Validity Test of Digital Science Teaching Materials Based on Case Method Learning Integrated with P5P2RA

Efrahutatera[1*], Jayanti Syahfitri[1], Merri Sri Hartati[1]

[1] Departemen of Biology Education, Faculty of Teacher Training and Education, Universitas Muhammadiyah Bengkulu, Bengkulu, Indonesia.

Abstract: This study aims to develop digital science learning media based on case method learning integrated with P5P2RA. The main data of this study are (a) knowing the facilities owned by the school based on the results of interviews with the principal, (b) learning media used by teachers during learning based on interviews with class teachers, (c) Practicality when used by students based on the results of student observations. This study uses the research and development (R&D) method. The development model used is the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The results of the study indicate that (a) the facilities owned by the school can be used well, and (b) the media developed is feasible for use in the classroom, this can be seen from the results of media expert validation of 91% and material expert validation of 90% with a very feasible category (c) digital science learning media based on case method learning integrated with P5P2RA is stated to be practical, this can be seen from the results of the Practicality Test of 92.6% with a very practical category.

Keywords: Case method learning; Digital Science teaching materials

Introduction

The government continues to make efforts in the recovery of education in Indonesia post-pandemic that has affected the world. Various policies and regulations have been implemented to restore the educational conditions that had experienced learning loss. One of the policies issued is th implementation of Merdeka Curiculum. This curriculum was launhed on february 11, 2022, by the Minister of Education, Culture, Research, and Technology (Idayanti, 2023).

The independent curriculum is a curriculum with intramural learning, where studedents have the right to learn from anywhere according to their needs by integrating information technology tools in accordance with the demands of the 21st century. Teacher are not only expected to be able to teach and manage classroom activities effectively. But also to buld effective relationship with students and the school comunity, use technology to support the the improvemnt of teaching

quality, and continuously reflect on and improve their teaching practices (Tarihoran, 2019).

In 21 st-century learning, education is one way to complement the phenomenon of digital integration where machines and humans interact to solve problems in the discovery of new theories. Education 4.0 as an information transformer in a practical and digital-based manner. Teachers must innovate to implement teaching by utilizing technology in acordance with th 4.0 revolution era (Sabaruddin, 2022; Susilawati et al., 2022). The technologies applied include digital technology, artificial inteligence, big data, and robotics. Educators must have mastery of technology and integrate it into the learning process (Fitria et al., 2024; Nisa et al., 2023).

P5P2RA in intracurricular activities needs to be develoed in accordance with the learning achievements of students, including in science as an instrument for character and citizenship development need to be integrated with in-depth learning strategies. Through a holistic approachh, science education not only becomes

---

How to Cite:

Efrahutatera, Syahfitri, J., & Hartati, M. S. (2025). Validity Test of Digital Science Teaching Materials Based on Case Method Learning Integrated with P5P2RA. *Jurnal Penelitian Pendidikan IPA*, *11*(6), 726-733. https://doi.org/10.29303/jppipa.v11i6.10852

a proces of knowledge transfer but also a means to instill Pancasila values in every aspect of student' lives and to become moral and responsible citizen (Muzakky, 2024).

Considering that the content of science lesson in schools is closely related to aspects of life and the environment, the case study-based method was chosen for the ddevelopment of media in the form of modules. The case study method is one of the learning method that has the potential to train students to solve the problems they face Case Method Learning is one of the problem-solving learning models, in the Case Method Learning (CML) model, it is a model that uses well-documented real cases as a means of learning. Students must explore and identify the problems and solutions from the given case under the guidance of the teacher in discussion activity (Minarni et al., 2024). The apllication of learning with the case method is capable of honing critical thingking skills for case resolution, comunication abilities, collaboration, and student creativity (Fauzi et al., 2022).

In line with the research conducted which explains that the application of the case study method to optimize student learning outcomes on plant pests and diseases at SMP N 1 Karangawen Demak in the odd semester of the 2014/2015 academic year, the average cognitive learning outcomes increased (L. W. Utami et al., 2014). According to research by that the development of Digital Science Learning Media at SMP N 3 Pangkalan District. Digital science learning media at SMPN 3 Pangkalan District in the form of e-books has been successfully developed using sigil software supported by other software such as Microsoft Word, Adobe Photoshop and others (Okra et al., 2019). The developed Digital Science Learning Media is considered feasible for use with product test results from computer informatics and natural science experts getting a score of 84.8 from material experts and 89.16 from media experts with the conclusion that this digital book is declared Very Valid (Okra et al., 2019).

