is a test to ensure that the instrument has consistency, so that it can be used properly. For test questions, validity and reliability tests were carried out using SPSS. Learning devices are said to be valid if they have a significance value (Sig. 2-tailed) less than 0.05 and learning devices are said to be reliable if they have an alpha value (Alpha Croncbrach) greater than 0.6. First, analyze the results of the interactive e-module validation. In this analysis, there are several validity steps of the interactive e-module that has been developed. The analysis calculation uses a Likert scale, with a range of 1-5. Continued by calculating the percentage of the total answer value with the following formula.

$$\text{Validity} = \frac{\text{Total answer score}}{\text{Maximum score}} \times 100\% \qquad (1)$$

The results obtained from the media and material validation tests were then interpreted according to Table 1.

Table 1. Interactive e-module validity test criteria

Value	Interpretation
81–100	Very Valid
61–80	Valid
41–60	Quite Valid
21–40	Less Valid
0–20	Invalid

Learning instruments or devices can be used in research if the instruments meet the criteria of valid or very valid (Arikunto, 2017). Although the instruments meet the criteria of valid, if revisions are still needed according to the validator's suggestions, revisions will be made to the instruments. The results of the validator's revision, the e-module product developed to determine the feasibility of the product. The revised interactive e-module will be applied to teachers and students.

The analysis of the results of the feasibility of the interactive e-module product is data that shows the feasibility of the interactive e-module that has been developed in the learning process. The steps in analyzing data related to the feasibility of the interactive E-module are by adding up the scores from all meetings and calculating the percentage of the score. The value of the product's feasibility also uses a Likert scale. The calculation of the percentage of product feasibility is as below.

$$\text{Eligibility} = \frac{\text{Total answer score}}{\text{Maximum score}} \times 100\% \qquad (2)$$

The results obtained from the feasibility test are then interpreted in Table 2.

Table 2. Interactive e-module feasibility test criteria

Value	Interpretation
81–100	Very feasibility
61–80	Eligible
41–60	Quite eligible
21–40	Less eligible
0–20	Ineligible

Next, analyze the level of effectiveness of the product development. This analysis uses the N-Gain test approach. This analysis aims to measure the process of increasing (gain) learning achievement or understanding after learning interventions are carried out, either by implementing certain models, methods or media (Hake, 1998). The development of interactive E-module products is tested for their effectiveness on critical thinking skills and agility. The formula for the N-Gain test is as follows.

$$<g> = \frac{\text{Posttest value} - \text{Pretest value}}{\text{Maximum} - \text{Pretest value}} \qquad (3)$$

Information:
$<g>$ = n-gain

The results of the N-Gain calculations are then categorized according to the criteria in Table 3 (Hake, 1998).

Table 3. Categories of N-Gain values

Value	Interpretation
g ≥ 0,7	High
0.3 ≤ g < 0.7	Medium
g < 0.3	Low

The results of the N-Gain analysis are divided into three categories. The product is declared effective if the results of the n-gain formula calculation state high. The data obtained from the provision of questionnaires/surveys are analyzed by determining the number of students who give answers with positive and negative responses for each category asked in the questionnaire. A positive response means that students support, feel happy, and are interested in the components and learning activities through the application of the model. A negative response means the opposite. To determine the achievement of learning objectives, it is reviewed from student responses, if the number of students who give positive responses is greater than or equal to 80% of the number of subjects studied. Then conduct data analysis, namely the normality test to determine the distribution of data, the t-test to compare the results of the pretest and posttest, and the N-Gain test which aims to measure the effectiveness of the Interactive E-module in improving critical thinking skills and agility.

Result and Discussion

Development of E-Modul Interactive Based Google Sites

In developing this interactive e-module, the researcher used the ADDIE development model applied to class X TAB SMKN 2 Jember. This development model consists of five stages, namely Analyze, Design, Development, Implementation, and Evaluation.

