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Increasing Students' Digital Literacy Through the Use of Google Cardboard Media on the Theme of My Dreams In Class IV of Elementary School

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Article Info	ABSTRACT
	Purpose of the study: This research aims to determine and improve students' digital literacy using Google Cardboard media for class IV students at Elementary School and assessing the extent to which students' participation and involvement in learning activities using Google Cardboard can motivate them to actively learn. **Methodology:** This research is classroom action research. The subjects of this research were 25 grade IV students at Elementary School. The object of the research is to increase students' digital literacy through Google Cardboard media. Data techniques use tests and observations. The research instrument uses observation sheets and test questions or evaluation of learning outcomes. **Main Findings:** The results of the study showed that before the implementation of Google Cardboard media on the theme of my dreams, 5 students (20%) had completed it and 20 students (80%) had not completed it and the class average score was 60%. However, after learning using Google Cardboard media in learning the theme of my dreams in cycles 1 and II, data was obtained that student learning outcomes increased. With the increase that occurred in students who had reached 88%. **Novelty/Originality of this study:** The novelty of this research is that through the use of Google Cardboard with a focus on the theme "My Dreams", class IV students elementary school can develop their digital literacy skills while gaining a deeper understanding of technology and information, thereby increasing students' digital literacy. through more contextual learning experiences.

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1. INTRODUCTION

Education in the current era of information and technology can be formulated as a human development effort which is characterized by increasing knowledge, skills, abilities, and individual and group behavior to which the person belongs, through continuous learning activities included in the world of education 4.0 [1]–[3]. Education 4.0 is education that is characterized by the use of digital technology in the learning process or known as a cyber system [4]–[6]. This system is able to enable the learning process to take place continuously without space and time limits. As the front guard in the world of education, teachers must upgrade their competencies in facing the era of education 4.0 [7]–[9]. The students faced by teachers today are the millennial generation who are no stranger to the digital world.

Based on the results of observations with class IV teachers carried out at elementary school, Waled District, Cirebon Regency, it was found that learning places more emphasis on the lecture method, which makes students less innovative and creative so that students' interest in learning decreases.Looking at the facts during learning in class IV of elementary school, Waled District, Cirebon Regency, it is known that varied learning media are not implemented enough by teachers. Learning in class and outside the classroom, teachers have not created an active and enjoyable learning atmosphere, so that it does not attract students' attention, and students are less motivated in the ongoing learning. Lessons from this research highlight the importance of integrating innovative technologies, such as Google Cardboard, in designing engaging and effective learning experiences. Additionally, a deep understanding of students' individual needs, early digital literacy skills, and necessary supports are key to successfully implementing these technologies in the classroom [10]–[12].

In learning on the theme of my dreams, the use of media is very necessary for stimulation or response to the material presented by the teacher and to stimulate students' attention [13]–[15]. Learning media is anything that can be used to channel messages from the sender to the recipient so that it can stimulate students' thoughts, feelings, attention and interest and attention in such a way that the learning process occurs [16]–[18]. Therefore, media in the learning process is very necessary to help students understand the learning material. including digital literacy which is a characteristic of education 4.0. Digital literacy is the ability to create and share in different modes and forms to create, collaborate and communicate more effectively, as well as to understand how and when to use digital technology to support these processes.

Surah Thoha verse 114:

$$\text{وَقُل رَّبِّ زِدْنِي عِلْمًا}$$

Meaning: "And say (by you Muhammad), "O my Lord, add to me knowledge".

Based on the verse above about seeking as much knowledge as possible, it says that every individual needs to understand that digital literacy is an important thing needed to be able to participate in today's modern world. Digital literacy is as important as reading, writing, arithmetic and other scientific disciplines. The generation that grew up with unlimited access to digital technology has a different thinking pattern from previous generations. Everyone should be responsible for how to use technology to interact with the surrounding environment. Digital technology allows people to interact and communicate with family and friends in everyday life. In the world of education, students are one of the users of information. The information students need is not only in printed format [19], [20]. The internet began to present information in a different format, namely digital. The digital literacy skills of students in class IV of elementary school, Waled District, Cirebon Regency are still considered lacking, considering that the method used is mostly lecture methods and does not use digital media. The digital media that can be applied at elementary school, Waled District, Cirebon Regency is Google Cardboard learning media. Google Cardboard media is a Virtual Reality media, presenting different advantages from other media such as TV and projectors. Google Cardboard media is a Virtual Reality (VR) developed by Google for use on smart cellphone devices. Based on the background above, action is needed to increase the digital literacy of class IV students by using Google Cardboard media. With this media, students are invited to apply, watch and experience virtual reality in a simple, fun way and can increase students' interest and digital literacy skills.

