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Socialization of a Causalitic Learning Video Model Integrated with Traditional Gendang Beleq Music as an Effort to Strengthen Local Wisdom in Schools

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Abstract: Science learning in junior high schools is often considered difficult and boring due to the memorization-heavy material and complex mathematical formulas, along with a lack of relevance to daily life. To address this, the causalitic learning model, which focuses on qualitative cause-and-effect analysis of natural phenomena, can be applied. Integrating this model with local wisdom, such as traditional Gendang Beleq music, offers a more engaging and contextual learning experience. This community service project aimed to socialize a causalitic learning video integrated with Gendang Beleq to strengthen local wisdom and improve students' understanding at SMPN 3 Labuapi. Survey results showed the video was highly suitable for use, with average scores of 87.8% from students and 96.4% from teachers, both in the "very good" category. The video also supports STEM education by integrating science, technology, engineering, and mathematics concepts within a local cultural context, making it a relevant and engaging approach. Feedback from respondents suggested emphasizing musical instruments in the opening scenes, reducing nature panoramas, and adding variations to enhance learning enthusiasm. Recommendations included showcasing applications and sound meters more frequently as examples, as they were considered interesting and could increase student engagement.

Keywords: Causalitic model; Gendang beleq; Learning video; Local wisdom

Introduction

Education in Indonesia requires serious attention to adopt technology that effectively and efficiently supports learning strategies (Fahrozy et al., 2022). The rapid development of information technology has significantly impacted the learning system, particularly in science (Makhrus et al., 2021; Muliyadi et al., 2023). Science education in Indonesia is still relatively low and has not achieved optimal results (Doyan et al., 2023; Doyan, Susilawati, & Hardiyansyah, 2021). One branch of science, Natural Science, encompasses aspects of processes, outcomes, and attitudes (Doyan et al., 2020; Januarti et al., 2024).

Science lessons tend to be perceived as difficult and boring because they involve many formulas and concepts that are hard to understand. This is consistent with Yunarti's (2021) study, which showed that factors contributing to learning difficulties among 7th-grade students at SMP Negeri 1 Rambang in science included low interest (16.67%), low motivation (36.67%), sufficient concentration (43.33%), poor study habits (40%), and low intelligence (30%). These difficulties make science learning feel meaningless due to the abstract and challenging nature of the material.

One way to make science learning more meaningful in junior high schools is by integrating local wisdom through the implementation of the causalitic learning model supported by learning videos. The causalitic

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learning model can be effectively integrated with local wisdom. Arum et al. (2023) found that integrating a causalitic learning model with character and local wisdom significantly influenced problem-solving abilities and the development of environmental conservation literacy.

Unlike general learning approaches, the causalitic thinking approach aims to construct phenomena with more than one possible answer using scaffolding strategies (Rokhmat, 2023). This approach is effective in enhancing students' problem-solving abilities, including understanding, selecting, distinguishing, determining, applying, and identifying (Azizah et al., 2022; Harjono et al., 2021; Hartiani et al., 2022; Helmi et al., 2017; Mahmudah et al., 2024; Rokhmat et al., 2017; Sari et al., 2020; Yuliana et al., 2017). The causalitic learning model aims to develop students' potential in identifying and explaining cause-and-effect relationships in phenomena or problems encountered in daily life. Its learning stages include four phases: 1) orientation, 2) exploration and development of causal concepts, 3) argument formulation, and 4) evaluation (Rokhmat, 2023). When integrated with local wisdom, the causalitic model becomes more innovative and relevant through the use of digital learning media, fostering creative and contextual learning processes. Irhasyuarna et al. (2022) stated that interactive media incorporating local wisdom elements could be a reference in science education. Januardi et al. (2024) also emphasized the importance of integrating local cultural wisdom to create more meaningful learning experiences.