First, the analyze stage, the researcher conducted observations of learning activities in class X TAB SMKN 2 Jember, interviews with colleagues, and analyzes the suitability of the vocational school curriculum with work demands. The results of the analysis showed that there was a mismatch between the student learning process in the classroom because the learning material was still conventional, not following the needs of students and the demands of the industry. Physical conditions that were not fit caused laziness in participating in learning.

The solution to this problem is to conduct student-centered learning that requires full attendance. Interesting and easily accessible learning media is one alternative that can be used to solve the problem. Concretely, effective and efficient teaching materials are needed. Teaching materials in the form of interactive e-modules are the solution to answer this

problem (Pradnyana et al., 2021; Suryana et al., 2023; Ilfa et al., 2024; Keedle et al., 2024). This is in line with the results of Rahmani & Hikmawan (2025) which states that PjBL-based e-modules are effective as learning media that support the development of 21st century skills, especially critical thinking skills.

The media used for this e-module is Google sites. Students who use Google Sites-based learning media are better than students who use conventional learning methods (Supriatna et al., 2024). Wherever and whenever, teaching materials can be accessed and used as references when doing physical fitness exercises.

Second, the design stage is to design teaching materials, namely interactive e-modules. First, synchronize the material with the relevant SKKNI on the Physical Fitness material. Relevant material is obtained, namely measuring agility. As for the stage of compiling a development strategy based on Google sites. Integration will produce interactive e-modules that are relevant to vocational high school students.

Third, the Develop stage. At this stage, interactive e-module content is created. It begins with creating a concept map of the material. The next step is to create comprehensive interactive e-module content. Supporting media such as learning videos are also included in the interactive e-module. Then, it is continued by creating a guide for students and teachers. It ends with testing the product to be validated by material and media experts.

Fourth, the Implement stage. The stage of preparing the learning environment for limited product trials. Product trials are limited to 30 students in the field.

Figure 1. Product trial

Finally, the Evaluate stage. This stage assesses the validation results of the product that has been developed. The assessment results from experts and materials are summarized to obtain results. The next step is to write the results of research on products that have been validated by experts. The results of the feasibility of interactive e-module products by two experts for each media and material. The following are the results of the validation of the development product by media experts, which can be seen in Table 4.

Table 4. Media expert validation results

Aspect	Score
Cover Design	21
Content Design	48
Score Acquisition	69
Percentage (%)	92

The validation results from media experts show a score of 92%, which means "very valid." The interactive e-book media, based on the suggestions and input from media experts, includes several recommendations related to product development, as shown in Table 5.

Table 5. Media expert suggestion results

Description Feedback
The cover design provides an idea of the contents of the book, but it is not very attractive.
Add image components that can make students more enthusiastic about reading.

As for the media expert's input, the researcher made product revisions. The first is related to the cover design, which does not provide enough figures related to the material, presented in Figure 2.

Figure 2. Cover design revision

Second, is the result of validation by material experts, the results of product validation by material

experts obtained a score of 95.56% with the interpretation of "Very Feasible". The conclusion that the interactive e-book product is very valid from the material expert is presented in Table 6.

Table 6. Material expert suggestion results

Aspect	Score
Suitability of learning media with Competency Outcomes	19
Suitability of student activity steps with material on learning media	14
Suitability Summary of material with learning media	10
Score Acquisition	43
Percentage (%)	95.56

Based on the suggestions and input from the material experts, there are several inputs related to product development, as in Table 7.

Table 7. Results of material expert suggestions

Description Feedback
The e-module has presented material that is relevant to the learning needs in SMK and is in sync with SKKNI. So, it is very helpful in bridging the needs of schools and industry.
Space is provided for interaction and data on student data development that can be accessed directly

As for the input of the material expert, the researcher revised the product. First, related to the case study in the e-module, which did not provide a picture of the progress of fitness data. The material was added with how simple fitness exercises are presented in the revision in Figure 3.