The case method learning approach integrated with the Pancasila Student Profile Strengthening Project and the Rahmatan Lil Alamin Student Profile offers a new paradigm in science learning that is more holistic and meaningful. Based on initial observation data at MTs N 1 Rejang Lebong and a questionnaire at the Science Teacher workshop in Padang Ulak Tanding District, Rejang Lebong Regency on October 10, 2024 regarding Digital Science Teaching Materials based on Integrated Case Method Learning P5P2RA, which was attended by 30 science teacher participants in Padang Ulak Tanding District, Rejang Lebong Regency. The use of digital teaching materials and the application of case method learning have not been widely carried out, the teaching materials used still refer to Student Books and Worksheets, from the results of the questionnaire 87% of

teachers have not used digital teaching materials based on integrated case method learning P5P2RA, and 90% of workshop participants were interested in implementing digital teaching materials based on integrated case method learning P5P2RA. Teachers still use books and LKS and have not implemented case method learning in the learning process.

Based of the results of these observation, it can concluded that the use of learning media is important to increase individual interest so that students are interested in seeing and understanding the material being taught. Because by using digital science teaching materials the learning process more inovative and can balance the conventional learning process. Although not all teacher are able to operate a laptop.

Based on the background above, it is necessary to develop digital science teaching materials that are relevant to the independent curriculum with one of its programs being P5P2RA as a character enhancer to support challenging and interesting learning.

Method

The research and Development method is the method used for this research. The development of ADDIE moddel is a process or a series of steps used in research and development (R&D) to create new products or improve existing ones. The stage in the development of ADDIE model are Analyze, Design, Develop, Implement, and Evaluate (Naldo et al., 2021). The steps in the ADDIE modddel in this study are as show in figure 1.
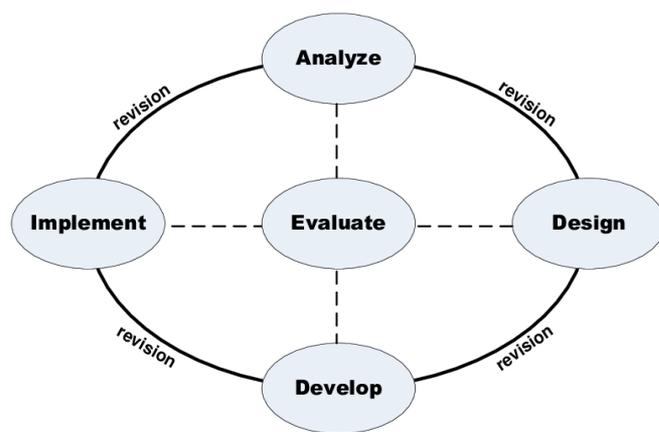

Figure 1. Steps of ADDIE model

The first stage the initial analysis aims to identify issues in learning at MTS located in Rejang Lebong Regency, thus requiring the development of digital science teaching matereials based on Case Method Learning Integrate with P5P2RA. At this stage, it is possible to understand the curriculum, methods, media, and teaching tools used by teachers in the school.

The second stage the design phase to prepare learning device that will be used for research on the development of digital science teacching materials based on Case Method Learning Integrated with P5P2RA. Next, a design was created by formulating learning objectives, and the product was outlined by designing the material inluded in the e-booklet compiling instrumens as tools to test validity and practicaly. The e-booklet product created using the Canva appliccation is provided as an alternative teaching material for innovative and engaging teachers. After designing the product, the next step is to consult with experts and validate it with validators.

The third stage is development, validity tests were conduted on the digital science teaching materials based on Case Method Learning Integrated P5P2RA, several tests were conducted. To make impro vements to the initial producted by three validators, including subject matter experts and media experts. The material expcert valiator is conducted to assess or validate the content in the product, while the media validator is used to evaluate the product's suitability.

