

Tri Pramana-Based Digital Learning Media: Enhancing Students' Science Learning Outcomes in Elementary Schools

I Made Ari Winangun^{1*} 

¹ Prodi Pendidikan Guru Sekolah Dasar, Sekolah Tinggi Agama Hindu Negeri Mpu Kuturan Singaraja, Singaraja, Indonesia

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ABSTRAK

Masalah yang mendasari penelitian ini adalah perlunya inovasi media pembelajaran yang relevan dan efektif untuk mendukung pembelajaran IPAS di sekolah dasar. Penelitian ini bertujuan mengembangkan media pembelajaran digital berbasis Tri Pramana pada mata pelajaran IPAS guna meningkatkan kualitas proses belajar-mengajar. Metode yang digunakan adalah pengembangan dengan model ADDIE (Analyze, Design, Develop, Implement, Evaluate). Subjek penelitian meliputi ahli, guru, dan siswa, dengan total 43 partisipan. Analisis data dilakukan secara kualitatif dan kuantitatif untuk mengevaluasi validitas, kepraktisan, dan efektivitas media pembelajaran yang dikembangkan. Hasil penelitian menunjukkan bahwa media pembelajaran digital berorientasi Tri Pramana memiliki karakteristik unik dan dirancang untuk topik Tumbuhan Sumber Kehidupan di Bumi dalam 8 pertemuan, yang terdiri atas dua bagian setiap pertemuan. Validitas media dinilai sangat tinggi dengan skor rata-rata 0,98 (konten), 0,94 (media), dan 0,93 (bahasa). Kepraktisan media memperoleh skor rata-rata 4,79 dari guru dan 4,37 dari siswa, keduanya termasuk kategori sangat praktis. Efektivitas media berdasarkan uji coba terhadap 24 siswa menunjukkan rata-rata *n-gain* score sebesar 0,68, yang termasuk kategori sedang. Dengan demikian, media pembelajaran digital berbasis Tri Pramana dinyatakan valid, praktis, dan cukup efektif untuk mendukung pembelajaran IPAS siswa SD serta memiliki potensi untuk diterapkan dalam skala lebih luas.

ABSTRACT

The underlying issue of this research is the need for innovative and effective learning media to support science education in elementary schools. This study aims to develop *Tri Pramana*-based digital learning media for the science subject to enhance the quality of teaching and learning processes. The research employed a development method using the ADDIE model (Analyze, Design, Develop, Implement, Evaluate). The study involved 43 participants, including experts, teachers, and students. Data were analyzed qualitatively and quantitatively to assess the validity, practicality, and effectiveness of the developed learning media. The results showed that the *Tri Pramana*-oriented digital learning media has unique characteristics and was designed for Plants as a Source of Life on Earth topic, in 8 sessions, divided into two parts per session. The media validity was rated very high, with an average score of 0.98 (content), 0.94 (media), and 0.93 (language). The practicality of the media received an average score of 4.79 from teachers and 4.37 from students, both categorized as very practical. The effectiveness of the media, based on a trial involving 24 students, resulted in an average *n-gain* score of 0.68, categorized as moderate. Thus, the *Tri Pramana*-based digital learning media is deemed valid, practical, and moderately effective in supporting science education for elementary school students and has the potential for broader implementation.

1. INTRODUCTION

The learning process in elementary schools currently adopts the *Kurikulum Merdeka*, regarded as more humanistic due to its strong alignment with students' characteristics and learning needs. *Kurikulum Merdeka* is a curriculum offering diverse learning experiences, focusing on essential content to provide students with sufficient time to deepen concepts and strengthen competencies (Nurani et al., 2022; Nurwidya & Nurjannah, 2023). This curriculum is vital for recovery efforts following the learning crisis caused by the COVID-19 pandemic. In practice, the *Kurikulum Merdeka* in elementary schools is

implemented through two main forms: subject-specific learning processes and the *Pancasila* Student Profile Strengthening Projects (P5) (Dalia, 2024; Irsyad & Fitri, 2023). These efforts embody the national education goals as outlined in Law No. 20 of 2003, which are operationalized into six dimensions of the *Pancasila* Student Profile namely, faith and devotion to God Almighty with noble character; global diversity; collaboration; independence; critical reasoning; and creativity (Irawati et al., 2022; Kahfi, 2022). These dimensions emphasize not only cognitive skills but also attitudes and behaviors reflective of Indonesia's national identity (Fitri et al., 2021).