Based on the background of the problem above, the problem can be identified as follows: The low digital literacy skills of students in class IV, the teacher in providing learning places more emphasis on the lecture method, so that the learning process feels boring and the learning media used does not attract students' interest. Problem Limitations, Based on the problems identified, for the purpose of this research the author needs to limit the problems to be researched, namely, Google Cardboard as the media used, and examine the digital literacy of students in class IV elementary school Tema My Aspirations, sub-theme 1 about me and My goal is to use learning I, namely Indonesian language subjects covering various types of work.

That the term digital literacy was first put forward as the ability to understand and use information from various digital sources [4], [21]. he stated that digital literacy is. the ability to use technology and information from digital devices effectively and efficiently in various contexts, such as academics, careers and everyday life. The digital era cannot be separated from literacy skills, because it is always related to how to obtain information that should be used wisely and ethically. Digital literacy can also be interpreted as the ability to read, read and analyze

various kinds of digital sources [22]–[24]. In modern society, especially in Indonesia, social media and various digital media have become a necessity. This massive digital development has had an impact on shifting people's behavior. Therefore, the need for information through the digital world needs to be accompanied by media intelligence by analyzing existing data and content. That school digital literacy must be developed as an integrated learning mechanism from the curriculum or at least connected to the teaching and learning system. Students need to improve their skills, teachers need to increase their knowledge and creativity in the process of teaching digital literacy, and school principals need to facilitate teachers or education staff in developing a school digital literacy culture.

Competency as the ability to organize knowledge, build a collection of information obtained from various sources with the ability to collect and evaluate facts and opinions well and without prejudice. This is done for certain purposes, both education and work. This competency includes several components, namely: Ability to search for information via the internet, Ability. to create a personal newsfeed or news notification. The latest information can be obtained by joining and subscribing to news in a newsgroup. Learning Media is one of the learning components that has an important role in teaching and learning activities. In accordance with scientific learning, the use of learning media should get the teacher's attention in every teaching and learning activity. Therefore, teachers need to learn how to determine learning media in order to effectively achieve learning goals. in the teaching and learning process. One learning media that can support the effectiveness of teaching and learning activities in accordance with developments in science and technology is the use of Google Cardboard in learning which is packaged in CD (Compact Disk) form. By using learning media in the form of Google Cardboard, students will be more interested and enthusiastic in learning, and the use of Google Cardboard can influence students in gaining knowledge about themselves and their dreams. The research activities that will be carried out will use learning media in the form of Google Cardboard in learning the theme of my dreams for students in class IV at Elementary School Waled District, Cirebon Regency, West Java Province.

The application of Google Cardboard media with the theme "My Dreams" in Class IV of Elementary School Waled District aims to bridge the existing gap in students' digital literacy. Recognizing the ever-evolving technological landscape, it is crucial to improve students' skills and understanding of digital literacy from an early age. The gap in digital literacy among today's students underscores the need for innovative and engaging approaches to the learning process. This research is in line with research conducted by Ahmed and Hossain [25] who conducted research on Google Cardboard. By utilizing Google Cardboard as a medium for exploration and education, students are not only exposed to digital content but are also encouraged to actively participate in a deeper learning experience. This initiative seeks to address the digital literacy gap by providing students at Elementary School Waled District with a unique and interactive platform to develop their digital skills, cultivating a future-ready generation equipped with the competencies necessary to navigate the digital world.