The material expert validator provides an assessment through the digital science teaching material validation assessment sheet instrument based on integrated case method learning P5P2RA. The purpose of validating the material is to ensure that the contents of the material in the product being developed are tested for their truth, namely the material on ecology and biodiversity (human influence on the environment) for grade VII M Ts that was developed.

Material validation was carried out by three validators. The results of the assessment of the material expert validation instrument sheet given by validator I concluded that the product being developed was in the "very valid" category. The validator concluded that the product that the researcher made was "suitable for field trials" with revisions according to the suggestions, namely 1) there are no references yet, add references to each material, image and video; 2) on the last page there is no bibliography page, so add a bibliography page according to the references used. The results of the revisions before and after the product was declared suitable for field testing can be seen in table 1.

The fourth stage is implementation, product trials will be conducted with two types of trials: 1) Limited trials will be carried out in one seventh-grade class at MTs N 1 Rejang Lebong, and 2) Extensive trials will be conducted in three MTs, namely MTs N 1 Rejang Lebong, MTs N 2 Rejang Lebong, and MTs Nurul Kamal, each involving one seventh-grade cla ss.

Fifth stage is evaluation, assessing the quality of the product and the learning process that has been carried out based on the 4 stages.

Table 1. Table before and after revision for validation of material validator development of science teaching materials based on integrated case method learning P5P2RA

Fraksi	Validated items	Before	After
1	References to materials, videos and images	There are no references to materials and images yet	Reference materials and images have been added
		There are no material and video references yet	Reference materials and videos have been added
2	Bibliography page	There is no bibliography page yet	There is already a bibliography page

The quantitative data for the validation test comes from the scores given by expert validators in content and

media towards the developed teaching materials. The scores are based on a 5-point Likert scale with the following bencmarks: Point 1. Very Poor, Point 2. Poor, Point 3. Fairly Good, Point 4. Good, and Point 5. Very Good. The data that has been obtained is then processed according to the equation that shows Aiken's formula (L. Utami et al., 2024).

$$V = \sum s/[n(c-1)] \qquad (1)$$

In this context, V is the validation value, s is the validator score relative to the lowest score (currently = 1 highest validity assessment number (currently = 5) and n is the total number of validators. After the validation value is obtained, it can be catagorized with refereence to the following table:

Table 2. Product Validation Catagories (Yanti et al., 2023)

Fraksi	Validation Value Range	Validation Category
1	0.80-1.00	Very Valid
2	0.60-0.79	Valid
3	0.40-059	Quite Valid
4	0.20-039	Less Valid
5	0.00-19	Very Invalid

Praticality Analysis, at this stage, the data on the practicality sheet filled out by the student is used to analyze the practicality of the develped product. The obtained data can be converted into a practicality test value expressed as a percentage by subtituting the data into the equation (Nadzif et al., 2022):

$$Percentage = \frac{\sum the\ score\ given}{\sum maximum\ score} x100\% \qquad (2)$$

Next, the overall score can be determined by subtituting each data point into the equation, interpreted with reference to the following table:

Table 3. Product Practicaly Catagory

Fraksi	Range of praticality values	Catagory of praticality
1	81-100	Very Practical
2	61-80	Practical
3	0.40-059	Quite Practical
4	0.20-039	Less Practical
	0.00-19	Very Impractial

Result and Discussion

The process of devloping this teaching material refers to ADDIE model developed by Branch (2009), which consists of 5 stages: Analyze, Design, Development, Implementation, and Evaluation. Needs analysis was cconducted through lassroom observations, interviews with 3 science teacher from MTs N 1 Rejang Lebong, Mts N 2 Rejang Lebong, and MTs Swasta Nurul Kamal Rejang Lebong, to identify the initial problems in the learning process. The result of direct observation revealed problems in the learning process, namely: first the teaching materias used in the learning process are based solely on textbooks and student worksheets, second the lack of utilization of technology in learning. Observation, interviews, and analysis of student needs at MTs N 1 Rejang Lebong, and MTs Swasta Nurul Kamal Rejang Lebong Serve as the basis to assist researchers in product development in the future.