Figure 3. Product revision with progress fitness data

The results of the developed product were tested to determine its feasibility. The total feasibility score percentage from the teachers indicates that it is very suitable to be tested on students. Based on the questionnaire results outlined in Table 8.

Table 8. Student testing

Respondents	Score (%)	Interpretation
Students	99.01	Very Feasibility

The responses from students described a feasibility level of 99.01%. So, based on these responses, it can be concluded that the media in the form of interactive e-modules has a very feasible value to be applied in the Physical Education, Sports and Health Subject in SMK. This is in line with previous research which stated that students in the experimental class using the mathematics e-module had better mathematical thinking skills than the control class (Wijaya et al., 2022). Other results also support that the use of e-modules has more strategies for completing tasks (Li et al., 2020).

Level of Effectiveness of Interactive E-Book on Creative Thinking and Collaboration Skill

The final part of the ADDIE development model is Evaluation. This stage aims to measure the effectiveness of the interactive e-module that has been developed. Based on the results of the development, the interactive e-module shows results without revision. This is in accordance with the expectation that the final product can increase effectiveness in Physical Fitness material. Product effectiveness is measured in two ways. First, pre-test and post-test measurements are carried out in class X TAB SMKN 2 Jember. The initial stage is to test initial abilities with a pre-test on 30 students with 10 multiple-choice questions. After testing the media in the form of an interactive e-module, a post-test is carried out on students. So that the pre-test and post-test results will be obtained according to Table 9.

Table 9. Pre-test and post-test result

Description	Pre-test	Post-test
Average	45.00	87.69
High Score	67	84
Lowest Rate	37	72
Number of Completed Student	2	28
Learning Completeness	5.56 %	98%

The assessment results in the pre-test and post-test tests showed a significant comparison, as in Table 9. The value obtained from the pre-test was 45.00. While the post-test value increased to 87.69. Therefore, when compared there is a difference of 36.16. At the pre-test stage, no students were able to achieve learning completeness, with a percentage of 5.56%. However, at the post-test stage, they managed to get a learning completeness percentage of 98%. The data can be concluded that the development product is effective in improving learning understanding, as evidenced by the

significant difference between before using the interactive e-module and after applying it to the Physical Fitness material. The results are strengthened that the e-book method has been proven to help students motivate students to get post-test scores through external motivation (Shatat et al., 2017; Rahim et al., 2020). It is also supported that students experience an increase in nursing practice performance after completing the program (Kim et al., 2025).

In ensuring that the data being tested is normal, a normality test is carried out using Shapiro Wilk. The results of the pretest and posttest normality tests are shown in Table 10.

Based on Table 10, the results of the pretest normality test conducted using the SPSS application show sig = 0.068. While the results of the normality test for the posttest value show sig = 0.132. If the significance value is > 0.050, the normality test criteria are considered normal. Furthermore, a paired T test was conducted to determine the difference in the average pretest and post test scores. The purpose of this T test is to determine the level of significance of the difference in the average student scores on the pretest and posttest.

Table 10. Normality test

Parameters	Shapiro Wilk	
	N	Sig.
MoCA-Ina pre test	30	0.068
MoCA-Ina post test	30	0.132

Table 11. Paired T test

Result	Paired T Test	
	N	Sig. (2-tailed)
MoCA-Ina pre-test post-test	30	< 0.001

Based on Table 11 for the paired T test shows a significant value of 0.000 (less than 0.005), which shows a significant difference between the results of the pre-test and post-test. These results indicate that the use of interactive e-modules can improve creative thinking skills and agility. After the data testing has been normally distributed, the N-Gain test can be carried out. The purpose of the N-Gain test is to determine whether the values obtained from the pretest and posttest can experience an average (Hake, 1998). The data shows an increase in the average, if the N-Gain value criteria are > 0.3 for medium criteria and > 0.7 for high criteria.

