

Development of Pancasila Values-Based E-LKPD for Fifth Grade Elementary Students

Didik Wahyu Triono¹, Muhammad Nukman¹

¹ Universitas Islam Riau, Pekanbaru, Indonesia
didikwahyutriono002@gmail.com, nukman.m16@edu.uir.ac.id
corresponding author: didikwahyutriono002@gmail.com

ABSTRACT

This study was conducted in response to the limited use of interactive digital learning media in Civic Education, particularly electronic student worksheets (e-LKPD) designed to foster Pancasila values among elementary school students. Previous studies have primarily focused on cognitive learning outcomes and have not specifically integrated contextual character education through interactive digital worksheets. Therefore, this study aimed to develop a Pancasila values-based e-LKPD for fifth-grade elementary students and determine its validity and practicality. This research employed a Research and Development (R&D) approach using the Four-D (4D) model, limited to the define, design, and develop stages. The study involved three expert validators consisting of a material expert, a language expert, and a design expert, as well as one fifth-grade teacher for the practicality test. Data were collected using validation sheets and teacher response questionnaires. The obtained data were analyzed using descriptive statistics based on percentages. The results showed that the developed e-LKPD achieved a very high level of validity, with scores of 92% from the material expert, 94% from the design expert, and 92% from the language expert. In addition, the teacher's practicality test scored 91%, indicating it was very practical. The developed e-LKPD integrates interactive activities, contextual learning tasks, reflective exercises, and multimedia features to support students' understanding and internalization of Pancasila values. The novelty of this study lies in integrating contextual character education and interactive multimedia elements into an e-LKPD specifically designed for elementary Civic Education learning. This study implies that digital-based learning media can support more meaningful, interactive, and character-oriented learning in elementary schools.

Keywords: *e-LKPD, Pancasila values, digital learning, character education, elementary education*

Submitted	Accepted	Published
17 April 2026	20 May 2026	30 May 2026

Citation	:	Triono, D.W & Nukman, M. (2026). Development of Pancasila Values-Based E-LKPD for Fifth Grade Elementary Students. <i>Jurnal PAJAR (Pendidikan dan Pengajaran)</i> , 10(3), 368-378. DOI: http://dx.doi.org/10.33578/pjr.v10i3.1528 .
----------	---	---

INTRODUCTION

Education plays a fundamental role in developing students' knowledge, skills, attitudes, and character. In Indonesia, education is not only oriented toward cognitive achievement but also toward the formation of moral values and responsible citizenship. Based on Law No. 20 of 2003 on the National Education System, national education aims to develop learners into individuals who are faithful, knowledgeable, creative, independent, and responsible citizens. Therefore, the learning process in schools should not merely emphasize academic mastery but also foster character development and the internalization of values in students' daily lives.

In the context of elementary education, Civic Education plays an important role in instilling Pancasila values as the foundation of national character. Through Civic Education learning, students are expected to understand and apply values such as cooperation, tolerance, responsibility, discipline, and respect for diversity. However, implementing Civic Education in elementary schools still faces several challenges. Learning activities are often teacher-centered and rely heavily on lecture-based instruction, resulting in passive student participation and low engagement. As a result, students tend to understand Pancasila values only in theory, unable to internalize and apply them in everyday life.

Observations and interviews conducted with fifth-grade teachers at SD Negeri 12 Tanjung Gadai revealed that learning activities still predominantly used conventional teaching methods and printed worksheets with limited interactive elements. Approximately 65% of students showed low participation

during classroom activities, including limited involvement in discussions, questioning, and collaborative activities. Furthermore, students found it difficult to understand abstract concepts related to Pancasila values because the learning materials were not contextualized to their real-life experiences. This condition indicates a gap between the expected characteristics of 21st-century learning and the classroom practices that actually implement them.

