Practicality of E-Module Teaching Materials Integrated With Islamic Values On Global Warming Material at Senior High School

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ABSTRACT

Islamic values in the subject matter of global warming symptoms for class XI at Senior high school. This research is a continuation of R&D research and development with the ADDIE model using 5 stages namely Analysis, Design, Development, Implementation, and Evaluation. The research instrument used was a practicality test questionnaire and student answer sheets on the e-module. there are 31 students and one educator have participated in this practicality test. The results of data analysis on the average value at the practicality test stage were carried out by educators and students. With the very practical category, the practicality analysis value of educators is 92.65 %, Very practical criteria for data analysis by students yielded 89.09 %. The results of the study concluded that the integrated e-module of Islamic values in the material on global warming symptoms that was developed was very practical to use in the learning process for class XI as an alternative teaching material in the learning process

Praktikalitas Bahan Ajar E-Modul Terintegrasi Nilai-Nilai Islam Pada Materi Pemanasan Global di Sekolah Menengah Atas

ABSTRAK: *Penelitian ini bertujuan untuk mengukur tingkat praktikalitas e-modul terintegrasi nilai-nilai islam pada materi gejala pemanasan global untuk kelas XI Sekolah Menegah Atas. Penelitian ini merupakan lanjutan penelitian dan pengembangan R&D dengan model ADDIE menggunakan 5 tahapan yaitu Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi. Instrumen penelitian yang digunakan berupa angket uji praktikalitas dan lembar jawaban peserta didik pada e-modul. terdapat 31 peserta didik dan satu pendidik telah berpartisipasi dalam pengujian kepraktisan ini. Hasil analisis data rata-rata nilai pada tahap uji praktikalitas dilakukan oleh pendidik dan peserta didik. Dengan katerogi sangat praktis diperoleh nilai analisis kepraktisan pendidik sebesar 92,65%, Kriteria sangat praktis analisis data oleh peserta didik menghasilkan sebesar 89,09%,. Hasil penelitian menyimpulkan bahwa e-modul terintegrasi nilai-nilai islam pada materi gejala pemanasan global yang dikembangkan sangat praktis digunakan dalam proses pembelajaran kelas XI sebagai bahan ajar alternative dalam proses pembelajaran.*

INTRODUCTION

In accordance with the regulation of the minister of national education number 16 of 2007 concerning academic qualification standards and educator competencies, it regulates the various

competencies that an educator must have in the guidance of pedagogical competencies and professional competencies, closely related to the ability of educators to develop learning resources and teaching materials (Handoko et al., 2024);(Rusilowati & Wahyudi, 2020). Through education, an educator is responsible for improving the quality of students (Haka et al., 2024). Educators are expected to have the expertise, skills and abilities that can carry out their duties as educators who can give birth to the next generations of the nation in the future (Puspita et al., 2023);(Rusilowati & Wahyudi, 2020). One of the efforts that an educator has in supporting the quality of education is being able to develop teaching materials competently, creatively and independently (Suprihatin & Manik 2020).

Teaching materials are all forms of materials that can be used by educators in assisting and carrying out teaching and learning activities in class (Fitria & Suminah, 2020);(Magdalena et al., 2020) . One of the teaching materials, namely e-modules, electronic modules are teaching materials that are presented in digital form (Okta Priantini & Widiastuti, 2021);(Panggabean et al., 2022);(Kimianti & Prasetyo, 2019) . Each learning activity is interrelated with navigation for students to become more interactive through this e-module. This is because e-modules are supported by video, animation and audio presentations to enrich students' learning experiences (Berlin et al., 2022); (Widodo et al., 2023).

Based on the results of the analysis of previous research that has done by Mega & Sari (2021) states that the electronic module is a form of presenting self-study material that is systematically arranged to make it easier to use. Larasati et al., (2020) in terms of the benefits of electronic media, e-modules make the learning process possible anytime and anywhere.