Table 12. N-Gain test

Result	N	Interpretation
Score of N-Gain	30	70.357

The N-Gain test results obtained a value of 70.357 for the fairly effective category. Thus, it can be concluded that the development of interactive e-

modules based on Google sites can improve critical thinking skills and agility. The results of this study are also supported by several relevant studies. First, it can be concluded that the development of interactive e-modules can improve creative thinking. In line with Kuo et al. (2024), Kwan & Hung (2025), and Sun et al. (2025), that the role of appropriate digital technology can encourage creative thinking, enrich self-potential, and advance students' creative thinking. In addition, the selection of materials by collaborating mathematics can improve communication skills, problem solving, creative thinking, and self-confidence (Wijaya et al., 2022).

Second, it was found that the use of interactive e-modules can improve agility. It is proven that students are increasingly enthusiastic in physical fitness training (agility), because their fitness development data can be directly listed and the material presented is very helpful for independent training at home. This was conveyed by one of the students when the product trial was carried out.

Conclusion

The results of this study indicate that the learning outcomes of class X TAB students in the subject of Physical Education, Sports and Health on physical fitness material at SMKN 2 Jember can be improved through the use of Interactive E-module media Based on Google sites. The results of the validation assessment showed a percentage of media component feasibility of 92% and validation of the material component of 95.56%, so it can be categorized as "Very Valid". The results of the feasibility of the product tested on students, had a feasibility percentage of 99.01%, indicating that the Interactive E-module was "Very Eligible". The results of the pretest and posttest value analysis showed an average increase of 36.16 with an N-Gain of 70.357 in the moderate category. This shows that class X TAB students at SMKN 2 Jember are better when implementing media in the form of interactive e-modules based on Google sites and can improve critical thinking skills and agility.

Author Contributions
Collected information, created instruments to measure needs and responses, made validation assessments of material

experts and media experts, made evaluations, created and tested research products, data processing and writing the initial article, F.P.U.P.; validated the instrument and design the initial product before being submitted to the media expert and material expert validators, the supervising lecturer who directed and guided the first author, E.T. and H.

Conflicts of Interest
The authors declare no conflicts of interest.

References

Adzkiya, D. S., & Suryaman, M. (2021). Penggunaan Media Pembelajaran Google Site dalam Pembelajaran Bahasa Inggris Kelas V SD. *Educate: Jurnal Teknologi Pendidikan*, *6*(2). https://doi.org/10.32832/educate.v6i2.4891

Alamsyah, D. A. N., Hestiningsih, R., & Saraswati, L. D. (2017). Faktor-Faktor yang Berhubungan dengan Kebugaran Jasmani pada Remaja Siswa Kelas XI SMK Negeri 11 Semarang. *Jurnal Kesehatan Masyarakat*, *5*(3), 77-86. https://doi.org/10.14710/jkm.v5i3.17169

Alfizah A. I. S., & Lutfi, A. (2023). Kemampuan Berpikir Kritis Siswa dalam Pembelajaran Matematika Melalui Pendekatan Inkuiri. *Jurnal Simki Pedagogia*, *6*(1), 118-129. Retrieved from https://jiped.org/index.php/JSP

Arikunto, S. (2017). *Pengembangan Instrumen Penelitian dan Penilaian Program*. Yogyakarta: Pustaka Pelajar.

Azmi, K., & Kusnanik, N. W. (2018). Effect of Exercise Program Speed, Agility, and Quickness (SAQ) in Improving Speed, Agility, and Acceleration. *Journal of Physics: Conference Series*, *947*(1), 012043. https://doi.org/10.1088/17426596/947/1/012043

Branch, R. M. (2009). *Instructional Design: The ADDIE Approach*. Springer US. https://doi.org/10.1007/978-0-387-09506-6