This research aims to determine and improve students' digital literacy using Google Cardboard media for class IV students at Elementary School and assessing the extent to which students' participation and involvement in learning activities using Google Cardboard can motivate them to actively learn. This latest research reveals interesting innovations in increasing the digital literacy of grade IV students at Elementary School Waled District. Involving the use of Google Cardboard media with the theme "My Dreams" in class, this research shows that this approach is successful in generating student interest and involvement in learning. By utilizing virtual reality technology, students can dig deeper into their dreams, while developing their digital literacy skills. The research results showed a significant increase in students' understanding of learning content and their ability to use digital technology. This innovative approach not only creates an enjoyable learning experience but also has a positive impact on the development of students' digital literacy in the era of modern technology. This research aims to determine and improve students' digital literacy using Google Cardboard media for class IV students at elementary school, Waled subdistrict, Cirebon district. And assessing the extent to which students' participation and involvement in learning activities using Google Cardboard can motivate them to actively learn.

2. RESEARCH METHOD
2.1. Types of Research
This type of research is classroom action research. The classroom action research model used in this research is the Kemmis & Taggart model. This research model combines two components, namely the action component and the observation component into one unit. The combination of these two components is because the process of action and observation is an inseparable unit. So when you perform an action, at that very moment. researchers make observations [26], [27]. This research cycle depends on the achievement of the research objectives, if the research objectives have been achieved then the next cycle is not carried out.

2.2 Sampling Technique
The sampling technique is random sampling. In conducting this research, we applied a random sampling method to ensure random and fair representation of the population studied [28]–[30]. By using this approach, each

element or individual in the population has an equal chance of being selected as a sample. The sample selection steps were carried out randomly, so that the research results could be more general and reliable. This random sampling process helps us avoid bias in sample selection, so that the research results can be applied more broadly to the population as a whole. The decision to use a random sampling method was based on our aim to obtain data that represents the diversity and variation that may exist in the population, so as to increase the validity and generalisability of our research findings.

2.3 Data Collection Technique

In collecting data for this research, we applied various careful and structured data collection techniques. The main method used is a questionnaire, where respondents are asked to provide their responses to a series of questions related to the research topic. [31], [32] This questionnaire was carefully designed to ensure the validity and reliability of the data obtained. In addition, we also conducted in-depth interviews with a number of selected respondents, exploring deeper understanding and context that may not be revealed in the questionnaire. Direct observations are also carried out to observe behavior and situations in the field. The use of triangulation techniques, namely combining several data collection methods, strengthens the reliability of research findings. These measures are carefully selected to ensure that the data collected reflects important aspects of the phenomenon under study and can provide a solid basis for analysis and conclusions.

2.4 Data Analysis Technique

The data analysis process in research on increasing digital literacy for fourth grade students through the use of Google Cardboard media with the theme "My Dreams" at elementary school Waled District involves a series of systematic steps. First, quantitative data obtained from the questionnaire was analyzed using descriptive statistics, including means, standard deviations, and percentages, to detail the extent of students' digital literacy development. Qualitative analysis was carried out by conducting thematic coding of interview and observation data, identifying emerging patterns, themes and trends [33], [34]. Next, we utilized triangulation techniques to compare and confirm findings from multiple data sources. During the analysis process, we use statistical software and data visualization applications to provide graphical presentations that make it easier to understand the results. It is hoped that this combinative approach between quantitative and qualitative analysis can provide a holistic understanding of the impact of using Google Cardboard in increasing the digital literacy of class IV students at elementary school Waled District.

2.5 Research Procedure

This research began by designing careful research procedures to achieve the goal of increasing students' digital literacy through the use of Google Cardboard media with the theme "My Dreams" in class IV of elementary school Waled District. The initial step involves preparing learning materials that are appropriate to the curriculum and theme, as well as developing special modules for use with Google Cardboard. After that, we randomly selected samples from class IV students and obtained permission and support from the school. The research implementation was carried out by integrating Google Cardboard media into daily learning, with students engaging in virtual exploration based on the theme "My Dreams". During the learning process, we use questionnaires, observations, and interviews to collect data regarding students' responses, level of engagement, and their understanding of digital literacy. The collected data was then analyzed using quantitative and qualitative approaches. Finally, the results of this research are presented in the form of a report that includes findings, conclusions and recommendations to support the implementation of digital literacy development strategies at the elementary school level.

