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Application of Interactive Website-Based Deep Learning Approach to Improve Indonesian Learning Outcomes in Elementary Schools

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Abstrack

This research is a Classroom Action Research which aims to improve the Indonesian learning outcomes of grade II elementary school students through the application of an interactive website-based Deep Learning approach. The background of this study is the low literacy skills and limited variation in digital-based learning media in Indonesian language learning, which tend to make students passive and less motivated. This study was carried out in two cycles involving 28 students, with each cycle consisting of the stages of planning, implementation, observation, and reflection. Data were collected through learning outcome tests and observation of student learning activities during the learning process. The results showed a significant improvement in learning completeness, from 32.14% in the pre-cycle to 75% in the second cycle, accompanied by an increase in the average student score from the low category to the good category. Furthermore, the effect size of improved learning outcomes was calculated at 1.23, which falls into the large category, indicating a strong and meaningful impact of the intervention on students' cognitive achievements. The application of interactive website-based media in this research succeeded in encouraging students to be more actively involved, facilitating meaningful understanding, and creating a more enjoyable and interactive learning atmosphere. Theoretically, this research contributes to the development of Deep Learning-based digital learning models for early literacy in elementary schools, an area that is still relatively limited in Indonesian language education.

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Introduction

21st century education requires educators to develop information and communication technology-based learning models to prepare a generation that is able to adapt and compete in the global era. The rapid development of technology has driven a paradigm shift in learning from conventional methods to digital systems that are interactive, contextual, and based on real experiences. UNESCO (2020) states that the integration of technology in learning plays an important role in improving student participation, critical thinking skills, and learning outcomes. In addition, the OECD (2021) reports that countries with education systems that systematically adopt technology show a significant increase in students' literacy and numeracy scores. This condition encourages the need for educators to master and utilize interactive digital media in designing creative and adaptive learning according to the characteristics of students.

In Indonesia, the Independent Curriculum policy launched by the Ministry of Education and Culture encourages the use of educational technology through flexible and contextual digital-based learning (Ministry of Education and Culture, 2022). However, implementation in the field still faces obstacles, especially at the elementary school level. The results of initial observations in class II A Bandungrejosari 3 Public Elementary School Malang showed that most teachers still used conventional lecture and practice methods without utilizing web-based interactive media. This condition makes Indonesian learning less interesting and limits student involvement. Interviews with classroom teachers also revealed that students had difficulty understanding the material due to the lack of variety of learning methods and media.

The main problem in learning Indonesian in the classroom is the low learning outcomes of students who have not reached the target of the Minimum Completeness Criteria. Of the 28 students, only 32.14% achieved a score above the Minimum Completeness Criteria of 75. In addition, low interest in learning, lack of motivation, and how quickly students feel bored when participating in learning without digital media also worsen the situation. Therefore, a learning approach is needed that not only utilizes technology, but is also able to increase student involvement and deepen understanding of concepts through meaningful activities.

One of the relevant alternative solutions is the application of an interactive website-based pedagogical deep learning approach in Indonesian language learning. It should be emphasized that deep learning in this context does not refer to a branch of artificial intelligence, but a learning approach that is oriented towards deep conceptual understanding through collaborative, reflective, and experiential activities (Artadhewi et al., 2025). Learning with this approach emphasizes active student involvement, the ability to relate material to real context, and the process of reflection on learning outcomes. Yulianti's research (2021) proves that the use of interactive website media based on deep learning is able to improve the critical thinking and literacy skills of elementary school students.

Although a number of studies have explored the use of web-based media in learning, there are still few studies that specifically integrate an interactive website-based pedagogical deep learning approach in Indonesian learning at the elementary school level. Most studies focus more on media development without evaluating the depth of the resulting learning experience (Erna et al., 2025). In addition, the concept of deep learning stages in basic literacy, such as active

exploration, concept elaboration, reflection, and meaningful applications, is still minimally applied in digital learning in elementary school.