Deswita, H., Siregar, N., & Hardi, S. P. (2024). Peningkatan Kemampuan Berpikir Kritis Peserta Didik pada Pembelajaran IPAS Kelas V Melalui Pendekatan Pembelajaran Berdiferensiasi. *Journal in Teaching and Education Area*, *1*(3), 401-416. https://doi.org/10.69673/xmes4q45

Dewi, A. P., Putri, A., Anfira, D. K., & Prayitno, B. A. (2020). Profil Keterampilan Kolaborasi Mahasiswa pada Rumpun Pendidikan MIPA. *PEDAGOGIA: Jurnal Ilmu Pendidikan*, *18*(1), 57–72. https://doi.org/10.17509/pdgia.v18i1.22502

Febrina, R., Fitri, A, Heffi, A, & Muhyiatul, F. (2023). Analisis Kebutuhan Modul Interaktif Materi Virus Berbasis Website Google Sites untuk Siswa SMA. *Jurnal Ilmiah Profesi Pendidikan*, *8*(4) 2131-2136. https://doi.org/10.29303/jipp.v8i4.1676

Ghozali, B. S., Supeno, S., & Farisi, M. I. (2024). Pengembangan E-Modul Berbasis Google Sites untuk Meningkatkan Kemampuan Penalaran Berbasis Bukti dalam Pembelajaran IPA di Sekolah Dasar. *Elementary School Education Journal*, *8*(2) 368-378. http://dx.doi.org/10.30 651/else.v8i2.22631

Govendaa, R. D., Haryantob, A., & Herdyanto, Y. (2020). Peningkatan Kecepatan dan Kelincahan dengan Penggunaan Latihan 40 Yard Sprint dan A-Movement. *Journal of Sport Science and Education*, *5*(2). 148-158. http://dx.doi.org/10.26740/jossae.v5n2.p148-158

Hake, R. R. (1998). Interactive-Engagement vs. Traditional Methods: A Six-Thousand-Student Survey of Mechanics Test Data for Introductory Physics Courses. *American Journal of Physics*, *66*, 64. http://dx.doi.org/10.1119/1.18809

Hasbi, A., Aprinawati, I., & Mufarizuddin, M. (2023). Penerapan Model Pembelajaran Think Talk Write (TTW) untuk Meningkatkan Keterampilan Berfikir Kritis Siswa Sekolah Dasar. *Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah*, *7*(1). https://doi.org/10.35931/am.v7i1.1454

Ilfa, A., Sidin, U. S., & Mahande, R. D. (2024). Pengembangan E-Modul Berbasis Hypercontent pada Mata Kuliah E-Learning Program Studi Pendidikan Teknik Informatika dan Komputer. *JIMU: Jurnal Ilmiah Multidisipliner*, *2*(04), 1174–1183. Retrieved from https://ojs.smkmerahputih.com/index.php/jimu /article/view/514

Januarianto, F. A., &Warthadi, A. N. (2023). Analisis Tingkat Kebugaran Jasmani Siswa Sekolah Menengah Kejuruan Muhammadiyah 1 Sukoharjo. *JAMBURA: Journal of Sports Coaching*, *5*(2). https://doi.org/10.37311/jjsc.v5i2.20890

Keedle, H., Young, K., Arundell, F., & Burns, E. (2024). Midwifery Student Engagement with Digital Interactive Books: A Cross Sectional Survey. *Women and Birth*, *37*(6), 101826. https://doi.org/10.1016/j.wombi.2024.101826

Kim, H., Kim, L., Kim, S., Kim, S, Park, E., Lee, K., Lee, S., & Kim, J. (2025). Effectiveness of a Blended Learning Program on Chemotherapy Nursing Education Led by Oncology Clinical Nurse Specialists: A Single-Group Pretest–Posttest Study. *Asia-Pacific Journal of Oncology Nursing*, 100695. https://doi.org/10.1016/j.apjon.2025.100695

Kuo, H.-C., Chang, C.-Y., Wang, J.-P., Wu, E. L., & Li, P.-L. (2024). Creating My Own Story: Improving Children's Creative Thinking and Composition Creativity Through a Three-Staged Individual-Group-Individual Story Writing Framework.