Islamic values into these teaching materials. Isma et al. (2023) and Lubis et al. (2024) argue, feel the need to innovate by developing teaching material e-modules according to core competency 1, namely spiritual attitude, by inserting Islamic values in the form of verses from the holy Koran, hadith of the prophet, sunah Rasulullah, and behavior that reflects a spiritual attitude. Integrated Islamic values mean a combination of scientific theory and religious theory so that a strong, complementary, and confirming theory will be built (Zarkasih et al., 2023);(Sudarmika et al., 2024). The development of e-modules by inserting Islamic values can provide teaching materials that support students to form achievements and be religious (Vitrianingsih et al., 2021) .

Based on the results of observations made, it is known that educators have not utilized teaching material sources in the form of e-modules complete with presentations in the form of text, images, audio and video. Spiritual competence, still not too detailed related to the material. Educators do not yet have special skills in compiling teaching materials independently or must work closely with religious educators to integrate material with Islamic values. This agrees with Dewi et al. (2022) the fact that there is still a lack of teachers in developing media based on Islamic values.

Researcher interviews with educators and students at class XI Senior High School. They stated that learning in class had never used teaching materials in the form of e-modules integrated with Islamic values and that some students in class XI MIPA 1 did not know about e-module teaching materials, because in the learning process so far educators still use simple teaching materials. in the form of printed books and student worksheets as handbooks for educators and students. The learning process uses the lecture method, discussion, assisted by a simple practicum in learning (Eva'atussalamah et al., 2022).

Based on the above problems that have been described, it is necessary to develop learning materials in the form of e-modules by integrating Islamic values. Sudarmika et al. (2024) argue, the goal of integrating

Islamic values can be the foundation of divine awareness in learning activities carried out independently, this is in line with increasingly sophisticated technology utilizing the state of the school environment which is already equipped with supporting tools such as computers and wi-fi, even students already have Smartphones and laptops at school (Windari et al., 2023). Puspita et al. (2023) argue, their respective homes to use positive things in everyday life for educators and students.

In making teaching materials there are several aspects that must be considered one of which is practicality. According to Haka et al. (2020) practicality is something that is practical. This means that it is easy and attractive to use. Like teaching materials that are said to be practical if educators and students can use teaching materials logically without any problems (Irvy, 2020). So, from this study aims to see the practicality of integrated e-module Islamic values in the material of global warming symptoms in the learning process.

METHOD

This type of research is research and development or Research and Development (R&D) is a research method used to produce certain products and test the effectiveness of these products (Fitria & Suminah, 2020). The development model used is ADDIE (Branch, 2009) namely analysis, design, development, implementation, and evaluation. This research is a continuation of the development stage, then the practicality test is the implementation stage, which is the trial stage of teaching materials that have been developed and declared valid by expert validators in actual situations in the learning process or in the classroom.

What is done in this stage is preparing classes, educators, students and questionnaire instruments. This research was conducted on July 17 2023 at Senior High School. The population and sample are 31 students in class XI MIPA 1 at Senior High School in Semester II of the 2022/2023 academic year. This sampling technique is non-probability sampling which includes purposive sampling techniques. In taking samples, there are several considerations, namely adjusting the schedule of school hours and the researcher considers that this technique is effective based on a sample that represents the population because it takes one class as a trial (Popa et al., 2020);(Setyaningsih & Suchyadi, 2021).

Data analysis of the practicality test of the developed e-module teaching materials, namely data analysis Quantitative descriptive data analysis is carried out by analyzing data in the form of numbers, this analysis is used to analyze data obtained from questionnaires (Mohajan, 2020). Furthermore, researchers used an instrument rating scale in the form of a Likert scale. The answer to each instrument that uses a Likert scale has 4 gradations of "very bad" to "very good". The Likert scale will later be used as a rating scale for instruments and practicality (Magalhães et al., 2023).