Local wisdom refers to cultural traditions and customs that guide community life (Kasmawati et al., 2024). Integrating local wisdom into science education can shape students' character. The Pancasila Student Profile emphasizes global diversity as dimension of student character, which involves preserving local culture while being open to other cultures, fostering mutual respect, and building positive relationships. The key elements of global diversity include cultural appreciation, intercultural communication, and accountability for diverse experiences (Kemendikbudristek, 2022). Putri et al. (2024) demonstrated that maintaining cultural identity can help develop students' 21st-century competencies and skills. One way to achieve this is by using digital learning media that integrates local wisdom, enabling students to learn in a relevant and contemporary manner.

The digital learning media used in this study is a causalitic learning video based on Canva and CapCut. Rahmawati et al. (2021) suggested that innovative and creative digital media, such as learning videos created with Canva, can be applied in science education, aligning with 21st-century education developments that integrate technology into various aspects of life. Canva is highly accessible, user-friendly, and cost-effective.

Thus, a causalitic learning video integrating traditional Gendang Beleq music can strengthen local wisdom within the Sasak Lombok community. Gendang Beleq, a traditional musical art of Lombok, reflects the social and cultural identity of the community and plays an essential role in sacred events such as weddings and traditional rituals.

Method

This study was conducted as a community service program in collaboration with SMP Negeri 3 Labuapi. The partners involved in this project were two science teachers and 25 eighth-grade students, supported by the school's vice principal in charge of facilities and infrastructure, with official permission from the school principal. The activity was implemented through four stages, namely pre-preparation, preparation, implementation, and evaluation, as illustrated in the following diagram:

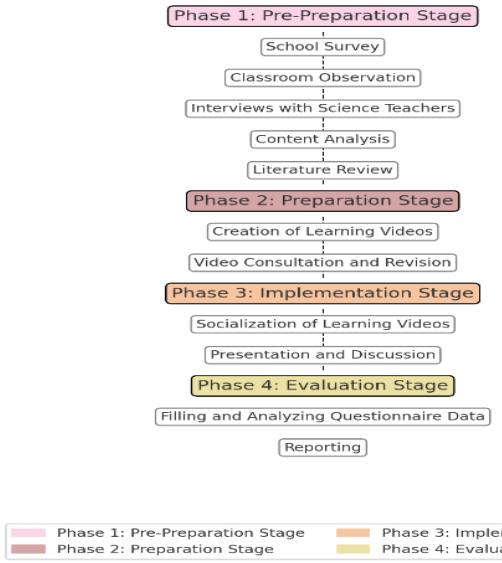

Figure 1. Diagram of the community service implementation stages

Each stage consisted of several activities:

Pre-preparation Stage

Activities included surveying the partner school, observing face-to-face learning, conducting interviews with science teachers, analyzing materials, and reviewing literature.

Preparation Stage

This stage was a follow-up to the pre-preparation results, including drafting the learning video,

consultations, and revisions until the video was ready for socialization.

Implementation Stage

Activities included video socialization, presentations, and open discussions with participants.

Evaluation Stage

This stage involved filling out questionnaires by students and teachers, analyzing questionnaire data, and compiling activity reports.

Result and Discussion

The preparation for this community service activity took approximately four months, from September to December 2024, focusing on the applied science curriculum. Each stage is described in detail below:

Pre-preparation Stage

This stage involved several steps, including: Surveying SMPN 3 Labuapi, located on Jl. Kediri-Narmada, Merembu, Labuapi District, West Lombok Regency, NTB, with postal code 83361. Observing science lessons in classrooms, analyzing the use of media, learning models, and the integration of local wisdom in teaching and learning processes. The observations and interviews revealed that, until now, there has been no integration of local wisdom in learning, and the use of digital learning media has not been optimal, even though facilities such as LCD projectors, laptops/computers, and Wi-Fi are available.

Figure 2. QR Code for the learning video and the video's opening screen

Preparation Stage

Based on the school's conditions, the researchers immediately began preparing the causalitic learning video integrated with the local wisdom of Gendang Beleq music, under the guidance of lecturers for the applied science course. The video was revised until it was ready for socialization. The causalitic learning video integrated with traditional Gendang Beleq music for strengthening local wisdom in schools can be accessed via the QR Code above.