The demands of 21st-century education emphasize student-centered learning, supported by the integration of digital technology, the development of critical thinking, collaboration, creativity, communication skills, and digital literacy. The integration of technology into learning has become increasingly important in creating interactive and meaningful learning experiences. Recent studies indicate that digital learning media can improve student engagement, learning motivation, and conceptual understanding through interactive multimedia features and flexible access to learning materials. Research by Richard E. Mayer shows that multimedia-based learning, combining text, visuals, audio, and interactive activities, can improve students' cognitive processing and understanding. Similarly, studies by George J. Hwang and colleagues demonstrated that interactive digital learning environments positively influence students' participation and learning outcomes in elementary education.

One digital learning medium that has gained significant attention in recent years is the Electronic Student Worksheet (e-LKPD). Unlike conventional printed worksheets, e-LKPD integrates multimedia components such as animations, videos, interactive quizzes, hyperlinks, and reflective learning activities. The use of e-LKPD allows students to participate more actively in learning while providing opportunities for independent and contextual learning experiences. Several previous studies have demonstrated the effectiveness of e-LKPD in improving students' cognitive achievement, critical thinking skills, and learning motivation in various subjects. However, most previous studies have focused primarily on science and mathematics learning and have emphasized cognitive outcomes rather than character education.

Previous research by Fuadah (2021) developed a Problem-Based Learning (PBL)- based e-LKPD to improve students' understanding of chemistry concepts. Meanwhile, Puriasih and Rati (2022) focused on interactive e-LKPD development to increase student engagement in learning activities. Other studies also examined e-LKPD implementation in improving critical thinking skills and conceptual understanding. Nevertheless, these studies generally focused on academic achievement and did not specifically integrate contextual character education or Pancasila values within digital learning media for elementary school students. In addition, limited studies have explored the integration of reflective activities and multimedia-based civic learning specifically designed to strengthen students' internalization of Pancasila values. The following table summarizes previous studies and the research gap addressed in this study.

Table 1. Studies And The Research Gap Addressed In This Study.

Previous Study	Research Focus	Limitation	Research Gap
Fuadah (2021)	Problem-Based Learning e-LKPD	Focused on science learning	Did not integrate character education
Puriasih & Rati (2022)	Interactive e-LKPD	General digital learning media	No Civic Education integration
Zahroh & Yuliani (2021)	Critical thinking skills	Focused on cognitive achievement	No Pancasila values integration
Present Study	Pancasila values-based e-LKPD	Integrates character education and interactive multimedia	Focus on elementary Civic Education

Based on an analysis of previous studies, a significant research gap remains in developing interactive digital worksheets specifically designed to foster Pancasila values through contextual, multimedia-based learning activities in elementary schools. Most existing studies have not integrated character education and reflective activities into digital Civic Education worksheets. Therefore, innovative learning media are needed

to support both conceptual understanding and the internalization of character traits among elementary school students.

The novelty of this study lies in the development of an interactive e-LKPD specifically designed to integrate contextual character education, reflective learning activities, and multimedia-based interaction in Civic Education learning at the elementary school level. Unlike previous studies that primarily focused on cognitive learning outcomes, this study emphasizes the internalization of Pancasila values through contextual digital learning experiences tailored to the characteristics of elementary school students. The developed e-LKPD includes interactive quizzes, contextual case studies, videos, visual illustrations, and reflective activities intended to increase student engagement and facilitate meaningful learning experiences.

This study employed the Four-D (4D) development model consisting of define, design, develop, and disseminate stages. However, the present study was limited to the define, design, and develop stages because the primary focus was to produce a feasible and practical e-LKPD product. The dissemination stage was not conducted due to time constraints and the research's limited scope.

Therefore, this study aims to develop a Pancasila values-based Electronic Student Worksheet (e-LKPD) for fifth-grade elementary school students and determine the validity and practicality of the developed product. Theoretically, this study is expected to contribute to the development of digital character-based learning media in elementary Civic Education. Practically, the developed e-LKPD is expected to assist teachers in creating interactive and meaningful learning experiences while helping students understand and internalize Pancasila values more effectively in their daily lives.