3.   RESULTS AND DISCUSSION

Based on observations of digital literacy in class IV of Elementary School before research was carried out in semester 2 of the 2018-2019 school year, it showed that students' digital literacy was still very low, as seen from the students. still passive when participating in learning because the teacher still uses the lecture method and there are no teaching aids such as pictures, videos, audio and so on. so it is still not interesting when the teacher explains the material. There are 25 students in this class.The implementation of this Classroom Action Research on the Use of Google Cardboard Media in Efforts to Increase Digital Literacy for Class IV Students at Elementary School Academic Year was carried out in two years .

Based on the results of the pre-action, 20 students or 80% of students had not yet completed and 5 students or 20% of students had completed. With this, students' acquisition of digital literacy in the pre-cycle still shows very poor results. Apart from that, from table 7 there are still many students whose scores are still below the minimum completeness criteria score, namely 65. These descriptive results show that there are students who still receive attention in improving digital literacy, such as students who must be given an understanding of digital literacy and media that supports students' digital literacy activities so that students can apply it directly so as to broaden their insight. about digital literacy. Therefore, researchers want to make improvements. students' digital

literacy using Google Cardboard media. Based on the results of the table, they should get better treatment in cycle 1.

Data from the table above regarding students' digital literacy in pre-action can be explained through the diagram below:

Table 1. Analysis of Completeness of Learning Results

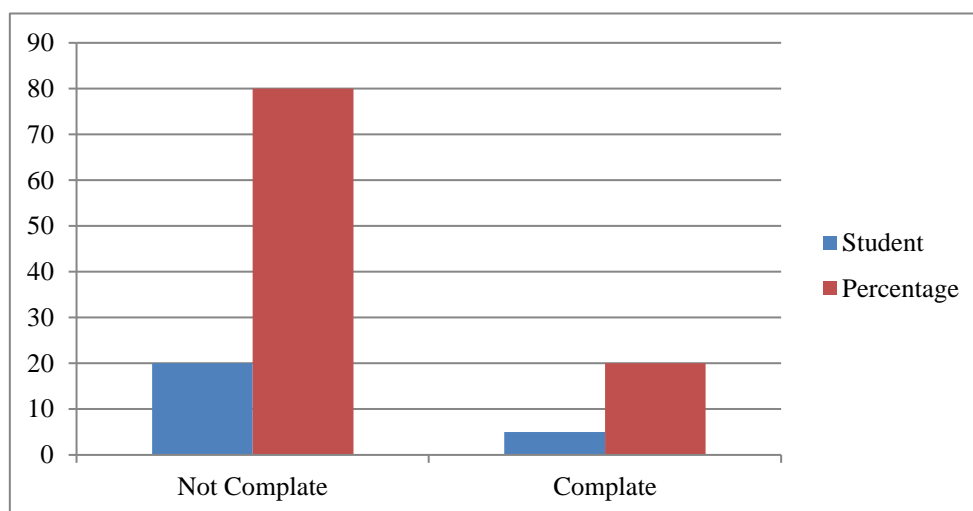| No	Value	Student	Percentage	Category
1	X < 65	20	80	Complate
2	X > 65	5	20	Not Complate

Figure 1. Pre-Action Student Learning Outcomes Diagram

From this data, it can be seen that there has been an increase in the percentage of students who have completed the minimum learning outcomes in cycle I and cycle II. With the increase that has occurred in students who have reached 88% of students who have completed and exceeded 75% of the success indicators, it is stated that this learning improvement has been successful. Apart from being able to improve student learning outcomes, the theme of my dreams using Google Cardboard media can also increase learning motivation and increase student participation and active learning that takes place in the classroom during learning. During initial observations carried out by researchers on class IV students at Elementary School, during the learning process, the teacher delivered learning material that only directed more towards the students' experiences. in liking their ideals and not providing a broader view so that students' thinking patterns will further develop by using Google Cardboard media.

The qualitative results of this research show a positive response and active involvement of students towards the use of Google Cardboard media with the theme "My Dreams". In general, students show high enthusiasm in participating in learning activities that use virtual reality technology. They stated that virtual reality experiences provided a new dimension to learning, allowing them to 'visit' places they could previously only imagine. Apart from that, students also involve themselves in group discussions related to the theme of their dreams, broadening their horizons about various aspirations and goals in life. The results of in-depth interviews show that students have increased understanding of digital literacy, especially in terms of navigation and interaction with virtual reality technology.