Implementation Stage

The next stage was the socialization of the learning video, targeting science teachers and eighth-grade students at SMPN 3 Labuapi. The researchers briefly presented the use of the learning video integrated with local wisdom to explain science concepts considered difficult and abstract for students. Participants watched and observed the video and were given opportunities for discussion and Q&A sessions.

The socialization event took place on Friday, November 8, 2024, in the science laboratory of SMPN 3 Labuapi. Participants included two science teachers and 25 eighth-grade students. Students observed the video attentively and enthusiastically, as the discussion on Gendang Beleq and its connection to science concepts captivated their interest. Some students asked questions during the video playback but were reminded by their peers that a Q&A session would follow.

Figure 3. Socialization of the causalitic learning video integrated with Gendang Beleq

Evaluation Stage

The final stage was the evaluation, which included completing questionnaires, analyzing participants' responses, and compiling activity reports. Students and teachers filled out questionnaires to assess their responses to the learning media. The practicality criteria for the learning video product are presented in Table 1.

Table 1. Practicality Criteria for the Learning Video Product

Score Interval	Practicality Criteria
$0 < p \leq 20$	Not Practical
$20 < p \leq 40$	Less Practical
$40 < p \leq 60$	Fairly Pratical
$60 < p \leq 80$	Practical
$80 < p \leq 100$	Very Practical

Responses from Students Regarding the Causalitic Learning Video Integrated with Traditional Gendang Beleq Music

The student questionnaire covered five aspects, divided into 11 statements: Clarity of materials and information, including (1) learning objectives and (2) content on vibrations, waves, and sound. Relevance to local culture, including (3) traditional culture and (4) local cultural knowledge. Engagement and appeal, including (5) interest and (6) motivation. Application and relevance to learning, including (7) relevance and (8) real-life application. Satisfaction level, including (9) material presentation, (10) understanding benefits, and (11) learning effectiveness. Each statement was scored using a Likert scale of 1–5 and categorized as practical or not. Students agreed with statements 1, 3, 7, and 8, and strongly agreed with statements 2, 4, 5, 6, 9, 10, and 11 regarding the learning video.

Evaluation results indicated highly positive responses. The analysis of student responses is presented in a histogram as a percentage:

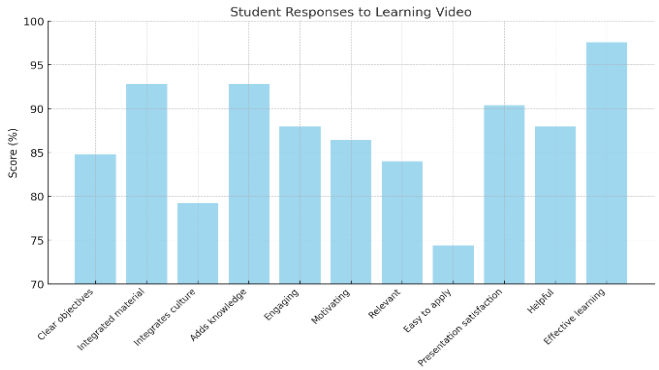

Figure 4. Histogram of student responses to the learning media

The histogram displays the final scores for each statement assessed by students concerning the use of the learning media. Evaluation results showed very positive responses, with an average student response score of 87.8%, which is categorized as excellent. These findings align with Dwidarti et al. (2025), who stated that using technology in multimedia-based learning, such as educational videos, computer programs, and digital choreography, positively impacts students' competencies.