The results of teacher interviews and studeent needs analysis at MTs N 1, MTs N 2, and MTs Swasta Nurul Kamal Rejang Lebong can be concluded that in the learning process it still releas on textbooks and student worksheets, and the learning process is still teacher-centered with the lecture method. The teacher explains the material, while th students act as listeners and take notes on what the teacher explains, making the learning procss ineffective. The studednts feel bored and unmotivated to learn.

Furthermore, in the learning process, the teaching materials have not been linked to real cases in the surrounding environment, so students do not understand the problems from the events ouccuring in the surrounding environment and cannot solve the problems or find solutions. This gives the impression that the learning activities are monotonous and there is a lack of literacy resources, with makes student less creative. This is videnced by the lack of students' ability to work well in groups, as well as students remaining silnt whn asked to xplain and summarize the material that has been learned, according to Jufrida et al. (2020), science learning should provide direct experiences of how science works, discover products, and solve everyday problems.

Than, the implementation of P5P2RA, in science subjects has not yet been applied; science learning often still focuses on cognitive aspects or mastery of material neglecting character and skill development. By integrate P5P2RA, teacher need to make changes in the learning process. Accoording to Shafira (2022), the results of the student needs analysis through a questionnaire given to 143 people indicate that in current science learning, digital teaching materials are not yet used (90%), the teaching materials used do not include videos, images, and audio that help in understanding the material (86%), the teaching materials used in science learning do not yet relate real-life cases in the surrounding environment (77%), and the science teaching materials currently used do not integrate the P5P2RA priject (81%). The used of digital learning materials allows abstract science

concepts to be explained and virtualized more effectively through images, animations, and videos, helping students undertand concept that are difficult to grasp through oral explanations and text.

In addition, it is also known that students feel difficulties in the implementation of P5P2RA project, activities ar still monotonous and therefore boring. Students suggested that the project activities should be more interesting and aligned with real cases in the surounding environment, which would make them more enthusiastic in participating in the project activities, easier to understend the material, and able to apply it in daily life. Similarly, according to the opinion of Arlina et al. (2023).

Before the prodduct is designed and developed, the researchers first create a teaching module that will later be used for product implementtion as a learning reference. The components in the module inlcude module identity, learning outcomes, learning objectives, meaningful understanding triggering questions, P5P2RA, learning activities, and reflection.

The selection of appropriate learning media is very important for the effectiveness of learning and must be tailored to the needs of the students. According to Masdar et al. (2024), educators must be able to use engaging, enjoyble, and needs-appropriate learning media to help students receive lessons, enhance and direct attention, and foster good interactions between students and their environment.

The main applicaton used by the researcher in product development is Canva apps. The researcher uses premium-based Canva apps sothat all icons or templates can be used without charge. The next step is to export them into an electronic book format. The export is done using the flpbook simplebooklet, generating a link that can then be applied thhrough the madrasah e-learning application or accessed directly via the internet.

Preminary product design is development of the digital scienceee teaching materials based on case method learning integrated with P5P2RA begins with the creation of a framework according to the storyboard design and product prototype.

Table 4. Storyboard of Digital Teaching Materials Based on Case Metod Learning integrate with P5P2RA

Fraksi	Component	Explanation
1	The front cover page of the digital teaching materials based on case method learning integared with P5P2RA	1. Title of the teaching material 2. Subject 3. Title of the lesson material 4. Education level 5. Year 6. Sopporting image
2	Table of contents page	1. The title "Table of Contens" 2. Contents 3. Number
3	Content page	1. Title of the material 2. Supporting image 3. Supporting video 4. Explanation of the material
4	Student discussion page	1. Discussion command title 2. Discussion questions
5	P5P2RA activity page	1. P5P2RA project friend 2. Dimensions of P5 according to the P5P2RA theme 3. Dimensions of P2RA
6	Reflection activity page	1. Video that supports 2. Reflection queationa.