However, the qualitative results also identified several challenges faced during implementation. Some students have some difficulty adjusting to this new technology, although most overcome these obstacles after some time. Some also expressed a need for more guidance from teachers regarding the use of Google Cardboard. In addition, some students expressed a preference for traditional learning methods and felt challenged in expressing their dreams openly. Therefore, understanding and overcoming these obstacles is important in optimizing the potential of Google Cardboard media as a tool for increasing students' digital literacy.

Learning, which is a process from not knowing to knowing, is very good as a moment to form aspects that are the goal of improvement and improvement in the learning process [35]–[37]. So teachers must be able to package learning well with the aim that the assessment aspects of students' digital literacy can be achieved. This is because students need to achieve good digital literacy, but these results must be achieved through a good process as well [38]. From the results of the discussion presented in the previous chapter, the conclusions that can be drawn are: The digital literacy activities of students in class IV use Google Cardboard media on the theme of my dreams in class IV at Elementary School based on. From the data obtained, it can be seen that there has been a change,

where previously students still lacked understanding of digital literacy using Google Cardboard media, now students are able and able to use Google Cardboard media well, as indicated by the results of observations which show that students' digital literacy activities have an average of 100. %.

The digital literacy abilities of students in class IV using Google Cardboard media on the theme of my dreams in class IV Elementary School according to the data obtained before and after the action was implemented showed an increase in students' digital literacy as indicated by the observation results obtained. From the results of observations obtained before implementing Google Cardboard media, students were not able to apply this media well, but after learning to use Google Cardboard media, based on the results of observations, students were able to apply Google Cardboard media well, marked by the results of observations that showed students were able to apply Google Cardboard media [39]. with 100% implementation. The learning outcomes of students in class IV using Google Cardboard media on the theme of my dreams in class IV Elementary School are based on the results of tests which show that before the implementation of Google Cardboard media on the theme of my dreams, 5 students or 20% completed and 20 students or 80% incomplete. However, after learning using Google Cardboard media on the theme of my dreams, cycles I and II, data was obtained that student learning outcomes increased.

This research is also in line with research conducted by Ahmed and Hossain [25] This research aims to explore and improve the digital literacy of fourth grade students through the use of Google Cardboard media with a thematic focus on "My Dreams" at Elementary School Waled District. By adopting this innovative approach, this research will explore the potential of virtual reality technology in creating more immersive and engaging learning experiences for students. By implementing learning modules specifically for Google Cardboard, we strive to integrate aspects of digital literacy with students' personal themes, providing a more personal and relevant dimension to learning. This approach is expected to not only increase students' technological understanding but also stimulate their interest and creativity in exploring and realizing personal dreams [40]. Thus, it is hoped that this research can make a significant contribution to the development of digital literacy learning methods at the elementary school level.

Although this research provides valuable insight into the use of Google Cardboard media in improving students' digital literacy in Class IV elementary school Waled District, there are several limitations that need to be acknowledged. First, the research results may be limited to the specific environment and characteristics of SDN 1 Cikulak Waled, so generalization of the results to other school environments needs to be done with caution. In addition, external factors such as technology accessibility and students' initial level of understanding of digital literacy can also influence research results. Furthermore, this study did not consider other variables that might influence the results, such as parental support and school policies regarding the use of technology in learning. Therefore, further research needs to be carried out taking these factors into account in order to gain a more comprehensive understanding of the effectiveness of using Google Cardboard in increasing students' digital literacy.

The novelty of the research lies in its innovative approach to enhancing students' digital literacy through the integration of Google Cardboard media with the thematic focus on "My Dreams" in Class IV of Elementary School Waled District. The significant innovation of this research lies in the integration of Google Cardboard in the context of basic education at SDN 1 Cikulak Waled District with a thematic approach focusing on the theme "My Dreams". The use of virtual reality technology in fourth grade students' digital literacy not only enriches their learning experience, but also opens up the potential for visual and interactive dream exploration. This research establishes an underexplored link between VR technology and the development of digital literacy at the primary level, enriching the knowledge base regarding the application of innovative media in the context of primary education. The novelty of this research lies not only in the use of technology, but also in the thematic approach which has a positive impact on students' motivation and participation in developing their digital literacy skills.