Responses from Teachers Regarding the Causalitic Learning Video Integrated with Traditional Gendang Beleq Music

The teacher questionnaire also covered five aspects, divided into 11 statements: Clarity of materials and information, including (1) systematic learning objectives and (2) information accuracy. Relevance to local culture, including (3) traditional culture (in problem-solving) and (4) local cultural knowledge. Visual and audio quality, including (5) appealing visuals and (6) clear audio. Application and relevance to learning, including (7) relevance and (8) real-life application. Satisfaction level, including (9) material presentation, (10) understanding benefits, and (11) learning effectiveness.

Teachers agreed with statement 3 and strongly agreed with statements 1, 2, 4, 5, 6, 7, 8, 9, 10, and 11 regarding the learning video. The histogram below shows the analysis of teacher responses to the learning media as a percentage:

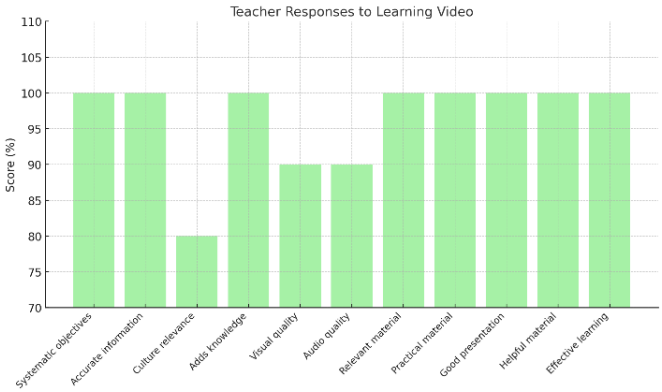

Figure 5. Histogram of teacher responses to the learning media

The teacher response survey results showed the highest score of 100 on most indicators, such as systematic learning objectives, information accuracy, material relevance, and benefits for enhancing students' understanding. The lowest score was 80, related to students' ease in solving problems using the causalitic model. The overall average score was 96.4%, categorized as highly practical. Learning media is one of the aspects that plays a role in influencing the teaching and learning process, alongside other factors such as student characteristics, availability of facilities, equipment, and environmental conditions (Doyan, Susilawati, Makhrus, et al., 2021; Susilawati et al., 2022).

Video as a learning medium is an essential element in Science, Technology, Engineering, and Mathematics (STEM) education, having a positive impact on both students and teachers (Susilawati et al., 2022). In line with the views of Talib et al. (2025), challenges in STEM implementation include providing adequate infrastructure, strengthening a school culture that supports STEM, and developing teachers' skills. The causalitic video learning integrated with Gendang Beleq can strengthen STEM education by combining local wisdom with STEM concepts, such as physics and engineering, in the creation of traditional Sasak musical instruments. The school principal plays a role in fostering a culture that supports the integration of STEM with local culture and providing professional development opportunities for teachers. This approach makes STEM education more relevant, engaging, and

profound, while also enhancing student involvement in contextual and meaningful learning. This can be observed from 11 survey statements from students and teachers regarding the learning video that has been socialized. Furthermore, learning media such as images, slides, photos, videos, graphics, and computers play an important role in facilitating effective communication between educators and students (Susilawati et al., 2023). These media enhance engagement and learning motivation, simplify the understanding of abstract concepts, and support the development of comprehension and critical thinking skills (Doyan et al., 2022; Kartini et al., 2019; Sevtia et al., 2022; Susilawati et al., 2025).

Criticism from respondents regarding the dissemination of the Causalitic Model Learning Video Integrated with Traditional Gendang Beleq Music is that the initial presentation should emphasize musical instruments more, reduce natural scenery, and add variety to boost enthusiasm. The suggestion provided is to showcase the application and sound meter as measuring tools more frequently as examples, as they are considered engaging and can increase students' interest.