Tabel 1. Likert Scale Assessment Criteria

No.	Evaluation	Statement
1.	4	Very good
2.	3	Good
3.	2	Not good
4.	1	Very not good

Furthermore, the researcher uses the Guttman Scale to get a firm answer to a stated problem, by having a gradation of "agree" and "disagree" ratings (Vladimir, 2018) . Gutman scale will be used as a rating scale on the student response instrument.

Tabel 2. Likert Guttman Assessment Criteria

No.	Evaluation	Statement
1.	1	Agree
2.	0	Don't agree

The score of the review results is calculated on average from each aspect assessed, the score obtained will be percentaged later with the equation according to (Arikunto, 2014) :

$$P = \frac{Score\ obtained}{Highest\ scoring\ score} \times 100\%$$

Then the questionnaire sheet data for educators and students are interpreted based on table 3.

Tabel 3. Criteria for physics e-modul practical result

No.	Percentage(%)	Criteria evaluation
1.	0%-25%	Less practical
2.	26%-50%	Practical enough
3.	51%-75%	Practical
4.	76%-100%	Very practical

(Source: Arikunto, 2014)

RESULTS AND DISCUSSION

Researchers refer to the development model used in this study is the ADDIE model. In the first stage the researcher carried out the analysis stages which consisted of curriculum analysis, needs analysis, and student analysis. Based on the results of field studies and interviews, the learning materials used were student worksheets and the availability of printed books was very limited, so that some students did not have books. Hosen et al. (2021) and Dutta (2020) argue, that the lack of existing media will affect the learning process in students. Analysis of the contents of the available book material is not too detailed with spiritual competence, because educators do not yet have special skills in compiling teaching materials independently or have to work closely with religious educators to integrate material with Islamic values. The limited teaching materials available in the learning process, it is necessary to develop teaching materials, one of which is an e-module which functions as a tool for students for the learning process which is complemented by the integration of Islamic values.

The design stage is carried out by designing e-module teaching materials integrated with Islamic values through designing e-module formats and determining the components to be presented from the cover to the end, and complementing the material presented in the e-module, namely global warming symptoms. class XI Senior High School uses a scientific approach in accordance with the 2013 curriculum. After going through the design stage, the developed teaching materials are then validated by experts consisting of 3 validators namely material experts, religion (integrating Islamic values) and the media, as validation according to Rosidin et al. (2023) and Alsina et al. (2021), that product validation is carried out by a validator such as a lecturer or experts who have experience assessing a new product.

After the teaching materials developed are declared valid by several validators, then the implementation of this stage is carried out to see whether there are errors or not in the e-module. After passing the product validation test, the next step is the practicality test for educators and students in class XI MIPA 1. The results of the implementation are described as follows:

Practicality trials according to educators

At this stage it is addressed to class XI educators, to examine the products produced and then educators are asked to be willing to provide an assessment on the questionnaire consisting of practical aspects of use, attractiveness of the presentation, as well as the benefits of teaching materials and the integration of Islamic values into the material of global warming symptoms. The product was distributed to class XI educators, with Ms. Sharmila Shahmi, S.Pd. The data obtained from the results of the respondents are as follows Tabel 4:

Tabel 4. Results Of Practicality By Educators

No.	Assessment	Average	Information
1.	Ease of Use	100%	Very Practical
2.	Interesting	90%	Very Practical
3.	Benefit	90%	Very Practical
4.	Integration	93,75%	Very Practical
Percentage		92,65%	Very Practical

Based on the results of the practicality of educators, it is known that the percentage of e-module teaching materials integrated with Islamic values obtained is 92.65 % with a very practical category. Includes several aspects, namely the practicality of using

100%, with the practicality category with the highest aspect value, the e-module makes it easier for students to understand the material, in accordance with one of the characteristics of the e-module, namely user friendly means making it easier for users to use (Atoum et al., 2021). This is also in accordance with the statement according to Wahyuni & Yerimadesi, (2021) and Fahlevi et al. (2021) the high level of practicality of e-modules is evidenced by the clarity of the material and the ease of use.