Structurally, the elementary school learning process under *Kurikulum Merdeka* is divided into Phase A (Grades I and II), Phase B (Grades III and IV), and Phase C (Grades V and VI). Additionally, science (IPA) and social studies (IPS) are integrated into a single subject, IPAS (Ariga, 2022; Zakiyah et al., 2024). The inquiry-based learning process in IPAS involves six essential skills, namely observing, questioning and predicting, planning and conducting investigations, processing and analyzing data and information, evaluating and reflecting, and communicating results. Teachers act as facilitators by differentiating and modifying instruction, applying various techniques and approaches, and recognizing students' progress (Fitri et al., 2021; Nawati et al., 2023). The implementation of the *Kurikulum Merdeka* aims to enhance the quality of education to develop superior human resources. However, education in Indonesia still falls short of expectations, as shown by the low scores in the 2022 PISA assessment: reading (359), mathematics (366), and science (383). These results remain below the RPJMN 2024 targets of 392, 379, and 402, respectively. The particularly low reading score highlights a pressing issue in basic education that needs urgent attention (Junika et al., 2020; Napitupulu, 2023).

In Buleleng Regency, education statistics reveal that 12.66% of males and 20.95% of females aged 15 and above lack a formal education certificate. Furthermore, 0.17% of children aged 7-12 are not enrolled in school, indicating persistent barriers to basic education access. The challenges identified in the 2022 PISA results and local education statistics are compounded by the habits of elementary students, who often prioritize play over study. Interviews with students in Cluster VI of Buleleng Subdistrict showed that 82% spent most of their time playing after school, frequently neglecting homework. Additionally, teacher-dominated instruction results in low comprehension, leading to confusion when students face assignments. Consequently, 60.87% of Grade IV students in three schools in the cluster failed to meet the learning objectives in IPAS. This underscores the urgent need for a balanced approach to study and play to optimize students' cognitive, interest, and talent development, ultimately improving learning outcomes. One solution is providing engaging, accessible learning activities at home through digital learning media.

Digital learning media refers to instructional tools that operate with digital data, enabling the creation, processing, access, and distribution of digital content using digital devices (Ismiyati et al., 2022; Lubis et al., 2023). Its implementation can integrate Bali's local wisdom, such as the *Tri Pramana* concept (Karta et al., 2022; Paramartha et al., 2022). This media can be developed in two parts: focusing on *Pratyaksa Pramana* through interactive content and emphasizing *Agama Pramana* and *Anumana Pramana* through content review, quizzes, and assignments to reinforce learning outcomes. These processes prepare students before school and enhance comprehension afterward, supporting their academic achievement. Digital learning media offer several advantages, including flexibility and interactivity that align with individual learning styles, increasing engagement and knowledge retention (Luthfiyati et al., 2023; Pradana et al., 2020). Additionally, such media facilitate independent learning and idea exchange, enhancing the overall learning experience (Antara et al., 2022; Bond et al., 2018).

This study introduces a novel approach by integrating digital learning media with Balinese local wisdom based on *Tri Pramana* to support science and social studies (IPAS) learning at the elementary level. Unlike previous research, which predominantly focused on the general development of digital learning media (Alfaruque et al., 2023; Azis & Ahmad, 2022; Dyanti et al., 2022; Fitriansyah, 2023; Ismiyati et al., 2022) or the exploration of local wisdom such as *Tri Pramana* without digital implementation (Linawati et al., 2023; Pendem, 2020; Suranata et al., 2022), this study adopts a holistic approach that combines both dimensions. By emphasizing the three core aspects of *Tri Pramana* (*Pratyaksa Pramana*, *Agama Pramana*, and *Anumana Pramana*) the proposed media aims to enhance conceptual understanding through observation-based activities, promote reflection on spiritual values, and foster critical thinking through digital tasks and quizzes. This integration represents an innovative inquiry-based learning approach aligned with the characteristics of the *Kurikulum Merdeka* and the needs of students in the digital era, offering a relevant solution to address challenges in effectively and meaningfully improving IPAS learning outcomes.

This study aims to develop digital learning media based on the *Tri Pramana* concept for IPAS subjects, enhancing the quality of teaching and learning processes. The research focuses on producing valid, practical, and effective media that prepare students for school learning and support independent study at home, ultimately improving learning outcomes for elementary students in Buleleng Regency.