METHOD

This study employed a Research and Development (R&D) approach to develop an interactive Electronic Student Worksheet (e-LKPD) designed to foster Pancasila values among fifth-grade elementary school students. The development process adopted the Four-D (4D) model proposed by Sivasailam Thiagarajan, which consists of four stages: define, design, develop, and disseminate. However, this study was limited to the define, design, and develop stages because the primary objective was to produce and validate a feasible and practical learning product. The dissemination stage was not conducted due to time constraints and the research's limited scope, which focused on product development, validity testing, and practicality evaluation.

The study was conducted at SD Negeri 12 Tanjung Gadai during the 2025/2026 academic year. The participants in this study included three expert validators and one fifth-grade teacher. The expert validators included one material expert specializing in Civic Education learning, one language expert specializing in educational language assessment, and one instructional design expert specializing in the development of digital learning media. In addition, one fifth-grade teacher participated in the practicality testing process to evaluate the usability and applicability of the developed e-LKPD in classroom learning.

Define Stage

The define stage aimed to identify learning problems, student needs, and learning conditions related to Civic Education instruction. At this stage, classroom observations, teacher interviews, and curriculum analyses were conducted to identify problems encountered during the learning process. The analysis focused on student characteristics, learning media currently used by teachers, learning objectives, and the implementation of Pancasila values in classroom activities.

The results of the needs analysis indicated that Civic Education learning was still dominated by lecture-based instruction and conventional printed worksheets, resulting in low student participation and limited learning interaction. Students also struggled to understand abstract concepts related to Pancasila values because the learning materials were not contextualized to their daily experiences. Therefore, the development of interactive digital learning media was considered necessary to support more meaningful and engaging learning activities.

Design Stage

The design stage focused on preparing the initial design of the e-LKPD product. Several activities were conducted during this stage, including determining learning objectives, organizing learning materials, selecting digital media formats, and designing learning activities. The e-LKPD was designed to integrate multimedia elements, including images, videos, interactive quizzes, contextual case studies, and reflective activities related to Pancasila values.

The developed e-LKPD comprised several components: a cover page, instructions for use, learning objectives, learning materials, interactive activities, evaluation tasks, and reflection sections. The design process also considered visual appearance, typography, color combinations, and layout organization to ensure readability and attractiveness for elementary school students. Furthermore, validation instruments and practicality questionnaires were prepared during this stage to evaluate the quality of the developed product.

Develop Stage

The development stage aimed to produce the final e-LKPD product through validation, revision, and practicality testing. At this stage, the initial product design was transformed into a complete digital learning medium using an appropriate digital platform. The developed e-LKPD integrated contextual learning materials, multimedia components, and interactive learning activities to facilitate students' understanding and internalization of Pancasila values.

After the product was developed, expert validation was conducted to assess the feasibility of the e-LKPD in terms of material quality, language appropriateness, and instructional design. The validators evaluated the product using validation sheets containing several assessment indicators. Suggestions and feedback from the validators served as the basis for product revisions and improvements.

Following the validation and revision process, a limited practicality test was conducted involving one fifth-grade teacher. The practicality test aimed to evaluate ease of use, suitability for classroom learning, clarity of instructions, and the e-LKPD's ability to support student engagement during learning activities.

Research Instruments

The instruments used in this study consisted of expert validation sheets and a teacher response questionnaire. The validation sheets were designed to evaluate three aspects of the developed product, namely material quality, language quality, and instructional design quality.

The material validation instrument included indicators of the material's suitability to learning objectives, curriculum relevance, clarity of content presentation, and integration of Pancasila values. The language validation instrument assessed sentence clarity, readability, grammatical accuracy, and communicative language use appropriate for elementary school students. Meanwhile, the design validation instrument evaluated visual appearance, layout organization, typography, color suitability, and multimedia integration.

In addition, a teacher response questionnaire was used to measure the practicality of the developed e-LKPD. The questionnaire contained statements related to ease of use, learning suitability, media attractiveness, and the effectiveness of the e-LKPD in supporting classroom learning activities.