Conclusion

The findings of this study demonstrate that the causalitic learning video integrated with Gendang Beleq music received significantly positive responses, with a score of 87.8% from students and 96.4% from teachers. These results indicate that the video is highly suitable for classroom use to achieve the intended learning objectives. Additionally, the video supports the implementation of STEM education by integrating science, technology, engineering, and mathematics concepts within a local cultural context. This approach provides a relevant and engaging method for strengthening learning in schools. Respondents provided constructive feedback, including the need to emphasize musical instruments in the opening scenes, reduce the use of natural panoramas, and add more variations to increase enthusiasm for learning. It was also suggested that applications and sound meters be featured more frequently as examples, as these were found to be interesting and could further enhance student engagement in the learning process.

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The authors declare no conflict of interest.

References

Arum, B. P., Rokhmat, J., Zuhdi, M., & Sutrio, S. (2023). The Effect of Character and Local Wisdom-Integrated Causalitic Model Learning on Problem-Solving Skills and the Development of Environmental Conservation Literacy. *Jurnal Pendidikan Fisika Dan Teknologi*, *9*(2), 253–261. https://doi.org/10.29303/jpft.v9i2.5564

Azizah, B. M. N., Rokhmat, J., Sutrio, S., & Susilawati, S. (2022). Pengembangan Perangkat Pembelajaran Berbasis Model Kausalitik untuk Meningkatkan Kemampuan Berpikir Kritis dan Pemecahan Masalah Peserta Didik Pada Materi Momentum dan Impuls. *Jurnal Ilmiah Profesi Pendidikan*, *7*(3), 1219–1228. https://doi.org/10.29303/jipp.v7i3.707

Doyan, A., Jufri, A. W., Susilawati, Hardiyansyah, A., Auliya, K., Hakim, S., & Muliyadi, L. (2020). Development of Learning Media of Microscope Portable Auto Design to Increase Student's Problem-Solving Ability in Light and Optical Tools Topic. *4th Asian Education Symposium (AES 2019)*, 300–302. https://doi.org/10.2991/assehr.k.200513.068

Doyan, A., Susilawati, & Hardiyansyah, A. (2021). Development of Digital Portable Auto Design Microscope Learning Media to Increase the Understanding of Concepts and Problem-Solving Abilities of Students. *Proceedings of the 7th International Conference on Research, Implementation, and Education of Mathematics and Sciences (ICRIEMS 2020)*, *528*, 465–470. https://doi.org/10.2991/assehr.k.210305.068

Doyan, A., Susilawati, Harjono, A., Muliyadi, L., Hamidi, Fuadi, H., & Handayana, I. G. N. Y. (2023). The effectiveness of modern optical learning devices during the Covid-19 pandemic to improve creativity and generic science skills of students. *The 1st International Conference on Science Education and Sciences*, 020005. https://doi.org/10.1063/5.0122553

Doyan, A., Susilawati, Makhrus, M., & Zamrizal, W. (2021). Development of Modern Physics Learning Devices Using Inquiry Learning Model Assisted with Virtual Media to Improve Student Cognitive Learning Result. *Proceedings of the 5th Asian Education Symposium 2020 (AES 2020)*, *566*, 213–216. https://doi.org/10.2991/assehr.k.210715.047

Doyan, A., Susilawati, S., Hadisaputra, S., & Muliyadi, L. (2022). Analysis Validation of Quantum Physics Learning Devices using Blended Learning Models to Improve Critical Thinking and Generic Science Skills of Students. *Jurnal Penelitian Pendidikan IPA*, *8*(3), 1581–1585. https://doi.org/10.29303/jppipa.v8i3.1920

Fahrozy, F. P. N., Iskandar, S., Abidin, Y., & Sari, M. Z. (2022). Upaya Pembelajaran Abad 19-20 dan Pembelajaran Abad 21 di Indonesia. *Jurnal Basicedu*, *6*(2), 3093–3101. https://doi.org/10.31004/basicedu.v6i2.2098

Harjono, A., Rokhmat, J., Hikmawati, Ayub, S., Ap'aludin, & Khalid, N. (2021). Pengembangan Fenomena dan Soal Multi Jawaban untuk Pembelajaran Kausalitik Dalam Meningkatkan Kemampuan Pemecahan Masalah dan Berpikir Kreatif Siswa. *Jurnal Pengabdian Magister Pendidikan IPA*, *4*(4), 448–455. https://doi.org/10.29303/jpmpi.v4i4.1202