2. METHOD

The development of digital learning media oriented towards *Tri Pramana* adopts a research and development approach using the ADDIE model, as illustrated in Figure 1. Each phase of the ADDIE model (Analyze, Design, Develop, Implement, and Evaluate) is executed iteratively with an embedded evaluation and revision process based on the Input→Process→Output paradigm (Branch, 2009). This iterative design ensures that the media aligns with the intended pedagogical goals while addressing emerging challenges during development and implementation. The systematic approach strengthens the reliability and validity of the developed learning media.

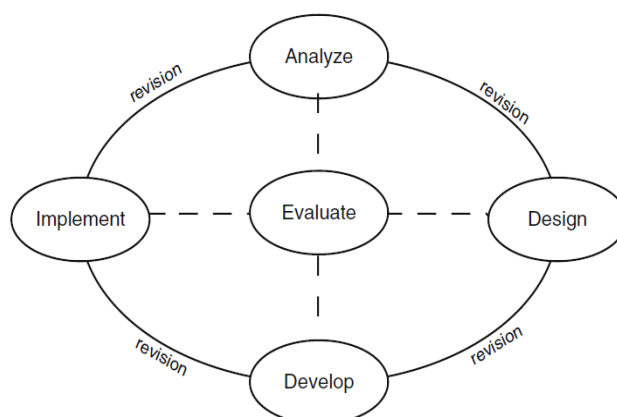


Figure 1. ADDIE Model

The study involved 43 participants, including 11 experts, 8 elementary school teachers, and 24 students. The diverse sample allowed for comprehensive evaluation across multiple perspectives, ensuring the validity, practicality, and effectiveness of the digital learning media. Experts provided insights into content validity, teachers contributed practical classroom application perspectives, and students served as the primary users for testing the media's usability and learning outcomes. Data were collected using a combination of instruments tailored to the research objectives. Questionnaires were utilized to assess the validity and practicality of the media, while an IPAS achievement test was administered to evaluate its effectiveness. The validity test ensured alignment with the *Tri Pramana* framework and curriculum standards, while the practicality test gauged the ease of implementation and user experience. The effectiveness test focused on measuring improvements in students' learning outcomes.

Table 1. One Group Pretest-Posttest

Pre-test	Treatment	Post-test
O ₁	X	O ₂

(Creswell, 2012)

Data analysis was conducted using both qualitative and quantitative methods. Qualitative descriptive analysis was employed to characterize the design and development process of the *Tri Pramana*-oriented digital learning media, detailing its structural and functional attributes. Quantitative analysis was applied to evaluate the validity, practicality, and effectiveness of the media. Effectiveness was determined using data from the one-group pretest-posttest design, as outlined in Table 1, and analyzed using the N-gain formula to classify improvement levels, based on the categories specified in Table 2. This dual-method approach ensured a comprehensive evaluation of the media's educational impact and feasibility.

Table 2. N-gain Interpretation Category

Percentage	Interpretation
<40	Ineffective
40-55	Less effective
56-75	Effective enough
>76	Effective

(Hake, 1999)

3. RESULT AND DISCUSSION

Result

Characteristics of the Tri Pramana-Oriented Digital Learning Media

The *Tri Pramana*-oriented digital learning media was developed for Chapter 1, "Plants as the Source of Life on Earth," in the Natural Sciences and Social Sciences (IPAS) curriculum for Grade IV, Semester 1. This chapter comprises three topics designed for eight sessions, each aligned with specific learning objectives. For each session, the media is divided into two parts. The first part provides digital learning resources focused on the implementation of *Pratyaksa Pramana*, which aims to orient students prior to engaging in the classroom learning process. The second part offers digital learning media centered on *Agama Pramana* through a review of classroom content and *Anumana Pramana* via quizzes and assignments, which assess students' learning achievements.

Each session of the *Tri Pramana*-oriented digital learning media is structured into two distinct sections. The first section includes a cover page indicating the material to be studied, learning objectives, an introduction, and a stimulating video designed to initiate the learning process in school, emphasizing *Pratyaksa Pramana*. The second section comprises a cover page that introduces the material to be reviewed, a summary of the content, and a quiz or evaluation activity that focuses on *Agama Pramana* and *Anumana Pramana*. The introductory screens for each topic are depicted in Figure 2 (Part 1), Figure 3 (Part 2), Figure 4 (Link to Edpuzzle Stimulus Video), and Figure 5 (Material and Quiz Interface in the Digital Learning Media).