In the creation of digital science teaching materials based on case method learning integrated with P5P2RA, materials such as A4 backgrounds, supporting images, YouToube videos, and others needed from the internet or from Canva apps themselves are first prepared according to the product's needs. Canva apps are used to create the product, the interface is as follows:

The stage of creating the cover is adjusted to the title of the material choosen by the reseacher, which is ecology and biodiversity for seventh grade.
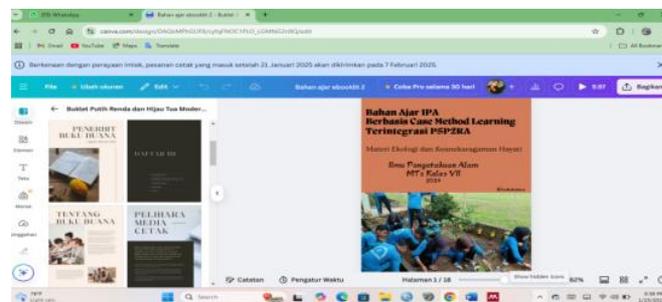

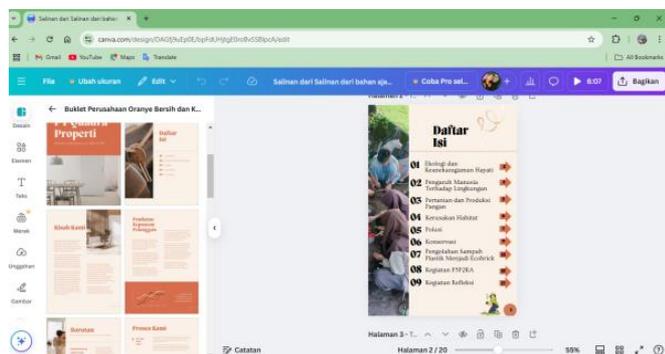**Figure 2.** Creation of digital science teaching material cover based

Figure 3. Create of a digital science teaching material table of contens

The stage of creating the table of contents is adjusted according to the subtopics in the ecology and biodiversity material.

Here are the results of the analysis of the assessement of the digital science teaching materials product based on case method learning integrated with P5P2RA:

Table 5. Results Validation of Digital Teaching Materials

Average Score	Interval	Catagory
0.90	0.80 – 1.00	Very Valid

Based on table 5, the results of thee validation sheet analysis conducted by subject matter expert validators on th dedveloped digital science teaching materials basede on case method learning integrate with P5P2RA obtained an average score of 0.90, which falls within the 0.8-1.00 interval, catagorized as very valid. Therefore, the assessment by expert material validators indicates that the developed digital science teaching materials based on case method learning integrated with P5P2RA are valid and suitable for use in the next stage.

Here are the results of the analysis of the assessement of the digital science teaching materials product based on case method learning integrated with P5P2RA:

Table 6. results Validation of Digital Teaching Materials

Average Score	Interval	Catagory
0.91	0.80 – 1.00	Very Valid

Based on table 6, the result of the validators on the developed digital science teaching materials based on case metgode learning integrated with P5P2RA obtained an average score 0.91, falling within the interval of 0.80 – 1.00, catagorized as very valid. Therefore, the assessment from media expert validators indicates that the developed digital science learning materials based on case method learning integrated with P5P2RA are valid and suitable for use in the next stage.

The assessement of each statement item is given a minimum score of 1 and a maximum score of 5. The results of the limited trial student response questionnaire can be seen in the table below:

Table 7. Results of the limited Trial Student Response Questinnaire Assessement

Number of student	Total score	Overall Value	Particality Category
38	3465	91	Very Practical

Based on table 7, it is known that questionnaire result from 38 students show an overall score of 91% whitin the interval of 81-100 catagorized as very practical. Developed digital science teaching materials based on case method learning integrated with P5P2RA makes them more enthusistic in learning and easier to enderstand the material. From the students' responses, it can be concluded that the developed digital science learning materials based on case method learning integrated with P5P2RA received very practical feedback from the students of MTs Negeri 1 rejang Lebong and are sutable to proceed to the next stage, which is extensive testing.

The data from the student response questionniare in the extensive trial were then analyzed to obtain the practically score, allowing the succes of developing digital science teaching materials based on case method learning integrated with P5P2RA to be determined. The results of the board student response questionnaire can be seen in the following table.