This study represents a pioneering initiative in leveraging virtual reality technology within the primary education context, providing students with an immersive and engaging learning experience. The incorporation of Google Cardboard as an educational tool not only introduces a novel dimension to traditional teaching methods but also taps into the potential of virtual reality to stimulate students' curiosity and active participation. The thematic emphasis on "My Dreams" adds a personal and motivational touch to the digital literacy curriculum, fostering a deeper connection between technology and the aspirations of the students. This unique blend of technology, thematic content, and educational objectives contributes to the originality of the research, paving the way for potential advancements in the field of digital literacy enhancement in primary.

4. CONCLUSION

Overall, this research shows that the use of Google Cardboard media with the theme "My Dreams" can effectively increase students' digital literacy in Class IV Elementary School Waled District. Through this innovative approach, students not only engage in more fun and interactive learning, but also successfully develop their digital literacy skills. The use of virtual reality technology such as Google Cardboard provides students with a more immersive and engaging learning experience, helping them understand digital concepts better. Thus, the

integration of this media in learning can be considered a positive step in preparing students for the digital era, opening up new opportunities for the development of their creativity, knowledge and technological abilities.

REFERENCES

[1] W.-L. Wang and C.-Y. Kuo, "Relationships Among Teachers' Positive Discipline, Students' Well-being and Teachers' Effective Teaching: A Study of Special Education Teachers and Adolescent Students With Learning Disabilities in Taiwan," *Int. J. Disabil. Dev. Educ.*, vol. 66, no. 1, pp. 82–98, Jan. 2019, doi: 10.1080/1034912X.2018.1441978.

[2] Kamid *et al.*, "Engklek Game " in mathematics : How difference and relationship student attitude towards science process skills ?," *Cypriot J. Educ. Sci.*, vol. 16, no. 6, pp. 3109–3123, 2021, doi: https://doi.org/10.18844/cjes.v16i6.6500 Education.

[3] A. Tohri, A. Rasyad, M. Sururuddin, and L. M. Istiqlal, "The urgency of Sasak local wisdom-based character education for elementary school in East Lombok, Indonesia," *Int. J. Eval. Res. Educ.*, vol. 11, no. 1, pp. 333–344, 2022, doi: 10.11591/ijere.v11i1.21869.

[4] H. Anggraeni, Y. Fauziyah, and E. F. Fahyuni, "Penguatan Blended Learning Berbasis Literasi Digital Dalam Menghadapi Era Revolusi Industri 4.0," *Al-Idarah J. Kependidikan Islam*, vol. 9, no. 2, pp. 190–203, 2019, [Online]. Available: http://ejournal.radenintan.ac.id/index.php/idarohe-ISSN:2580-2453https://doi.org/10.24042/alidarah.v9i2.5168.

[5] M. D. Ernawati, Asrial, R. Perdana, S. E. Septi, and Rahmi, "Evaluation of Students' Attitudes and Science Process Skills toward Middle School Science Subject in Indonesia," *J. Pendidik. Progresif*, vol. 1, no. 2, pp. 258–274, 2021, doi: 10.23960/jpp.v1.

[6] K. Syauqi, S. Munadi, and M. B. Triyono, "Students' perceptions toward vocational education on online learning during the COVID-19 pandemic," *Int. J. Eval. Res. Educ.*, vol. 9, no. 4, pp. 881–886, 2020, doi: 10.11591/ijere.v9i4.20766.

[7] Lukman *et al.*, "Effective teachers' personality in strengthening character education," *Int. J. Eval. Res. Educ.*, vol. 10, no. 2, pp. 512–521, 2021, doi: 10.11591/ijere.v10i2.21629.

[8] F. K. Azadboni and S. E. Septi, "Differences and Relationships on Self-Efficiency and Discipline Character of High School Students," *EduFisika J. Pendidik. Fis.*, vol. 8, no. 2, pp. 233–244, 2023, doi: 10.59052/edufisika.v8i2.27704.