Figure 2. Introductory Screens Part 1

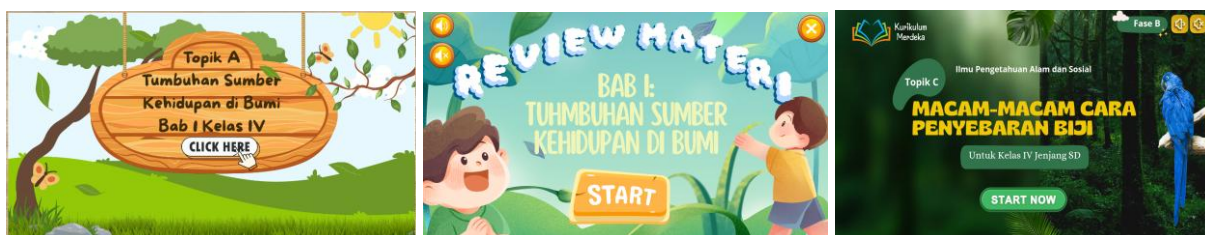


Figure 3. Introductory Screens Part 2

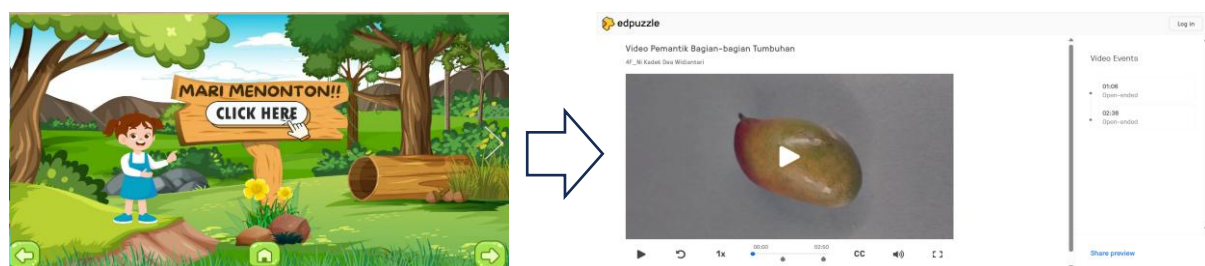


Figure 4. Link to Edpuzzle Stimulus Video



Figure 5. Material and Quiz Interface in the Digital Learning Media

Validity of the Tri Pramana-Oriented Digital Learning Media

The *Tri Pramana*-oriented digital learning media underwent a validity assessment conducted by experts across three key aspects: content, media, and language. Each aspect was evaluated by three experts, with the detailed results presented in [Table 3](#).

Table 3. Interpretation Categories for N-Gain Effectiveness

No	Expert	Aspect	Validity Index	Criteria
1	Content	Content Feasibility	0.98	Very Valid
		Presentation Feasibility	0.99	Very Valid
		Average	0.98	Very Valid
2	Media	Graphics	0.93	Very Valid
		Accessibility	0.97	Very Valid
		Average	0.94	Very Valid
3	Language	Readability	0.98	Very Valid
		Compliance with Indonesian Language Standards	0.88	Very Valid
		Average	0.93	Very Valid

The results in [Table 3](#) indicate that the digital learning media is highly valid across all assessed aspects. In terms of content, the media received an average validity index of 0.98, categorized as "Very Valid," with individual scores for content feasibility (0.98) and presentation feasibility (0.99). The media aspect, encompassing graphic design and accessibility, achieved an average validity index of 0.94, also categorized as "Very Valid." Lastly, the language aspect, which includes readability and adherence to proper Indonesian language rules, attained an average validity index of 0.93, maintaining the "Very Valid" criteria. These findings confirm the robustness of the *Tri Pramana*-oriented digital learning media in supporting effective learning through comprehensive and accessible content, engaging visual design, and clear, well-structured language.

Practicality of the Tri Pramana-Oriented Digital Learning Media

The practicality testing of the *Tri Pramana*-oriented digital learning media was conducted during the Implementation phase. In this phase, the practicality of the media was evaluated by teachers and students. The recapitulation of the practicality test results is presented in [Table 4](#).