Data Analysis Technique

The data obtained from the validation sheets and practicality questionnaires were analyzed using descriptive percentage analysis. The product validity and practicality scores were calculated using the following formula:

$$P = \frac{\sum X}{\sum X_i} \times 100\%$$

Where P represents the percentage score, $\sum X$ represents the total score obtained, and $\sum Xi$ represents the maximum possible score.

The percentage results were then interpreted using the following criteria:

Table 2. Percentage criteria

Percentage Interval	Category
81%–100%	Very Valid / Very Practical
61%–80%	Valid / Practical
41%–60%	Fairly Valid / Fairly Practical
21%–40%	Less Valid / Less Practical
0%–20%	Invalid / Impractical

The validation results from material, language, and design experts were analyzed to determine the feasibility of the developed e-LKPD. Meanwhile, the practicality test results obtained from the teacher response questionnaire were analyzed to determine the usability and practicality level of the developed product in classroom learning.

To ensure instrument consistency, the validation instruments were developed using indicators adapted from previous studies on the evaluation of digital learning media and were reviewed by expert validators before use. The revision process was conducted systematically based on validator suggestions to improve the quality and feasibility of the developed e-LKPD.

Ethical Considerations

This study was conducted in accordance with the principles of educational research ethics. Prior to the research implementation, permission to conduct the study was obtained from the school administration of SD Negeri 12 Tanjung Gadai. All participants were informed about the objectives and procedures of the study and voluntarily agreed to participate. The confidentiality of participant data and research information was maintained throughout the research process.

RESULTS AND DISCUSSION

Define Stage

The define stage was conducted to identify learning problems, student characteristics, and the need for digital learning media in Civic Education learning. The results of classroom observations and teacher interviews at SD Negeri 12 Tanjung Gadai indicated that the learning process was still dominated by lecture-based instruction and the use of printed worksheets with limited interactive elements. Consequently, students tended to be passive during classroom learning activities and demonstrated low participation in discussions and collaborative learning.

Observation results showed that approximately 65% of fifth-grade students displayed low engagement during classroom activities. Students also struggled to understand abstract concepts related to Pancasila values because the learning materials were not sufficiently connected to their real-life experiences. In addition, the available learning media were not optimally utilizing digital technology, despite the school already having supporting facilities such as laptops and projectors.

These findings indicate that the current learning process has not fully reflected the principles of student-centered and technology-integrated learning required in 21st-century education. Therefore, the development of interactive digital learning media was deemed necessary to create more meaningful, engaging, and contextually relevant learning experiences.

Design Stage

The design stage focused on preparing the initial design of the Pancasila values-based e-LKPD. At this stage, learning objectives, learning materials, learning activities, and multimedia elements were systematically designed to align with the characteristics of elementary school students.

The developed e-LKPD comprised several components: a cover page, instructions for use, learning objectives, learning materials, contextual activities, interactive quizzes, evaluation exercises, and reflection sections. The learning materials were designed using contextual learning principles by connecting Pancasila values to students' daily experiences. Multimedia elements such as images, videos, animations, and interactive quizzes were also integrated to increase student engagement and learning motivation.

The visual design of the e-LKPD was developed with readability, typography, layout consistency, and color suitability for elementary school students in mind. The design process aimed to produce an attractive, user-friendly learning medium that facilitates independent, interactive learning activities.

Develop Stage

The development stage aimed to produce the final e-LKPD product through validation, revision, and practicality testing. After the initial product design was completed, the e-LKPD was validated by material, language, and instructional design experts to assess its feasibility and quality.

Table 3. Validation Results of the Developed e-LKPD

Validator	Percentage	Category
Material Expert	92%	Very Valid
Design Expert	94%	Very Valid
Language Expert	92%	Very Valid

Based on Table 2., the developed e-LKPD achieved a very high level of validity in all assessed aspects. The material expert evaluation scored 92%, indicating that the learning materials were aligned with curriculum objectives and successfully integrated contextual Pancasila values into the learning activities. The design expert evaluation achieved a score of 94%, demonstrating that the visual appearance, multimedia integration, and layout met the criteria for effective digital learning media. Meanwhile, the language expert's evaluation scored 92%, indicating that the language was communicative, readable, and appropriate for elementary school students.