Hartiani, B. S., Rokhmat, J., & Taufik, M. (2022). Validitas Perangkat Pembelajaran Model Kausalitik Berbantuan Google Classroom untuk Meningkatkan Kemampuan Pemecahan Masalah dan Berpikir Kreatif Fisika Peserta Didik. *Jurnal Ilmiah Pendidikan Fisika*, *6*(2), 393. https://doi.org/10.20527/jipf.v6i2.4992

Helmi, F., Rokhmat, J., & 'Ardhuha, J. (2017). Pengaruh Pendekatan Berpikir Kausalitik Ber-Scaffolding Tipe 2b Termodifikasi Berbantuan LKS Terhadap Kemampuan Pemecahan Masalah Fluida Dinamis Siswa. *Jurnal Pendidikan Fisika Dan Teknologi*, *3*(1), 68–75. https://doi.org/10.29303/jpft.v3i1.332

Irhasyuarna, Y., Hafizah, E., Sari, M. M., Nurhaliza, S., & Fajar, I. N. (2022). The Development of Interactive Media in The Context of Wetland Local Wisdom on Science Materials for Junior High Schools to Practice Science Literacy. *AIP Conference Proceedings*, *2600*(1)). https://doi.org/10.1063/5.0117913

Januardi, A., Superman, S., & Nur, S. (2024). Integrasi Nilai-Nilai Tradisi Masyarakat Sambas dalam Pembelajaran Sejarah. *Jurnal Pendidikan Dan Pembelajaran Indonesia (JPPI)*, *4*(2), 794–805. https://doi.org/10.53299/jppi.v4i2.604

Januarti, I. M., & Muliyadi, L. (2024). Development of Ethnoscience-Based Student Worksheet Using the Guided Inquiry Learning Model to Increase Students' Learning Motivation and Scientific Literacy: A Review. *International Journal of Science Education and Science*, *1*(1), 13–18. https://doi.org/10.56566/ijses.v1i1.109

Kartini, K., Doyan, A., Kosim, K., Susilawati, S., Khasanah, B. U., Hakim, S., & Muliyadi, L. (2019). Analysis of Validation Development Learning Model Attainment Concept to Improve Critical Thinking Skills and Student Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, *5*(2), 185–188. https://doi.org/10.29303/jppipa.v5i2.262

Kasmawati, K., L. Parisu, C. Z., Sisi, L., Eka Dayanti, W. O., & Ahmad, A. (2024). Pengembangan Media Pembelajaran Video Animasi Berbasis Kearifan Lokal di Sekolah Dasar. *Jurnal Ilmiah Profesi Pendidikan*, *9*(1), 579–585. https://doi.org/10.29303/jipp.v9i1.2118

Mahmudah, H., Rokhmat, J., Kosim, & Mustofa, H. A. (2024). Practicality of Causalytic Model Learning Integrated to Character Values Assisted by Go-Lab Platform to Improve Students' Problem Solving and Creative Thinking Abilities. *International Journal of Contextual Science Education*, *2*(1), 43–47. https://doi.org/10.29303/ijcse.v1i2.575

Makhrus, M., Wahyudi, W., & Zuhdi, M. (2021). Students' Conceptual Understanding through Implementation of LiveWire in Basic Electronics Virtual Experiment. *Jurnal Penelitian Pendidikan IPA*, *7*(2), 249–254. https://doi.org/10.29303/jppipa.v7i2.705

Muliyadi, L., Doyan, A., Susilawati, Hamidi, Hakim, S., & Munandar, H. (2023). Training on Using PhET Virtual Media on Newton's Law of Gravity for Class X Students at Islamic Senior High School of Syaikh Abdurrahman Kotaraja, East Lombok. *Unram Journal of Community Service*, *1*(1), 15–18. Retrieved from https://journals.balaipublikasi.id/index.php/jcss/article/view/68