Table 4. Recapitulation of Practicality Testing by Teachers and Students during Preliminary Field Testing

No.	Practicality Test	Aspect	Average Score	Criteria
1	Practicality Test by Teachers	Effectiveness	4.75	Very Practical
		Interactivity	4.83	Very Practical
		Efficiency	4.85	Very Practical
		Creativity	4.71	Very Practical
		Average	4.79	Very Practical
2	Practicality Test by Students	Usefulness	4.31	Very Practical
		Ease of Use	4.41	Very Practical
		Efficiency	4.41	Very Practical
		Average	4.37	Very Practical

Based on the results shown in [Table 4](#), the practicality test conducted by teachers across aspects such as effectiveness, interactivity, efficiency, and creativity scored within the range of 4.00–5.00, achieving a "Very Practical" criterion, with an overall average of 4.79. Similarly, the practicality test conducted by students, which included aspects of usefulness, ease of use, and efficiency, also scored within the same range, with an overall average of 4.37, categorized as "Very Practical." These findings indicate that the *Tri Pramana*-oriented digital learning media is highly practical and effective for application in supporting student learning outcomes, particularly in Grade IV science lessons on the topic *Plants as the Source of Life on Earth*. The media demonstrates exceptional usability for both educators and students, making it a valuable resource for facilitating meaningful and engaging learning experiences.

Effectiveness of Tri Pramana-Oriented Digital Learning Media

During the Implementation phase, the *Tri Pramana*-oriented digital learning media was applied in the learning process. This phase involved administering pretests (initial tests) and posttests (final tests) to assess the students' learning outcomes in the IPAS subject. The results of the effectiveness test are presented in frequency distribution table in Table 5 for the pretest and posttest data.

Table 5. Frequency Distribution Table

Data	Interval	f	Percentage (%)	Criteria
Pretest	90 - 100	0	0.00	Very High
	80 - 89	0	0.00	High
	65 - 79	0	0.00	Sufficient
	40 - 64	8	33.33	Low
	0 - 39	16	66.67	Very Low
Posttest	90 - 100	6	25.00	Very High
	80 - 89	8	33.33	High
	65 - 79	7	29.17	Sufficient
	40 - 64	3	12.50	Low
	0 - 39	0	0.00	Very Low

Table 5 show that the posttest data distribution exhibits better criteria compared to the pretest. Moreover, the average posttest score is higher than the pretest score, with values of 77.50 and 30.42, respectively. The posttest results yield an N-gain score of 0.68, which falls under the moderate category. This indicates that the *Tri Pramana*-oriented digital learning media effectively supports the achievement of learning outcomes in the IPAS subject for Grade IV elementary students. The results suggest that the digital learning media is successful in enhancing students' learning performance, particularly in understanding the lesson content.

Discussion

The development of *Tri Pramana*-oriented digital learning media was conducted using the ADDIE development model. In each phase of the ADDIE model, the focus was on producing a development product with specific characteristics that are valid, practical, and effective in supporting the learning outcomes of Grade IV IPAS students. The characteristics of the learning media can be observed through its structure, which consists of two parts—one for pre-school learning activities and the other for post-school learning activities—both oriented toward the *Tri Pramana* principles. The media also incorporates technology, such as Canva, PowerPoint, Edpuzzle, and Google Forms, to facilitate content construction. The validity of the learning media, assessed by content, media, and language experts, yielded highly valid results, with validity indices of 0.98, 0.94, and 0.93, respectively. The practicality of the media, evaluated by both teachers and students, also demonstrated very practical results with average scores of 4.79 and 4.37, respectively. The effectiveness of the media, as indicated by an N-gain score of 0.68, falls into the moderate qualification category. Thus, the *Tri Pramana*-oriented digital learning media is effective in supporting the IPAS learning outcomes of students.

The *Tri Pramana*-oriented digital learning media supports IPAS learning outcomes because this learning model accommodates the construction of students' cognitive knowledge through contextual phenomena presented in the introductory videos for the first part of the media. This learning process is oriented toward *Pratyaksa Pramana*, where students engage in observation through the video prompts, enabling them to analyze and relate the material to be studied. In the second part of the media, the review of the material and the quizzes, which are oriented toward *Agama Pramana* and *Anumana Pramana*, empower students' critical, logical, and analytical thinking skills, thus supporting their learning outcomes. Additionally, the digital learning process helps enhance students' interest and motivation, as evidenced by the very practical results from the practicality test.

The findings of this study align with previous research emphasizing the significant impact of incorporating local cultural approaches like *Tri Pramana* in science education. Previous studies demonstrated that the integration of *Tri Pramana* into learning practices fosters deeper cognitive engagement, enhancing students' academic performance (Karta et al., 2022; Linawati et al., 2023; Pendem, 2020). This approach, rooted in Bali's cultural philosophy, not only provides contextual relevance but also encourages active participation and critical thinking, supporting the notion that culturally responsive pedagogy can improve learning outcomes. In comparison, this study also affirms that *Tri Pramana* fosters better learning when combined with technological tools, which is consistent with the findings of these

previous studies that highlighted the importance of culturally grounded methodologies in enhancing students' understanding and academic achievements.