The aspect of the attractiveness of the presentation is 90%, and the benefits of teaching materials are 90% and the integration of Islamic values is 93.75%. The lowest aspect is the aspect of presentation and the benefits provided because e-module teaching materials can be used as teaching materials independently without supervision, thus requiring higher diligence from educators to continuously monitor student learning process activities (Setiawan et al., 2022).
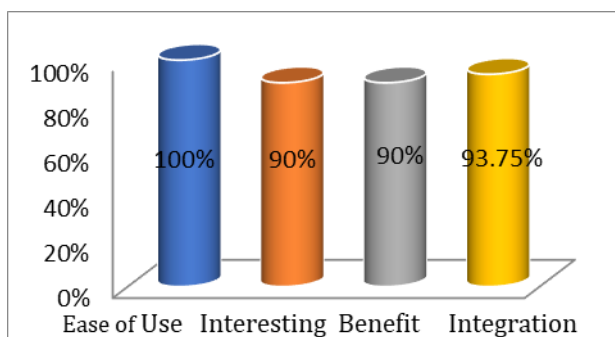

Figure 1. Educator Practicality Trial

Practicality Trials According to Students

Islamic values, so that researchers can find out the advantages and disadvantages of these teaching materials. The trial begins with preliminary activities, namely giving opening greetings, praying and conveying the objectives of the activities to be carried out. Then the core activities are carried out by first ensuring students bring Smartphones, have an internet package and a good internet connection so that students can operate the e-module quickly and smoothly. Then, the e-module link is sent to all students via the WhatsApp group that

was created before. And besides the link, the researcher also provides a QR barcode.

When all students have opened the e-module, students will then explain how to operate the e-module, as well as explain the content and purpose of each of the components presented in the e-module. Chameron et al. (2022) and Subari (2022), it was found that all students could operate the e-module and students felt happy when they opened every page in the e-module, so that students were not only enthusiastic about using e-module teaching materials because of pictures, design, audio, video, as well as colors and buttons. interesting, then students are invited to carry out learning activities in the e-module.

Then after conducting each trial to students, the researcher gave a questionnaire sheet and asked to provide feedback, for evaluating e-module products. At this stage, the product was tested on 36 students in class XI MIPA 1. However, the number of students who attended the distribution of the questionnaire was 31 students. The data obtained from the results of the respondents are as follows:

Tabel 5. Student Practical Result

No.	Assessment	Average	Information
1.	Interesting	96,31%	Very Practical
2.	Material	81,52%	Very Practical
3.	Language	100%	Very Practical
Percentage		89,09%	Very Practical

The response results obtained by students were 89.09 % with a very practical category. Each of each aspect has an assessment score, namely the interest aspect of 96.31%, according to research on students' responses to the ethno-edutainment e-module states that the interest value is very high, because the presentation in the e-module is very interesting so that it makes students not bored when using it (Ardianti et al., 2019)

The material aspect is 81.52 % and the language aspect is 100%. Of the several aspects the lowest is the material aspect, because there is integration of Islamic

values in the content of the material so that it makes students understand more deeply the content of the material, and there are students who are heterogeneous. The highest aspect of the student's response is the language aspect in terms of the e-module, the language used is in accordance with the level of understanding of students and semi-formal Indonesian is communicative. This is in accordance with one of the eligibility aspects of language according to Chrisyarani & Yasa, (2018) the language used in teaching materials prioritizes communication between writers and readers.
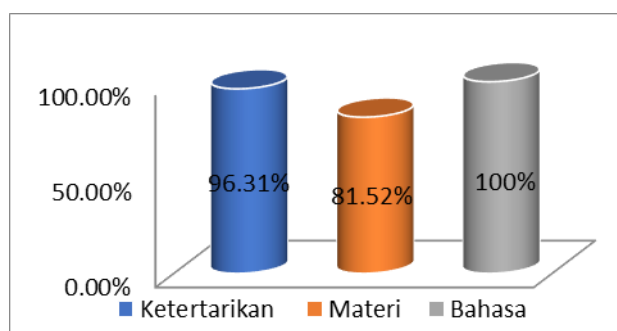