Table 8. results of the Student Response Questinnaire trial Assessement

Number of student	Total score	Overall Value	Particality Category
143	13.247	92.6	Very Practical

Based on table 8, it is known that the result of the student response questionnaire from 143 students, whith an average score of 92.6%, fall wtihin the interval of 82 – 200, catagorized as veri practical. Comments from students indicate that the use of the developed digital science learning materials based on case method learning integrated with P5P2RA made them more interested in learning and enthusiastic due ti the presence of videos in the surrounding environment. It can be concluded that the developed digital science teaching materials based on case method learning integrated with P5P2RA received a very practical response and are suitable for use in the learning process.

Evaluation conducted by the researchers includes an evaluation at the at the design stage, where in the product develovment, the researchers determine the appearbce of the digital science teaching materials based

on case method learning integrated with P5P2RA that will be developed, including the selection of images, videos, audio, materials, and reflecion activities to be used. Evaluation at implementation stage is conducted when observing the difficulties experienced by students during limited trials. After each stage of development, an evaluation is conducted at the final stage to assess the product after it has been tested and validated.

In the implementation of P5P2RA based on case method learning with the provision of real cases in the surrounding environment, students find it easier to understand the material and can apply it in their lives. P5P2RA embodies character values that align with real problems and are based on community needs or real issues in the school environment (Yoan Valenza, 2023). Based on this, it can be concluded that the digital science teaching materials product based on case method learning integrated with P5P2RA developed by the researcher is a product that is "valid and practical" for use in learning.

Conclusion

Suggestions obtained from expert validators, teachers, and students can improve the quality of the developed Digital IPA learning matereials based on cacse method learning integrated with P5P2RA to be suitable for use in the learning process. that have been developed are declared highly valid in terms of content and media. The digital sciencec teahing materials based on casee method learning intgrateddd with P5P2RA that have been developed are very practical.

References

Arlina, Pane, N. E., Sitorus, W., Jerohmi, M. P., & Munazah, A. (2023). Strategi Project Based Learning Sebagai Alternatif Menciptakan Siswa Kreatif. *SOKO GURU: Jurnal Ilmu Pendidikan*, *3*(2), 117–126. https://doi.org/10.55606/sokoguru.v3i2.2191

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

Fauzi, A., Ermiana, I., Rosyidah, A. N. K., & Sobri, M. (2022). Implementasi Case Method (Pembelajaran Berbasis Pemecahan Kasus) Ditinjau Dari Kemampuan Kolaboratif Mahasiswa. *Jurnal Eduscience*, *9*(3), 809–817. https://doi.org/10.36987/jes.v9i3.3446

Fitria, D., Lufri, Asrizal, & N, A. (2024). Digital Teaching Material of Integrated Science with Blended-PBL Model for Independent Curriculum. *Jurnal Penelitian Pendidikan IPA*, *10*(11), 8328–8338. https://doi.org/10.29303/jppipa.v10i11.9058

Idayanti, S. (2023). Analisis Kesesuaian P5P2RA Dengan Prinsip Pelaksanaan Dan Dampaknya Terhadap Perilaku Peserta Didik. *Wawasan: Jurnal Kediklatan Balai Diklat Keagamaan Jakarta*, *4*(1), 48–66. https://doi.org/10.53800/wawasan.v4i1.228

Jufrida, J., Basuki, F. R., Rinaldo, F., & Purnamawati, H. (2020). Analisis Permasalahan Pembelajaran IPA: Studi Kasus Di SMPN 7 Muaro Jambi. *Jurnal Pendidikan Sains (JPS)*, *8*(1), 50. https://doi.org/10.26714/jps.8.1.2020.50-58

Masdar, A. K. C., Nadira, L., Murnika, Y., & Wismanto. (2024). Pemilihan Media Pembelajaran Yang Tepat Untuk Meningkatkan Hasil Pencapaian Belajar Peserta Didik. *Edukasi Elita : Jurnal Inovasi Pendidikan*, *1*(3), 76–85. https://doi.org/10.62383/edukasi.v1i3.243

Minarni, M., Kundera, I. N., Tangge, L., Sutrisnawati, S., & Ramadhan, A. (2024). Pengaruh Model Pembelajaran Case Based Learning terhadap Keterampilan Proses Sains Siswa pada Materi Ekosistem di SMAN 4 Sigi. *Ideguru: Jurnal Karya Ilmiah Guru*, *10*(1), 241–246. https://doi.org/10.51169/ideguru.v10i1.1361