Furthermore, this research underscores the growing body of evidence supporting the effectiveness of digital learning media in improving educational outcomes. Similar studies, report that digital media, when thoughtfully designed and integrated, can significantly enhance learning outcomes by providing interactive and engaging experiences for students (Leaning, 2019; Rahmat et al., 2019; Susantini et al., 2021). In line with previous study who explored the role of technology in promoting critical thinking and understanding, this study supports the claim that digital tools, including videos as learning prompts, not only aid in content delivery but also stimulate students' higher-order thinking skills (Alfaruque et al., 2023; Fitriansyah, 2023). These findings collectively suggest that the combination of digital tools with culturally relevant pedagogies creates a powerful learning environment that motivates students and improves their academic performance.

The findings of this study have significant implications for the field of education, particularly in the development of technology-based learning media that incorporates local values such as *Tri Pramana*, which can enhance student learning outcomes. The implications of this research suggest that integrating the *Tri Pramana* approach into science education enriches holistic educational practices, fostering not only cognitive development but also critical thinking and analytical skills. Furthermore, the use of digital learning media proves effective in supporting more dynamic interactions and boosting student motivation. It is recommended that the development and expansion of *Tri Pramana*-based digital learning media be applied in other schools, with adjustments to the relevant curriculum, and that professional development for teachers be prioritized to optimize the integration of technology in teaching and learning processes.

4. CONCLUSION

Based on the development of *Tri Pramana*-oriented digital learning media, several conclusions can be drawn. The media is structured into two parts: the first part includes a cover, learning objectives, an introduction, and a video prompt oriented toward Pratyaksa Pramana, while the second part consists of a cover, material review, and a quiz, focusing on Agama Pramana and Anumana Pramana. The media's validity, evaluated from the perspectives of content, media, and language, received high scores of 0.98, 0.94, and 0.93, respectively, indicating that it is highly valid for use in the learning process. The practicality of the media, as assessed by 8 teachers and 24 students, yielded average scores of 4.79 and 4.37, respectively, categorizing it as very practical and easy to implement in supporting student learning activities. Additionally, the effectiveness of the media, as measured by an N-gain score of 0.68, was classified as moderate, suggesting that the media has a positive impact on students' learning outcomes in the IPAS subject. These findings indicate that *Tri Pramana*-oriented digital learning media can serve as an effective tool for enhancing student engagement and learning. Based on these results, it is recommended that educational institutions promote innovations in teaching that integrate technology to support student learning. Teachers should also consider adapting digital learning media to the specific characteristics of their students, while future researchers are encouraged to further develop and implement similar media, paying close attention to student interest and motivation.

5. REFERENCES

- Alfaruque, S. Y., Sultana, S., Rastogi, R., & Jabeen, Z. (2023). Integrating Literature with Technology and Use of Digital Tools: Impact on Learning Outcomes. *World Journal of English Language*, 13(1), 278–285. <https://doi.org/10.5430/wjel.v13n1p278>.
- Antara, I. G. W. S., Suma, K., & Parmiti, D. P. (2022). E-Scrapbook: Konstruksi Media Pembelajaran Digital Bermuatan Soal-soal Higher Order Thinking Skills. *Jurnal Edutech Undiksha*, 10(1), 11–20. <https://doi.org/10.23887/jeu.v10i1.47559>.
- Ariga, S. (2022). Implementasi kurikulum merdeka pasca pandemi covid-19. *Edu Society: Jurnal Pendidikan, Ilmu Sosial Dan Pengabdian Kepada Masyarakat*, 2(2), 662–670. <https://doi.org/10.56832/edu.v2i2.225>.
- Azis, U. A., & Ahmad, M. (2022). Analysis of the Effect of Online-Based Interactive Digital Learning Media Word Wall on Pancasila and Citizenship Education Learning Outcomes of Elementary School Students. *Jurnal Paedagogy*, 9(3), 609. <https://doi.org/10.33394/jp.v9i3.5344>.
- Bond, M., Marín, V. I., Dolch, C., Bedenlier, S., & Zawacki-Richter, O. (2018). Digital Transformation in German Higher Education: Student and Teacher Perceptions and Usage of Digital Media. *International Journal of Educational Technology in Higher Education*.