Figure 2. Student Practicality Trial

Researchers interviewed a student named Alya Fitriani, after using the e-module, revealed that the appearance of the e-module presented was interesting and something new was used. Moreover, the e-module contains images, audio and video as well as navigation buttons which can be directly used anywhere and anytime online on a Smartphone. This is in accordance with the statement according to Agprianti et al., (2022) because so far the learning process uses teaching materials in the form of books and Student Worksheets, colorless (black-and-white).

Based on the results of the assessment of the practicality of educators and students, it is known that the response of educators to teaching materials integrated with Islamic values, the percentage obtained is 92.65 % with a very practical category. And the results of the assessment obtained by students were 89.09 with a very practical category.

CONCLUSIONS AND SUGGESTIONS

After conducting research starting from analysis, design, development, implementation and evaluation. It was concluded that the e-module teaching materials were integrated with Islamic values through trials on educators and students, accompanied by filling out a response questionnaire guided by researchers to find out perceptions of the e-modules that had been developed. Practicality assessment by educators to assess practicality using a Likert scale, with a perception test result of 92.65 % very practical category. Furthermore, the assessment by students to see the practicality of the e-module using the Guttman scale measurement obtained an average percentage of 89.09 % with a very practical category. As for suggestions for further research, the development of e-modules integrated with Islamic values is expected to be carried out in other subjects and to determine the effectiveness of their use in the field in the learning process.

REFERENCES

Agprianti, N., Agusminarti, A., & Sholihat, N. (2022). Development of Printed Module of Plants Structure Materials and Its Technology-Based Utilization on The Eighth-Grade Cross Puzzles at Smp Negeri 35 Pekanbaru. *Biosfer : Jurnal Tadris Biologi*, *13*(2), 231–238.

Alsina, A., Maurandi, A., Ferre, E., & Coronata, C. (2021). Validating an Instrument to Evaluate the Teaching of Mathematics Through Processes. *International Journal of Science and Mathematics Education*, *19*(3), 559–577. https://doi.org/10.1007/s10763-020-10064-y

Ardianti, S. D., Wanabuliandari, S., Saptono, S., & Alimah, S. (2019). Respon Siswa Dan Guru Terhadap Modul Ethno-Edutainment Di Sekolah Islam Terpadu. *Edukasia : Jurnal Penelitian Pendidikan Islam*, *14*(1), 1.

https://doi.org/10.21043/edukasia.v1 3i2.3693

Arikunto, S. (2014). *Prosedur Penelitian Suatu Pendekatan Praktik-Revisi Ke X.* Jakarta : Rinerka Cipta*.*

Atoum, I., Baklizi, M. K., Alsmadi, I., Otoom, A. A., Alhersh, T., Ababneh, J., Almalki, J., & Alshahrani, S. M. (2021). Challenges of Software Requirements Quality Assurance and Validation: A Systematic Literature Review. *IEEE Access*, *9*, 137613–137634. https://doi.org/10.1109/ACCESS.2021. 3117989

Berlin, A. W., Apriliaswati, R., & Rezeki, Y. S. (2022). Developing E-Module of Islamic Reading Text Materials. *Journal of Foreign Language Teaching and Learning*, *7*(1), 24–40. https://doi.org/10.18196/ftl.v7i1.1321 0

Branch, R. M. (2009). *Instructional Design: The ADDIE Approach*. Springerb Science Business Media.

Chameron, S. J., Aswirna, P., & Jannah, R. (2022). The Implementation of E-Module Teaching Materials on Student Learning Outcomes at SMA N 1 BONJOL. *Proceedings of the 3rd UIN Imam Bonjol International Conference on Islamic Education*, *1*(2), 1–10.