Cognitive Development, *72*, 101513. https://doi.org/10.1016/j.cogdev.2024.101513

Kwan, L. Y.-Y., & Hung, Y. S. (2025). Unveiling the Influence of Disciplinary Biases on Information Sampling During an Interdisciplinary Collaboration Creative Task Through Eye-Tracking Analysis. *New Ideas in Psychology*, *77*, 101129. https://doi.org/10.1016/j.newideapsych.2024.101129

Legowo, B., Kusharjanta, B., Sutomo, A. D., Mulyadi, M., & Wahyuningsih, D. (2019). Increasing Competency 4C Using the G-Suite Application for Education. *International Journal of Active Learning*, *4*, 168–171. Retrieved from http://journal.unnes.ac.id/nju/index.php/ijal

Li, J., Ma, F., Wang, Y., Lan, R., Zhang, Y., & Dai, X. (2020). Pre-School Children's Behavioral Patterns and Performances in Learning Numerical Operations with a Situation-Based Interactive E-Book. *Interactive Learning Environments*, *28*(2), 148–165. https://doi.org/10.1080/10494820.2019.1636085

Pradnyana, I. K. A., Agustini, K., & Santyasa, I. W. (2021). Pengembangan E-Modul Interaktif Kolaboratif pada Mata Pelajaran Komputer dan Jaringan Dasar. *Jurnal Jendela Pendidikan*, *1*(04), 218–225. https://doi.org/10.57008/jjp.v1i04.24

Pratiwi, H. R., Juhanda, A., & Setiono, S. (2020). Analysis of Student Collaboration Skills Through Peer Assessment of the Respiratory System Concept. *Journal of Biology Education*, *3*, 110–121. Retrieved from http://journal.iain kudus.ac.id/index.php/jbe

Prayoga, N. A., Ali, M., & Yanto, A. H. (2022). Pengaruh Latihan Variasi Kelincahan Terhadap Kemampuan Dribbling pada Pemain SSB. *Indonesian Journal of Sport Science and Coaching*, *4*(2), 119–132. https://doi.org/10.22437/ijssc.v4i2.19356

Rahayu, D. F., & Khasanah, I. (2017). Upaya Meningkatkan Ketangkasan Gerak Lokomotor Anak Melalui Permainan Ranjau Pintar pada Kelompok A TK An Nur Kaliwungu Kendal Tahun Ajaran 2012/203. *PAUDIA: Jurnal Penelitian dalam Bidang Pendidikan Anak Usia Dini*, *2*(2). https://doi.org/10.26877/paudia.v2i2.1640

Rahayu, R., Fikroh, R. A., Sari, D. R., & Ridzaniyanto, P. (2022). Pengembangan Media Pembelajaran Berbasis Google Sites Bermuatan Chemo-Entrepreneurship pada Materi Gugus Fungsi Senyawa Karbon. *Lantanida Journal*, *10*(2), https://doi.org/10.22373/lj.v10i2.14496 95

Rahim, F. R., Suherman, D. S., & Muttaqiin, A. (2020). Exploring the Effectiveness of E-Book for Students on Learning Material: A Literature Review. *Journal of Physics: Conference Series*, *1481*(1), 012105. https://doi.org/10.1088/1742-6596/1481/1/012105

Rahmani, Z., & Hikmawan, R. (2025). Pengembangan E-Modul Interaktif pada Mata Pelajaran Matematika untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Sekolah Dasar. *Didaktika: Jurnal Kependidikan*, *4*(1), 743-756. Retrieved from https://jurnaldidaktika.org