Table 4. Product Revision Based on Validator Suggestions

Validator	Suggestion	Revision
Material Expert	Add contextual examples related to students' daily activities	Added contextual case studies related to Pancasila values
Design Expert	Improve layout consistency and color balance	Revised layout arrangement and adjusted visual appearance
Language Expert	Simplify several instructional sentences	Improved sentence clarity and readability

The revision process was conducted systematically to improve the quality and feasibility of the developed product. The improvements included adding contextual examples, refining the visual presentation, and simplifying language instructions to facilitate student understanding.

Table 5. Practicality Test Results

Respondent	Percentage	Category
Fifth-grade Teacher	91%	Very Practical

Based on Table 4, the developed e-LKPD obtained a practicality score of 91%, categorized as "very practical." The teacher stated that the e-LKPD was easy to use, supported interactive learning, and helped students participate more actively during classroom learning activities. The multimedia features integrated into the e-LKPD also facilitated teachers in explaining abstract concepts related to Pancasila values.

The developed e-LKPD was designed with interactive, contextually relevant visual features tailored to the characteristics of elementary school students. The product interface used attractive colors, simple navigation, illustrative animations, and interactive quiz activities to increase students' engagement during learning activities.



Figure 1. e-LKPD interface



Figure 2. e-LKPD quiz content

Figure 1. Main Interface of the Developed e-LKPD

Figure 1 presents the opening display of the developed e-LKPD, which includes a title page, interactive navigation buttons, and visual illustrations related to learning Pancasila values. The attractive visual appearance was intentionally designed to increase students' motivation and interest in participating in digital learning activities.

Figure 2. Interactive Quiz Feature in the e-LKPD

Figure 2 illustrates the interactive quiz feature integrated into the e-LKPD. The quiz activity was designed around contextual questions about the implementation of Pancasila values in students' daily lives. This feature aimed to strengthen students' understanding of learning materials while encouraging active participation and reflective thinking during learning activities.

The findings of this study indicate that the developed Pancasila values-based e-LKPD achieved a very high level of validity and practicality. The high validation scores from material, design, and language experts demonstrate that the developed product meets the criteria for appropriate digital learning media for elementary Civic Education. These findings strengthen the argument that digital learning media integrated with contextual character education can support meaningful learning experiences in elementary schools.

The material expert validation result obtained a score of 92%, categorized as "very valid." This result indicates that the learning materials presented in the e-LKPD were aligned with curriculum objectives, competency indicators, and the characteristics of fifth-grade elementary school students. The integration of contextual examples related to students' daily lives also strengthened students' understanding of Pancasila values. According to Johnson (2020), contextual learning enables students to connect academic content with real-life experiences, thereby increasing meaningful learning and conceptual understanding. In this study, the contextual approach was implemented through reflective activities, case studies, and interactive exercises related to the application of Pancasila values in everyday situations. These findings are consistent with previous studies that have reported that contextual e-LKPD can improve student participation in learning and conceptual understanding in elementary schools.

The findings are also consistent with Mayer's multimedia learning theory. Mayer (2020) explains that students learn more effectively when verbal information is combined with visual elements such as images,

animations, and videos. The developed e-LKPD integrated multimedia components to support students' understanding of abstract concepts related to Pancasila values. This integration helped students process information more effectively by presenting learning materials through both visual and verbal representations simultaneously. Recent studies also revealed that multimedia-based e-LKPD significantly improves students' learning outcomes and critical thinking skills through interactive digital learning activities.