Chrisyarani, D. D., & Yasa, A. D. (2018). Validasi modul pembelajaran: Materi dan desain tematik berbasis PPK. *Premiere Educandum : Jurnal Pendidikan Dasar Dan Pembelajaran*, *8*(2), 206. https://doi.org/10.25273/pe.v8i2.3207

Dewi, R. K., Khofifah, U. K., & Binti Yahya, N. A. (2022). Chemistry Learning Innovation With Religious Character Integrated Reaction Rate Module for Class XI Students of Senior High School. *Fenomena*, *21*(2), 187–202. https://doi.org/10.35719/fenomena.v2 1i2.120

Dr. Vladimir, V. F. (2018). Skala Pengukuran. *Gastronomía Ecuatoriana y Turismo Local.*, *1*(69), 5–24.

Dutta, D. A. (2020). Impact of Digital Social Media on Indian Higher Education: Alternative Approaches of Online Learning during COVID-19 Pandemic Crisis. *International Journal of Scientific and Research Publications (IJSRP)*, *10*(05), 604–611. https://doi.org/10.29322/ijsrp.10.05.2 020.p10169

Eva'atussalamah, E., Fitri, A. Z., & Choiruddin, C. (2022). Development of Thematic E-Modules Based on Al-Qur'an Verses To Improve Student Learning Outcomes. *Al-Bidayah : Jurnal Pendidikan Dasar Islam*, *14*(2), 279–296. https://doi.org/10.14421/albidayah.v1 4i2.793

Fahlevi, A., Asrizal, -, Gusnedi, -, & Hidayati, -. (2021). Practicality E-Module of Vibration in Everyday Life on Online Learning To Improve Science Process Skills of Grade X High School Students. *Pillar of Physics Education*, *14*(2), 109. https://doi.org/10.24036/1164217107 4

Fitria, H., & Suminah, S. (2020). Role of Teachers in Digital Instructional Era. *Journal of Social Work and Science Education*, *1*(1), 70–77. https://doi.org/10.52690/jswse.v1i1.1 1

Haka, N. B., Anggoro, B. S., Hamid, A., Novitasari, A., Handoko, A., & Puspita, L. (2020). The Development of Biology Module Based on Local Wisdom of West Lampung: Study of Ecosystem Material. *Journal of Physics: Conference Series*, *1467*(1). https://doi.org/10.1088/17426596/14 67/1/012013

Haka, N. B., Pamungkas, M. F., Masya, H., Rakhmawati, I., & Hidayah, N. (2024). Desain, Development, and Evaluation of

Biology E-Modules Website Based on Local Wisdom of the Baduy Tribe: Strengthening Pancasila Student Profiles on Ecosystem Material. *E3S Web of Conferences*, *482*(05005), 1–12. https://doi.org/10.1051/e3sconf/2024 48205005

Handoko, A., Pratama, A. O. S., Haka, N. B., Puspita, L., Wulandari, E., Marzuki, Z. A. W., & Anggoro, B. S. (2024). Creative thinking: The Effect of Green School-Based Project Based Learning (PjBL) Model. *E3S Web of Conferences*, *482*. https://doi.org/10.1051/e3sconf/2024 48204016

Hosen, M., Ogbeibu, S., Giridharan, B., Cham, T. H., Lim, W. M., & Paul, J. (2021). Individual motivation and social media influence on student knowledge sharing and learning performance: Evidence from an emerging economy. *Computers and Education*, *172*(June 2020), 104262. https://doi.org/10.1016/j.compedu.20 21.104262

Irvy, I. I. (2020). Understanding the Learning Models Design for Indonesian Teacher. *International Journal of Asian Education*, *1*(2), 95–106. https://doi.org/10.46966/ijae.v1i2.40