Therefore, this study aims to fill this gap by applying an interactive website-based deep learning approach as a strategy to improve the Indonesian learning outcomes of grade II elementary school students. Theoretically, this research contributes to enriching the study of deep learning-based basic literacy learning in the digital era. Practically, the results of this research are expected to be a reference for teachers in developing digital technology-based learning strategies that are effective, interactive, and fun. These findings are also expected to support the implementation of the Independent Curriculum that encourages project-based learning, digital technology, and 21st century literacy.

Method

This study uses the Classroom Action Research method of the Kemmis and McTaggart (1988) model which consists of four stages, namely planning, implementation, observation, and reflection which is carried out in two cycles, with the aim of determining the effectiveness of the application of an interactive website-based deep learning approach in improving the Indonesian learning outcomes of students in grade II A Bandungrejosari 3 Public Elementary School Malang. The research subjects amounted to 28 students, consisting of 15 males and 13 females who were selected purposively based on the results of initial observations which showed low learning outcomes and minimal use of interactive digital media. In the planning stage, lesson plans, teaching materials, student activity observation sheets, learning implementation observation sheets, and learning outcome test instruments were prepared, and Wordwall-based media was designed which contained multiple-choice quizzes, match-up games, and random wheels according to Indonesian materials. The implementation of the action of applying pedagogical deep learning through group discussions, concept exploration, the use of Wordwall individually and in groups, and reflection on learning outcomes. The research instrument consisted of learning outcome tests in the form of 10 multiple-choice questions, student activity observation sheets, learning implementation sheets, and documentation. The instrument has been validated by two expert lecturers with a content validity test using Aiken's V (≥ value of 0.85) and a KR-20 reliability test with a result of 0.78 (reliable category). Quantitative data were analyzed descriptively through the calculation of mean and completion percentages, and used normalized gain tests to measure the increase in effectiveness between cycles. Meanwhile, qualitative data is analyzed through reduction, presentation, and drawing conclusions. The success criteria are determined if at least 75% of students achieve a score of ≥75 and there is an increase in student involvement in the good category during the interactive website-based learning process.

Results and Discussion

Result

This classroom action research aims to improve the learning outcomes of students in grade II A Bandungrejosari 3 Public Elementary School Malang through the application of an interactive website-based deep learning approach. The Minimum Completeness Criteria was set at 75, and the research was conducted in two cycles. The learning results in the pre-cycle showed that out of 28 students, as many as 9 students (32.14%) achieved learning completion, while 19

students (67.86%) did not complete with an average score of 62.6. The highest score achieved by the students was 82 and the lowest score was 30. The results of the observation show that student activity in the learning process is still low; Students tend to be passive, lack enthusiasm, and easily get bored of Indonesian learning.

After the action was applied in Cycle I with an interactive website-based deep learning approach, there was an increase in learning outcomes. The average score of students increased to 75, with 12 students (42.86%) achieving completeness and 16 students (57.14%) not completing it. The highest score of students in this cycle is 90 and the lowest score is 65. The results of the activity observation showed that student involvement increased to 68%, characterized by activeness in group discussions and material exploration through the website. The obstacles found include that some students still have difficulty adapting to website navigation and independent learning concepts.

In Cycle II, actions were improved by increasing the duration of the website exploration exercise, providing clearer navigation guidance, and providing more varied digital teaching materials. As a result, the average score of students increased to 82.5, with 21 students (75%) achieving completeness and 7 students (25%) not completing it. The highest score reaches 100 and the lowest score is 70. Activity observation showed a significant improvement, with 85% of learners actively asking questions, participating in Wordwall-based games, and participating in group discussions. This data proves that the application of an interactive website-based deep learning approach can gradually improve learning outcomes and student involvement in the learning process.