The design validation score of 94% indicates that the developed e-LKPD successfully met the criteria for attractive, interactive digital learning media. The visual appearance, color palette, typography, and layout were designed to reflect the characteristics of elementary school students. In addition, interactive features such as quizzes, videos, and animations increased student engagement during learning activities. According to Bozkurt et al. (2020), digital learning environments that support multimedia and interactive features can improve student participation, motivation, and learning engagement in online and blended learning contexts. Similarly, recent research found that interactive digital worksheets and e-flipbook-based learning media positively affect student engagement and classroom interaction in elementary education.

The practicality test conducted with the fifth-grade teacher obtained a score of 91%, categorized as "very practical." This result indicates that the developed e-LKPD was easy to use and effectively supported classroom learning activities. Teachers explained that students became more active and enthusiastic during learning because the e-LKPD offered interactive learning experiences and contextualized activities. These findings align with Trust and Whalen (2020), who state that technology-based learning media can improve classroom interaction and encourage more student-centered learning environments. In addition, recent studies have confirmed that practical, technology-integrated e-LKPD implementation improves student learning activities and classroom participation.

Furthermore, the language validation result obtained a score of 92%, indicating that the language used in the e-LKPD was communicative, understandable, and appropriate for elementary school students. Language clarity is an important aspect in digital learning media because it affects students' ability to understand instructions and learning content independently. According to Lestari and Muchlis (2021), communicative and readable instructional language significantly contributes to improving students' understanding of learning materials. The use of simple instructional language in the developed e-LKPD also supported independent learning activities and reduced misunderstandings during the learning process.

Compared with previous studies, this research offers a distinct contribution by developing an e-LKPD that not only focuses on cognitive learning outcomes but also integrates character education and Pancasila values into interactive digital learning activities. Previous studies generally focused on improving cognitive achievement and critical thinking skills through e-LKPD implementation. For example, Hasanah and Budhi (2023) focused on STEM-based e-LKPD development, while Ghaisani and Setyasto (2023) developed a liveworksheet-based e-LKPD to improve science learning outcomes. In contrast, this study specifically integrated contextual character education through multimedia-based activities to strengthen students' understanding and internalization of Pancasila values in daily life.

The findings of this study also support the implementation of 21st-century learning, which emphasizes digital literacy, critical thinking, creativity, collaboration, and student-centered learning. The developed e-LKPD encouraged students to actively participate in learning through interactive exercises, reflective tasks, and contextual problem-solving. Recent studies have shown that integrating digital learning media with interactive activities can improve student engagement, learning motivation, and conceptual understanding in elementary education settings.

CONCLUSIONS AND RECOMMENDATION

Based on the research results, it can be concluded that the development of e-LKPD to instill Pancasila values for fifth-grade students was successfully implemented using the 4D model, limited to the define, design, and develop stages. In the initial stage, it was found that learning remained largely conventional, lacked interactivity, and failed to engage students actively, necessitating the use of more innovative learning

media. During the design and development stages, the e-LKPD was developed with careful consideration of content, language, and design to align with the characteristics of elementary school students. The resulting product includes interactive and visual activities, as well as a contextual approach that supports both understanding and the instillation of Pancasila values in daily life. Validity test results indicate that the developed e-LKPD falls into the “highly valid” category, with approval rates of 92% from content experts, 92% from language experts, and 94% from design experts. This demonstrates that the product is suitable for instructional use, as it meets the criteria for content, language, and visual presentation. The recommendation from this study is that teachers can utilize the e-LKPD as an alternative learning medium that is more engaging and interactive. For future researchers, It is recommended to continue the research in the effectiveness testing phase to determine the impact of using e-LKPDs on student learning outcomes. Additionally, future developments could incorporate more innovative features to make learning more engaging and meaningful.

Credit Authorship Contribution Statement

The first author contributed to the formulation of the research concept, methodological design, data collection and processing, data analysis, and the drafting of the initial manuscript. The second author was responsible for providing data sources, managing research administration, and assisting in the development and implementation of the research methodology; they also contributed to research support, critical review and refinement of data analysis, and the final revision of the manuscript. All authors participated in the review process and approved the final version of the manuscript.