- <https://doi.org/10.1186/s41239-018-0130-1>.
- Branch, R. M. (2009). *Instructional Design: The ADDIE Approach*. Springer US. https://doi.org/10.1007/978-3-319-19650-3_2438.
- Creswell, J. W. (2012). *Educational Research*. University of Nebraska.
- Dalia, A. (2024). I, Implementasi Implementasi P5 Pada Sekolah IKM Kategori Mandiri Berubah. *Jurnal Gentala Pendidikan Dasar*, 9(1), 96–110. <https://mail.online-journal.unja.ac.id/gentala/article/view/31369>.
- Dyanti, C. R., Rahmatan, H., Halim, A., Syukri, M., & Elisa, E. (2022). Effect of the Kahoot Application as a Learning Media on Students' Learning Outcomes on the Material of Wave Vibration. *Jurnal Penelitian Pendidikan IPA*, 8(3), 1483–1488. <https://doi.org/10.29303/jppipa.v8i3.1476>.
- Fitri, A., Rasa, A. A., Kusumawardhani, A., Nursya'bani, K. K., Fatimah, K., & Setianingsih, N. I. (2021). *Buku Panduan Guru Ilmu Pengetahuan Alam Sosial*. Kementerian Pendidikan, Kebudayaan, Riset, Dan Teknologi Badan Penelitian Dan Pengembangan Dan Perbukuan Pusat Kurikulum Dan Perbukuan.
- Fitriansyah, F. (2023). The Effectiveness of Using Learning Videos on Student Science Learning Outcomes in Digital PR Courses. *IJIS Edu: Indonesian J. Integr. Sci. Education*, 5(2), 117–126. <http://dx.doi.org/10.29300/ijisedu.v5i2.11040>.
- Hake, R. R. (1999). Analyzing Change/Gain Scores. *AERA-D - American Educational Research Association's Division D, Measurement and Research Methodology*, 1(1), 1–4.
- Irawati, D., Iqbal, A. M., Hasanah, A., & Arifin, B. S. (2022). Profil Pelajar Pancasila Sebagai Upaya Mewujudkan Karakter Bangsa. *Edumaspul: Jurnal Pendidikan*, 6(1), 1224–1238. <https://doi.org/10.33487/edumaspul.v6i1.3622>.
- Irsyad, & Fitri, Y. (2023). Implementasi Proyek Penguatan Profil Pelajar Pancasila (P5) Dalam Kurikulum Merdeka di SMKN 1 Batusangkar. *INNOVATIVE: Journal Of Social Science Reseach*, 3(4), 5149–5157. <http://j-innovative.org/index.php/Innovative/article/view/3192>.
- Ismiyati, I., Pramusinto, H., Sholikah, M., & Yulianti, N. D. (2022). Meta-analysis of Digital-based Learning to Improve Learning Outcomes. *Psychology, Evaluation, and Technology in Educational Research*, 4(2), 53–62. <https://doi.org/10.33292/petier.v4i2.114>.
- Junika, N., Izzati, N., & Tambunan, L. R. (2020). Pengembangan Soal Statistika Model PISA untuk Melatih Kemampuan Literasi Statistika Siswa. *Mosharafa: Jurnal Pendidikan Matematika*, 9(3), 499–510. <https://doi.org/10.31980/mosharafa.v9i3.615>.
- Kahfi, A. (2022). Implementasi profil pelajar Pancasila dan Implikasinya terhadap karakter siswa di sekolah. *DIRASAH: Jurnal Pemikiran Dan Pendidikan Dasar Islam*, 5(2), 138–151. <https://doi.org/10.51476/dirasah.v5i2.402>.
- Karta, I. W., Suarta, N., Rasmini, N. W., Widiana, I. W., Putri, N. N. C. A., & Antara, I. G. W. S. (2022). The Impact of Tri Pramana-based Hypothetic Deductive Learning Cycle Model on Character Forming and Creativity Development in Early Childhood. *Educational Sciences: Theory & Practice*, 22(2), 239–249. <https://doi.org/10.12738/jestp.2022.2.0017>.
- Leaning, M. (2019). An approach to digital literacy through the integration of media and information literacy. *Media and Communication*, 7(2 Critical Perspectives), 4–13. <https://doi.org/10.17645/mac.v7i2.1931>.
- Linawati, I. G. A., Yudana, I. M., & Gata, I. W. (2023). Pengaruh Model Problem Based Learning Berorientasi Tri Pramana terhadap Motivasi dan Hasil Belajar. *Widyalya: Jurnal Ilmu Pendidikan*, 3(3), 340–345.
- Lubis, R. R., Rambe, N., Azhar, P. C., Sugma, A. R., & Franklin, T. N. D. (2023). Development of Digital-Based Smart Card Learning Media to Improve the Learning Outcomes of Madrasah Ibtidaiyah Students. *MUDARRISA: Jurnal Kajian Pendidikan Islam*, 15(1), 1–24. <https://doi.org/10.18326/mdr.v15i1.1-24>.
- Luthfiyati, D., Purwati, O., Widyastuti, W., & Munir, A. (2023). Integrating Distance Education Into Mobile Devices Using Adobe Connect Pro. *Al-Ishlah Jurnal Pendidikan*. <https://doi.org/10.35445/alishlah.v15i1.2246>.
- Napitupulu, E. L. (2023). *Penurunan Skor PISA Indikasikan Darurat Pendidikan Dasar*. Kompas.
- Nawati, A., Yulia, Y., & Khosiyono, B. H. C. (2023). Pengaruh pembelajaran berdiferensiasi model problem based learning terhadap hasil belajar IPA pada siswa sekolah dasar. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 8(1), 6167–6180. <https://doi.org/10.23969/jp.v8i1.8880>.
- Nurani, D., Anggraini, L., Misiyanto, & Mulia, K. R. (2022). *Buku Saku Serba-Serbi Kurikulum Merdeka Kekhasan Sekolah Dasar*. Direktorat Sekolah Dasar.
- Nurwidya, R., & Nurjannah, N. (2023). Implementasi Kurikulum Merdeka melalui Strategi Proyek Penguatan Profil Pelajar Pancasila (P5) untuk Meningkatkan Budaya Kerja Siswa di SMK Negeri 2 Boyolangu Kata kunci: Budaya kerja Kurikulum merdeka P5 Alamat Korespondensi. *Belantika*