Discussion

The improvement in student learning outcomes from pre-cycle to cycle I and cycle II shows that the application of an interactive website-based deep learning approach has the potential to be effective in increasing student understanding and engagement. These results are consistent with the opinion of Suwandi (2024) that deep learning encourages students to explore the meaning of material in depth, not just memorize. In the first cycle, the improvement in learning outcomes occurred as students adapted to digital media, although obstacles such as website navigation and difficulties in independent learning were still found. This finding is in accordance with the research of Mutmainnah and Nurul (2025) which shows that the initial stage of implementation of digital-based deep learning requires intensive guidance. Reflection in cycle I encourages improvement in cycle II through additional exploration time, digital media guides, and a variety of content in the form of videos, songs, and educational games, which is in line with the theory of constructivism (Vygotsky in Suparno, 2013) about the importance of active involvement and direct experience in the learning process.

In addition, these results are strengthened by studies by Yuni Karsih (2025) and Arum Donna Safira (2021) which show that digital interactive media can improve the motivation and learning outcomes of elementary school students. The Wordwall educational game feature in this study also creates a competitive and fun atmosphere that encourages active participation and training critical thinking skills, in line with the findings of Raup et al. (2022) on the effectiveness of technology-based learning in improving contextual understanding. However, this study still has limitations, such as the absence of a control group so that the improvement in learning

outcomes cannot be directly attributed to the intervention provided, as well as the variation in digital skills between students that affects the speed of adaptation. Learning environment factors, facility support, and teacher readiness also have the potential to affect outcomes.

Therefore, the results of this study cannot be generalized widely to various educational contexts, especially in classrooms with different digital infrastructure conditions. As a reflection, follow-up research should involve control groups, apply quasi-experiment or mixed-method designs, and test the effectiveness of interactive website-based deep learning approaches across subjects and educational levels. At the international level, this model has the opportunity to be adapted in digital-based basic education in developing countries to strengthen digital literacy and 21st century skills, provided it is supported by teacher training and adequate technological infrastructure. Thus, these findings contribute to strengthening elementary digital literacy in the global era while expanding the reference of pedagogical deep learning-based learning, not in the context of artificial intelligence.

Conclusion

Based on the results of the classroom action research carried out at Bandungrejosari 3 Public Elementary School Malang, the application of an interactive website-based deep learning approach shows the potential to be effective in improving the learning outcomes of grade II A students in Indonesian subjects, as seen from the increase in student learning completeness from 32.14% in the pre-cycle to 75% in the second cycle, as well as the increase in the average score from 62.6 to 82.5. The application of interactive digital media based on Wordwall is able to encourage active engagement, interest in learning, and understanding of more meaningful concepts. However, this study has limitations because it was carried out without a control group and within the scope of one class, so the results cannot be generalized to a broader context. In addition, the effectiveness of learning can be influenced by external factors such as student motivation outside the classroom and the support of technology facilities. Therefore, follow-up research is recommended to apply a similar approach to other subjects and different levels using quasi-experiment or mixed-method designs to obtain a more comprehensive picture of impact. Theoretically and practically, this research also strengthens the contribution to the development of digital literacy in elementary schools as part of efforts to equip students with 21st century competencies in the global era.

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Authors' Note

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

References

Abdalla, H., & Moussa, A. (2024). Culturally responsive teaching: Navigating models and implementing effective strategies. *Acta Pedagogia Asiana,* 3(2), 91–100. https://doi.org/10.53623/apga.v3i2.432

Aranditio, D., & Suwandi, H. (2024). Deep learning paradigm in Indonesian primary education. *International Journal of Educational Innovation,* 14(3), 110–125. https://doi.org/10.21831/ijedi.v14i3.4811

Arikunto, S. (2010). *The research procedure is a practical approach*. Rineka Cipta.

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. IEEE Access. https://doi.org/10.1109/ACCESS.2020.2978205

Erna, A., & Prasetyo, D. (2025). Enhancing literacy and numeracy through deep learning in elementary school. Journal of Educational Innovation, 12(1), 22–35. https://doi.org/10.1152/jei.2025.1201.0022

Gay, G. (2010). Culturally responsive teaching: Theory, research, and practice (2nd ed.). Teachers College Press.