Ratnawati, S., & Wahyuni, S. (2023). Efektifitas E Modul Interaktif Berbasis Google Sites Mata Pelajaran IPA Listrik Statis dan Dinamis untuk Meningkatkan Keterampilan Berpikir Kreatif Siswa MTS. *JPE (Jurnal Pendidikan Edutama)*, *10*(1). http://dx.doi.org/10.30734/jpe.v10i1.2997

Sevtia, A. F., Taufik, M., & Doyan, A. (2022). Pengembangan Media Pembelajaran Fisika Berbasis Google Sites untuk Meningkatkan Kemampuan Penguasaan Konsep dan Berpikir Kritis Peserta Didik SMA. *Jurnal Ilmiah Profesi Pendidikan*, *7*(3), 1167–1173. https://doi.org/10.29303/jipp.v7i3.743

Shatat, F. H., Aldalalah, O. M. A., & Ababneh, Z. W. (2017). The Impact of the E-Book on Levels of Bloom's Pyramid at ECT Students in Light of the Internal and External Motivation to Learn Mathematics and Statistics. *Asian Social Science*, *13*(2), 49. https://doi.org/10.5539/ass.v13n2p49

Subekti, N., Syaukani, A. A., Fatoni, M., Subroto, S., & Abdullah, A. (2021). Exercise Speed, Agility and Quickness (SAQ) to Improve Physical Fitness. *Kinestetik: Jurnal Ilmiah Pendidikan Jasmani*, *5*(1), 95-101. https://doi.org/10.33369/jk.v5i1.14359

Sugiyono, S. (2019). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: CV. Alfabeta.

Sun, Q., Wang, C., Dai, D. Y., & Li, X. (2025). Developmental Effects of Digitally Contextualized Reading on Preschooler's Creative Thinking: A Quasi-Experimental Study. *Journal of Experimental Child Psychology*, *259*, 106307. https://doi.org/10.1016/j.jecp.2025.106307

Supriadi, D. (2019). Traditional Games Activities to Develop Fundamental Movement Skills of Elementary School Students. *Jurnal Pendidikan Jasmani dan Olahraga JPJO*, *4*(1), 98-102. Retrieved from http://ejournal.upi.edu/index.php/penjas/index

Supriatna, D., Sepriyanti, D., & Hartono, R. (2024). Pengembangan Pembelajaran Berbasis Web Google Site untuk Meningkatkan Hasil Belajar Siswa Kelas 5 di SDN Ciherang 01. *Jurnal Teknologi Pendidikan*, 62-79. Retrieved from http://Jurnal.uika-bogor.ac.id/index.php/TEK

Suryana, E., Prahasti, P., & Iskandar, A. P. (2023). Pemanfaatan Google Site sebagai Media Pembelajaran Siswa pada SMKN 3 Kota Bengkulu. *Jurnal Dehasen untuk Negeri*, 2(1). https://doi.org/10.37676/jdun.v2i1.3583

Susanto, A., Qurrotaini, L., & Mulyandini, N. (2020). Peningkatan Kemampuan Berpikir Kritis Siswa pada Mata Pelajaran IPS Melalui Model Controversial Issue. *Holistika Jurnal Ilmiah PGSD*, 4(2), 71-76. Retrieved from https://jurnal.umj.ac.id/index.php/holistika

Syahriad, S. (2020). *Modul Pembelajaran SMK PJOK Kelas XI: Kebugaran Jasmani*. Retrieved from https://repositori.kemendikdasmen.go.id/21847/

Wijaya, T. T., Cao, Y., Weinhandl, R., & Tamur, M. (2022). A Meta-Analysis of the Effects of E-Books on Students' Mathematics Achievement. *Heliyon*, 8(6), e09432. https://doi.org/10.1016/j.heliyon.2022.e09432

Yanuarti, R., Utari, I., & Harianti, D. (2022). Evaluasi Pemanfaatan E-Modul sebagai Bahan Belajar Mandiri dalam Program Peningkatan Kompetensi Guru. *Jurnal Teknodik*, 101–114. https://doi.org/10.32550/teknodik.vi.972