Isma, F., Ayatusa'adah, A., & Lestariningsih, N. (2023). Development of an e-module in the form of a flipbook on integrated Islamic circulatory system material for grade XI SMA/MA. *Practice of The Science of Teaching Journal: Jurnal Praktisi Pendidikan*, *2*(2), 64–74. https://doi.org/10.58362/hafecspost.v 2i2.37

Kimianti, F., & Prasetyo, Z. K. (2019). Pengembangan E-Modul Ipa Berbasis Problem Based Learning Untuk Meningkatkan Literasi Sains Siswa. *Kwangsan: Jurnal Teknologi Pendidikan*, *7*(2), 91. https://doi.org/10.31800/jtp.kw.v7n2. p1--13

Larasati, A. D., Lepiyanto, A., Sutanto, A., &

Asih, T. (2020). Pengembangan E-Modul Terintegrasi Nilai-Nilai Islam Pada Materi Sistem Respirasi. *Jurnal Penelitian Pendidikan Biologi*, *4*(1), 1–9.

Lubis, R., Bundu, P., & Gani, H. A. (2024). Development of a learning model for islamic religious education based on a flipbook e-module for junior high school student achievement. *Journal of Multidisciplinary Academic and Practice Studies*, *2*(2), 131–145. https://doi.org/10.35912/jomaps.v2i2. 2138

Magalhães, R., Marcondes, F. S., Durães, D., & Novais, P. (2023). Emotion Extraction from Likert-Scale Questionnaires. *International Conference on Intelligent Data Engineering and Automated Learning*, *1*(1), 166–176. https://doi.org/10.1007/978-3-031-48232-8_16

Magdalena, I., Prabandani, R. O., Rini, E. S., Fitriani, M. A., & Putri, A. A. (2020). Analisis Pengembangan Bahan Ajar. *Jurnal Pendidikan Dan Ilmu Sosial*, *2*(2), 170–187.

Mega, I. R., & Sari, W. P. (2021). Need Assesment of English E-Module Integrated to Islamic Value Development for the Eight Grade Students at Islamic Schools. *Ethical Lingua: Journal of Language Teaching ...*, 493–500. https://doi.org/10.30605/25409190.3 14

Mohajan, H. (2020). Munich Personal RePEc Archive Quantitative Research: A Successful Investigation in Natural and Social Sciences. In *Journal of Economic Development, Environment and People* (Vol. 9, Issue 4). https://mpra.ub.uni-muenchen.de/105149/

Okta, P. D. A. M. M., & Widiastuti, N. L. G. K. (2021). How Effective is Learning Style Material with E-Modules During the COVID-19 Pandemic? *Jurnal Ilmiah Sekolah Dasar*, *5*(2), 307.

https://doi.org/10.23887/jisd.v5i2.376
87

Panggabean, D. D., Sinuraya, J., Irfandi, & Butarbutar, Y. (2022). Analysis of Teaching Material Needs in the Form of General Physics E-Modules Based on Scientific Approach. *AIP Conference Proceedings*, *2659*(November). https://doi.org/10.1063/5.0117259

Popa, D., Repanovici, A., Lupu, D., Norel, M., & Coman, C. (2020). Using Mixed Methods to Understand Teaching and Learning in COVID 19 Times. *Sustainability*, *12*(20), 8726. https://doi.org/10.3390/su12208726

Puspita, L., Rakhmawati, I., & Komarudin, K. (2023). Developing Student Worksheet Based on Islamic, Science, Environment, Technology, and Society on Junior High School Students' Critical Thinking Skills. *BIOSFER: Jurnal Tadris Biologi*, *14*(2), 273–284. https://doi.org/10.24042/b

Puspita, L., Rosa, V. A., Hidayah, N., & Velina, Y. (2023). Flipped classroom learning model assisted by the experimentation method : the impact on problem-solving skills and learning independence. *International Journal of Mathematics and Science Education Research*, *1*(2), 1–12.