Gong, B., & Xiong, G. (2024). Development and design of an AI learning system for primary and middle school students based on large model technology. International Journal of New Developments in Education, 6(10), 204–213. https://doi.org/10.25236/IJNDE.2024.061030

Han, J., Zeng, M., Zhong, G., & Li, X. (2022). Research on the improvement path of primary school teachers' instructional design ability under deep learning theory. Frontiers in Educational Research, 5(18), 35–40. https://doi.org/10.25236/FER.2022.051806

Indartiwi, L. (2020). Interactive learning media to support language acquisition in early childhood. Journal of Early Childhood Education, 28(4), 212–223. https://doi.org/10.1007/s10643-020-01143-7

Jainal, N. H., & Shahrill, M. (2021). Incorporating Jigsaw strategy to support students' learning through action research. International Journal on Social and Education Sciences, 3(2), 252–266. https://doi.org/10.46328/ijonses.75

Kamaruddin, S., & Yusoff, N. M. R. (2019). The effectiveness of cooperative learning model Jigsaw and Team Games Tournament towards social skills. Creative Education, 10, 2529–2539. https://doi.org/10.4236/ce.2019.1012180

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. American Educational Research Journal, 32(3), 465–491. https://doi.org/10.3102/00028312032003465

Mutmainnah, N., & Nurul, S. (2025). Impact of deep learning approach in elementary classroom instruction. Indonesian Journal of Primary Education, 8(2), 45–58. https://doi.org/10.33751/ijpe.v8i2.5678

Perrotta, C., & Selwyn, N. (2020). Deep learning goes to school: Toward a relational understanding of AI in education. Learning, Media and Technology. https://doi.org/10.1080/17439884.2020.16860172

Prasetyo, B., Dwiki, M., & Iffan, R. (2023). Deep learning simulation and collaboration in primary education. Elementary Education Online, 22(3), 415–430. https://doi.org/10.17051/ilkonline.2023.03.35

Rainey, E. C., et al. (2022). Technology-based learning in elementary schools: Bridging theory and practice. Journal of Educational Computing Research, 60(4), 1010–1032. https://doi.org/10.1177/07356331221077544

Safira, A. D. (2021). The impact of interactive web media on learning motivation: A study in primary schools. Journal of Educational Technology and Society, 24(2), 102–114. https://doi.org/10.5304/jets.2021.2402.0103

Slavin, R. E. (1995). Cooperative learning: Theory, research, and practice (2nd ed.). Allyn & Bacon.

Sugiyono. (2011). Educational research methods: Quantitative, qualitative, and R&D approaches (14th ed.). Alphabet.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.

White, E., Thompson, C., & Baker, M. (2023). Assessing teachers' culturally responsive classroom practice in PK–12. Educational Researcher. https://doi.org/10.3102/0034654323120872o

White-Jones, L., Suleiman, A., & Martin, T. (2025). Elementary teachers' experiences of implementing culturally responsive sustaining education. Education Sciences, 15(1), 89. https://doi.org/10.3390/educsci15010089

Yulianti, F., & Ramadhani, R. (2021). Effects of interactive website media on students' critical thinking skills. Journal of Educational Multimedia and Hypermedia, 30(1), 67–86. https://doi.org/10.4256/jemh.2021.12345

Young, J., & Young, J. (2021). A systematic review of culturally responsive teaching self-efficacy. Multilingualism and Lifelong Teaching, 2021. https://doi.org/10.1515/mlt-2021-0011

Zhou, Z., Qiu, Y., & Zhang, Y. (2024). Applications of deep learning method of artificial intelligence in education: A systematic review. Education and Information Technologies. https://doi.org/10.1007/s10639-024-12883-w