Declaration of Competing Interest

The authors declare that there are no conflicts of interest, whether financial or personal, that could influence the research process or the results reported in this article.

Ethical Declaration

This research was conducted in accordance with established research ethics principles. All participants provided informed consent prior to their involvement in the study. Participants were fully informed about the study's objectives, procedures, and their right to withdraw from the study at any time without any consequences.

REFERENCES

- Akbar, S. (2013). Instrumen perangkat pembelajaran. Bandung: Rosdakarya.
- Amarulloh, A., Surahman, E., & Melyani, V. (2019). Refleksi peserta didik terhadap pembelajaran berbasis digital. *Metaedukasi*, 1(1).
- Aisyah, S., Suriswo, S., & Sudibyo, H. (2024). Pengembangan lembar kerja peserta didik elektronik (E-LKPD) dengan media Heyzine Flipbook untuk meningkatkan hasil belajar sejarah. *Journal of Education Research*, 5(4), 6629–6640. <https://doi.org/10.37985/jer.v5i4.2108>
- Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Paskevicius, M., & Lambert, S. R. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1–126. <https://doi.org/10.5281/zenodo.3878572>
- Cahyadi, A. (2019). Pengembangan media dan sumber belajar: Teori dan prosedur. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699.
- Defina, S. S. (2021). BIPA dan MKWK Bahasa Indonesia: Penelitian dan pengembangan materi ajar di IPB. Bogor: IPB Press.
- Fuadah, L. F. (2021). Pengembangan LKPD elektronik (e-LKPD) berbasis problem based learning (PBL) bermuatan etnosains pada materi reaksi redoks. Skripsi. Universitas Islam Negeri Yogyakarta.

- Ghaisani, N. R. T., & Setyasto, N. (2023). The development of Liveworksheets-based electronic student worksheets (E-LKPD) to improve science learning outcomes. *Jurnal Penelitian Pendidikan IPA*, 9(8), 6147–6156. <https://doi.org/10.29303/jppipa.v9i8.4571> JPPIPA Article
- Habibah, S. O. (2019). Pengembangan bahan ajar LKPD berbasis budaya lokal Lampung. Skripsi. UIN Raden Intan Lampung.
- Hasanah, D., & Budhi, W. (2023). Pengembangan e-LKPD fisika berbasis STEM pada topik elastisitas dan hukum Hooke. *Compton: Jurnal Ilmiah Pendidikan Fisika*, 9(2), 130–139. <https://doi.org/10.30738/cjipf.v9i2.14863> Compton Journal Article
- Hendriani, M., & Gusteti, M. U. (2021). Validitas LKPD elektronik berbasis masalah terintegrasi nilai karakter. *Jurnal Basicedu*, 5(4), 2430–2439. <https://doi.org/10.31004/basicedu.v5i4.1193> Jurnal Basicedu Article
- Holmes, W., Bialik, M., & Fadel, C. (2022). Artificial intelligence in education: Promises and implications for teaching and learning. Boston: Center for Curriculum Redesign. [L1]Center for Curriculum Redesign
- Hwang, G. J., & Chien, S. Y. (2022). Definition, roles, and potential of metaverse in education: An artificial intelligence perspective. *Computers and Education: Artificial Intelligence*, 3, 100082. <https://doi.org/10.1016/j.caeai.2022.100082> Computers and Education Artificial Intelligence
- Irsalina, A., & Dwiningsih, K. (2018). Analisis kepraktisan pengembangan LKPD berorientasi blended learning. *Jurnal Kimia dan Pendidikan Kimia*, 3(3), 171–182. <https://doi.org/10.20961/jkpk.v3i3.25642> JKPK Article
- Johnson, E. B. (2020). Contextual teaching and learning: What it is and why it's here to stay. Thousand Oaks: Corwin Press.
- Khodijah, S., Hariyadi, S., & Prihatin, J. (2025). Development of E-LKPD using Canva, based on problem-based learning on respiratory material, to improve critical thinking skills and learning outcomes among elementary school students. *BIOEDUKASI*, 23(3). <https://doi.org/10.19184/bioedu.v23i3.53729> BIOEDUKASI Article
- Kimmons, R., Graham, C. R., & West, R. E. (2023). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education*, 23(1), 176–198. CITE Journal Article
- Lestari, I., & Muchlis, M. (2021). Pengaruh penggunaan bahasa dalam bahan ajar terhadap pemahaman siswa. *Jurnal Pendidikan*, 6(2), 145–152.
- Lickona, T. (2019). Educating for character: How our schools can teach respect and responsibility. New York: Bantam Books.
- Mayer, R. E. (2020). Multimedia learning (3rd ed.). Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781316941355> Cambridge University Press
- Prastowo, A. (2013). Panduan kreatif membuat bahan ajar inovatif. Yogyakarta: Diva Press.
- Pratama, A. R., & Saregar, A. (2019). Pengembangan LKPD berbasis scaffolding untuk pemahaman konsep. *Indonesian Journal of Science and Mathematics Education*, 2(1), 84–97. <https://doi.org/10.24042/ijsme.v2i1.3975> IJSME Article
- Puriasih, N. L., & Rati, N. W. (2022). Pengembangan e-LKPD interaktif dalam meningkatkan keterlibatan siswa. *Jurnal Pedagogi dan Pembelajaran*, 5(2), 250–259. <https://doi.org/10.23887/jp2.v5i2.47614> Jurnal Pedagogi dan Pembelajaran Article
- Redecker, C. (2021). European framework for the digital competence of educators: DigCompEdu. Luxembourg: Publications Office of the European Union. [L1]European Commission Publications
- Sari, N. P., Widodo, A., & Wahyuni, S. (2022). Pengembangan e-LKPD berbasis kontekstual untuk meningkatkan pemahaman siswa. *Jurnal Pendidikan Dasar Indonesia*, 7(2), 100–108. <https://doi.org/10.26737/jpdi.v7i2.3021> Jurnal Pendidikan Dasar Indonesia Article
- Sugiyono. (2015). Metode penelitian kuantitatif, kualitatif, dan R&D. Bandung: Alfabeta.