Rosidin, U., Herliani, D., & Viyanti. (2023). Development of Assessment Instruments in Project-Based Learning to Measure Students Scientific Literacy and Creative Thinking Skills on Work and Energy Materials. *Jurnal Penelitian Pendidikan IPA*, *9*(6), 4484–4494. https://doi.org/10.29303/jppipa.v9i6.2421

Rusilowati, U., & Wahyudi, W. (2020). The Significance of Educator Certification in Developing Pedagogy, Personality, Social and Professional Competencies. *Atlantis Press : Social Science, Education and Humanities Research*, *409*, 446–451. https://doi.org/10.2991/assehr.k.200225.095

Setiawan, D. C., Ni'mah, F., & Karolina, W. (2022). Analysis of the need for development of e-module based on interactive media learning in the era of the pandemic. *Edubiotik : Jurnal Pendidikan, Biologi Dan Terapan*, *6*(02), 132–138. https://doi.org/10.33503/ebio.v6i02.1358

Setyaningsih, S., & Suchyadi, Y. (2021). Classroom Management in Improving School Learning Processes in the Cluster 2 Teacher Working Group in North Bogor City. *Jhss (Journal of Humanities and Social Studies)*, *5*(1), 99–104. https://doi.org/10.33751/jhss.v5i1.3906

Subari, S. (2022). Developing E-Module for English Language Teaching (R&D Study at Tenth Grade Students of Senior High School 1 Donggo). *Internatioanl Journal of Multicultural and Multireligious Understanding*, *9*(1), 102–117.

Sudarmika, P., Santyasa, I. W., Tegeh, I. M., & Sudarma, I. K. (2024). Development of Project-Based Flipped Learning Media to Achieve Nurse's Critical Thinking, Creative, and Spiritual Attitude. *International Journal of Instruction*, *17*(2), 519–538. https://doi.org/10.29333/iji.2024.17229a

Suprihatin, S., & Manik, Y. M. (2020). Guru Menginovasi Bahan Ajar Sebagai Langkah Untuk Meningkatkan Hasil Belajar Siswa. *PROMOSI (Jurnal Pendidikan Ekonomi)*, *8*(1), 65–72. https://doi.org/10.24127/pro.v8i1.2868

Vitrianingsih, D., Aulianingsih, I., & Yuliani, H. (2021). Analisis Kebutuhan Pengembangan Modul Elektronik (E-Module) IPA Terintegrasi Islam. *Jurnal Ilmiah Pendidikan Fisika*, *5*(1), 27. https://doi.org/10.20527/jipf.v5i1.2525

Wahyuni, Z. A., & Yerimadesi, Y. (2021). Praktikalitas E-Modul Kimia Unsur Berbasis Guided Discovery Learning untuk Siswa Sekolah Menengah Atas. *Edukatif : Jurnal Ilmu Pendidikan*, *3*(3), 680–688.

Widodo, W., Purwanto, H., Sholihat, N., Jehloh, N., & Suryanti, S. (2023). Development of Integrated Interactive Modules Education for Sustainable Development (ESD) Global Warming Material Junior High School Muhammadiyah Pekanbaru. *Biosfer : Jurnal Tadris Biologi*, *14*(2), 141–148. https://doi.org/10.24042/b

Windari, M. R., Prihatin, J., & Fikri, K. (2023). The Effectiveness of Digital Textbooks on Brain-based Learning assisted by Animated Videos and Maze Chase-Wordwall on Science Literacy Skills and Student Learning Outcomes. *Biosfer: Jurnal Tadris Biologi*, *14*(1), 79–88. https://doi.org/10.24042/biosfer.v14i1.16891

Zarkasih, Z., Diniya, D., Permana, N. D., & Kirana, I. (2023). Development of Science E-Modules Based on Socio-scientific Issues Integrated with The Quran Verses to Establish Pancasila Student Profiles. *Journal of Natural Science and Integration*, *6*(1), 63. https://doi.org/10.24014/jnsi.v6i1.21855