- Pendidikan*, 6(2), 1–8. <https://doi.org/10.47213/bp.v6i2.200>.
- Paramartha, W., Sustiawati, N. L., Sukrawati, N. M., & Dessy Sugiharni, G. A. (2022). Tri Pramana Values in Educational Pedagogy. *Academic Journal of Interdisciplinary Studies*, 11(3), 199–212. <https://doi.org/10.36941/AJIS-2022-0064>.
- Pendem, I. W. (2020). Penerapan Pendekatan Tri Pramana dalam Pembelajaran Ilmu Pengetahuan Alam untuk Meningkatkan Prestasi Belajar Siswa Kelas IV Sekolah Dasar Negeri 4 Seraya Barat. *Inovasi Jurnal Guru*, 6(12), 76–82.
- Pradana, L. N., Sholikhah, O. H., Maharani, S., & Kholid, M. N. (2020). Virtual mathematics kits (VMK): Connecting digital media to mathematical literacy. *International Journal of Emerging Technologies in Learning*, 3, 234–241. <https://doi.org/10.3991/ijet.v15i03.11674>.
- Rahmat, R. F., Mursyida, L., Rizal, F., Krismadinata, K., & Yunus, Y. (2019). Pengembangan media pembelajaran berbasis mobile learning pada mata pelajaran simulasi digital. *Jurnal Inovasi Teknologi Pendidikan*, 6(2), 116–126. <https://doi.org/10.21831/jitp.v6i2.27414>.
- Suranata, K., Suartama, I. K., Doddy Tisna Ms, G., Lasmawan, I. W., Yaniasti, N. L., & Susiani, K. (2022). Incorporated Tri Premana Philosophy on Learning Science in Elementary School Culture. *Journal of Intercultural Communication*, 22(4), 37–43. <https://doi.org/10.36923/jicc.v22i4.60>.
- Susantini, E., Puspitawati, R. P., Raharjo, & Suaidah, H. L. (2021). E-book of metacognitive learning strategies: design and implementation to activate student's self-regulation. *Research and Practice in Technology Enhanced Learning*, 16(1). <https://doi.org/10.1186/s41039-021-00161-z>.
- Zakiah, F. I., Pratiwi, D. E., & Wati, E. S. (2024). Peningkatan Hasil Belajar Peserta Didik Melalui Penggunaan Pendekatan Pembelajaran Teaching at The Right Level (TaRL) pada Pembelajaran IPAS Kelas VI Sekolah Dasar. *Journal of Educational Science and E-Learning*, 1(2), 69–77. <https://doi.org/10.62354/jese.v1i2.26>.