- Sung, Y. T., Chang, K. E., & Liu, T. C. (2023). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, 196, 104724. <https://doi.org/10.1016/j.compedu.2022.104724> Computers and Education Article
- Suryaningsih, N. M. A., & Nurlita, F. (2021). Pentingnya media pembelajaran dalam meningkatkan motivasi belajar siswa. *Jurnal Pendidikan Indonesia*, 5(3), 45–52. <https://doi.org/10.23887/jpi.v5i3.32571> Jurnal Pendidikan Indonesia Article
- Suryani, E., & Rini, Z. R. (2023). Pengembangan E-LKPD berbasis SETS untuk meningkatkan aktivitas belajar siswa sekolah dasar. *Scholaria: Jurnal Pendidikan dan Kebudayaan*, 13(2), 158–167. <https://doi.org/10.24246/j.js.2023.v13.i2.p158-167> Scholaria Article
- Sweller, J., Ayres, P., & Kalyuga, S. (2019). *Cognitive load theory*. New York: Springer. <https://doi.org/10.1007/978-1-4419-8126-4> Springer Cognitive Load Theory
- Tika Aprilia, Djono, & A'isyah, A. (2024). Utilization of interactive e-flipbook media oriented toward contextual approaches to learning in elementary schools. *Jurnal Inovasi Teknologi Pendidikan*, 11(2). <https://doi.org/10.21831/jitp.v11i2.71434> JITP Article
- Trust, T., & Whalen, J. (2020). Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. *Journal of Technology and Teacher Education*, 28(2), 189–19 JTATE Article
- Wati, R. (2023). Pengembangan LKPD digital untuk meningkatkan hasil belajar siswa. *Jurnal Pendidikan Digital*, 4(1), 1–10.