Putri, A., Pitono, C., & Perdana, R. (2024). Integrasi Kearifan Lokal Sebagai Media Pembelajaran Fisika Digital Guna Meningkatkan Kemampuan Abad 21: Studi Literatur Sistematis. *Jurnal Inovasi Dan Pembelajaran Fisika*, *11*(2), 217–244. Retrieved from https://jipf.ejournal.unsri.ac.id/index.php/jipf/article/view/470

Rahmawati, F., & Atmojo, I. R. W. (2021). Analisis Media Digital Video Pembelajaran Abad 21 Menggunakan Aplikasi Canva Pada Pembelajaran IPA. *Jurnal Basicedu*, *5*(6), 6271–6279. https://doi.org/10.31004/basicedu.v5i6.1717

Rokhmat, J. (2023). *Pengenalan Model Pembelajaran Kausalitik Untuk Guru, Calon Guru Dan Dosen*. Jakarta: Erlangga.

Rokhmat, J., Marzuki, Hikmawati, & Verawati, N. N. S. P. (2017). The causal model in physics learning with a causalitic-Thinking approach to increase the problem-solving ability of pre-service teachers. *Pertanika Journal of Social Sciences and Humanities*, *25*(S), 153–168. Retrieved from https://www.tused.org/index.php/tused/article/view/762

Sari, Y., Rokhmat, J., & Hikmawati, H. (2020). Pengaruh Model Pembelajaran Kausalitik Terhadap Kemampuan Pemecahan Masalah Fisika Peseta Didik. *GeoScienceEdu Journal*, *1*(1), 11–16. https://doi.org/10.30998/npjpe.v6i2.2713

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

Susilawati, Doyan, A., Rokhmat, J., & Muliyadi, L. (2023). Analysis Validation of Modern Physics Learning Media Based on Smartphone Integrated Project Based Learning to Improve Students' Creativity and Scientific Literacy. *Jurnal Penelitian Pendidikan IPA*, *9*(10), 7888–7892. https://doi.org/10.29303/jppipa.v9i10.5404

Susilawati, Doyan, A., Rokhmat, J., Muliyadi, L., Rizaldi, D. R., Fatimah, Z., Ikhsan, M., & Ardianti, N. R. (2025). Integration of Smartphone-Based Learning Media and Project-Based Learning to Enhance Creativity and Scientific Literacy in Physics. *International Journal of Information and Education Technology*, *15*(7), 1449–1459. https://doi.org/10.18178/ijiet.2025.15.7.2346

Susilawati, S., Rahmana, F., Kosim, K., & Muliyadi, L. (2022). Practicality of Problem-Based Physics Learning Tools with Video Assistance to Improve Problem-Solving Ability of Students. *Journal of Science and Science Education*, *3*(1), 55–59. https://doi.org/10.29303/jossed.v3i1.1614

Talib, S., Alias, B. S., Matore, M. E., & Abdullah, A. H. (2025). Empowering STEM education through the role of principals: a systematic literature review. *Journal of Education and Learning*, *19*(1), 570–578. https://doi.org/10.11591/edulearn.v19i1.21889

Yuliana, I., Rokhmat, J., & Gunada, I. W. (2017). Pengaruh Berpikir Kausalitik Ber-Scaffolding Terhadap Kemampuan Pemecahan-Masalah Kalor pada Siswa SMA. *Prosiding SNFA (Seminar Nasional Fisika Dan Aplikasinya)*, *2*, 85. https://doi.org/10.20961/prosidingsnfa.v2i0.16370

Yunarti, N. (2021). Analisa Kesulitan Dalam Pembelajaran IPA Pada Siswa SMP Negeri 1 Rambang. *Jurnal Educatio FKIP UNMA*, *7*(4), 1745–1749. https://doi.org/10.31949/educatio.v7i4.1570