Muzakky, F. R. (2024). Analisis Implementasi Penilaian P5 pada Mata Pelajaran Ilmu Pengetahuan Alam di SMP Negeri 1 Kedunggalar Tahun Pelajaran 2023-2024. *Jurnal Pendidikan Dan Keilmuan*, *04*(02), 39–49. https://doi.org/10.37471/jpik.v4i2.1011

Nadzif, M., Irhasyuarna, Y., & Sauqina, S. (2022). Pengembangan Media Pembelajaran Interaktif IPA Berbasis Articulate Storyline Pada Materi Sistem Tata Surya SMP. *JUPEIS : Jurnal Pendidikan Dan Ilmu Sosial*, *1*(3), 17–27. https://doi.org/10.55784/jupeis.Vol1.Iss3.69

Naldo, S., & Basri, W. (2021). Pengembangan Video Pembelajaran Sejarah. *Jurnal Kronologi*, *3*(4), 387–399. https://doi.org/10.24036/jk.v3i4.324

Nisa, K., Amanda, N., & Pribadi, R. A. (2023). Kolaborasi

Pendidik Dan Peserta Didik dalam Mewujudkan Digitalisasi dan Penguasaan Teknologi Pada Pembelajaran Abad 21. *Jurnal Basicedu*, *7*(3), 1433–1445. https://doi.org/10.31004/basicedu.v7i3.5383

Okra, R., & Novera, Y. (2019). Pengembangan Media Pembelajaran Digital IPA Di SMP N 3 Kecamatan Pangkalan. *Journal Educative : Journal of Educational Studies*, *4*(2), 121. https://doi.org/10.30983/educative.v4i2.2340

Sabaruddin, S. (2022). Pendidikan Indonesia Menghadapi Era 4.0. *Jurnal Pembangunan Pendidikan: Fondasi Dan Aplikasi*, *10*(1). https://doi.org/10.21831/jppfa.v10i1.29347

Shafira, N. T. (2022). Profil Pembelajaran IPA di SMP Inklusi ; Analisis Kebutuhan Media Pembelajaran Digital. *COLLASE (Creative of Learning Students Elementary Education)*, *5*(5), 911–917. https://doi.org/10.22460/collase.v5i5.12129

Susilawati, S., Doyan, A., Mulyadi, L., Abo, C. P., & Pineda, C. I. S. (2022). The Effectiveness of Modern Physics Learning Tools Using the PhET Virtual Media Assisted Inquiry Model in Improving Cognitive Learning Outcomes, Science Process Skills, and Scientific Creativity of Prospective Teacher Students. *Jurnal Penelitian Pendidikan IPA*, *8*(1), 291–295. https://doi.org/10.29303/jppipa.v8i1.1304

Tarihoran, E. (2019). Guru Dalam Pengajaran Abad 21. *Sapa - Jurnal Kateketik Dan Pastoral*, *4*(1), 46–58. https://doi.org/10.53544/sapa.v4i1.68

Utami, L., Festiyed, Ilahi, D. P., Ratih, A., Yenti, E., & Lazulva. (2024). Analisis Indeks Aiken Untuk Mengetahui Validitas Isi Instrumen Scinetific Habbits Of Mind. *Journal of Research and Education Chemistry*, *6*(1), 59. https://doi.org/10.25299/jrec.2024.vol6(1).17430

Utami, L. W., & Indriyanti, D. R. (2014). Penerapan Metode Case Study Untuk Mengoptimalkan Hasil Belajar Siswa Materi Hama Dan Penyakit Tumbuhan. *Lembaran Ilmu Kependidikan*, *43*(2), 50229. Retrieved from http://journal.unnes.ac.id/nju/index.php/LIK

Yanti, N. K. M., Pujani, N. M., & Juniartina, P. P. (2023). Pengembangan Modul IPA Terpadu Berbasis Problem Based Learning dengan Tema Jajanan. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, *6*(1), 55–66. Retrieved from https://ejournal.undiksha.ac.id/index.php/JPPSI/article/view/53318