[9] N. D. S. Chetty *et al.*, "Learning styles and teaching styles determine students' academic performances," *Int. J. Eval. Res. Educ.*, vol. 8, no. 4, pp. 610–615, 2019, doi: 10.11591/ijere.v8i3. 20345.

[10] M. Williams, "John Dewey in the 21st Century," *J. Inq. Action Educ.*, vol. 9, no. 1, pp. 91–102, 2017.

[11] N. A. Hidayati, H. J. Waluyo, R. Winarni, and Suyitno, "Exploring the implementation of local wisdom-based character education among indonesian higher education students," *Int. J. Instr.*, vol. 13, no. 2, pp. 179–198, 2020, doi: 10.29333/iji.2020.13213a.

[12] E. Wacner Simamora, "The Effect of Student Team Achievement Division Cooperative Learning on The Concept Understanding Ability of Mathematic," vol. 104, no. 22, pp. 407–411, 2017, doi: 10.2991/aisteel-17.2017.87.

[13] Crisvin, M. Asbari, and J. V. Chiam, "Innovate to Liberate : Akselerasi Kreativitas Siswa dalam Pendidikan," *J. Inf. Syst. Manag.*, vol. 2, no. 5, pp. 8–12, 2023.

[14] S. Ramli, R. Novanda, M. Sobri, and E. Triani, "The Impact of Student Responses and Concepts Understanding on the Environmental Care Character of Elementary School Students," *Int. J. Elem. Educ.*, vol. 6, no. 1, pp. 48–57, 2022.

[15] M. D. W. Ernawati, A. Asrial, R. Perdana, S. E. Septi, S. Rohana, and A. M. Nawahdani, "Evaluation of Students' Interest, Attitudes, and Science Process Skills in Science Subjects," *J. Educ. Res. Eval.*, vol. 6, no. 1, pp. 181–194, 2022, doi: 10.23887/jere.v6i1.37583.

[16] S. Hidayat, S. Apriliya, and A. Fauziyaturrosyidah, "Metode Gamification Sebagai Solusi Fenomena Learning Loss Dalam Pembelajaran Daring Selama Pandemi Covid-19: A Literatur Review," *J. Elem. Educ.*, vol. 04, no. 05, pp. 741–753, 2021.

[17] R. Hidayat, Z. Moosavi, Hermandra, Zulhafizh, and P. Hadisaputra, "Achievement goals, well-being and lifelong learning: A mediational analysis," *Int. J. Instr.*, vol. 15, no. 1, pp. 89–112, 2022, doi: 10.29333/iji.2022.1516a.

[18] Z. Arifin, "Development of authentic assessment instrument for performance in learning mathematics in linear program," *J. Educ. Res. Eval.*, vol. 7, no. 2, pp. 154–162, 2018.

[19] L. Listiani and A. E. Kusuma, "Memperkenalkan Penerapan Strategi Pembelajaran Dengan Pendekatan Saintifik Kepada Guru Sekolah Dasar Melalui Pelatihan Singkat," *J. Pengabdi. Masy. Borneo*, vol. 1, no. 1, p. 1, 2017, doi: 10.35334/jpmb.v1i1.235.

[20] Y. Ramalisa, S. E. Septi, and F. I. Putri, "Comparison of Two Learning Models on Students ' Process Skills in Elementary School," vol. 6, no. 3, pp. 446–457, 2022.

[21] S. Ramli, R. Novanda, M. Sobri, E. Triani, and S. E. Septi, "The Effect of Student Responses on Environmental Care Characters and Student Learning Outcomes," *Eurasian J. Educ. Res.*, vol. 99, pp. 112–126, 2022, doi:

10.14689/ejer.2022.99.007.

[22] D. Saripudin, W. I. Fauzi, and E. Nugraha, "The development of interactive E-book of local history for senior high school in improving local wisdom and digital literacy," *Eur. J. Educ. Res.*, vol. 11, no. 1, pp. 17–31, 2022, doi: 10.12973/eu-jer.11.1.17.

[23] F. N. Husain, "Digital Assessment Literacy: The Need of Online Assessment Literacy and Online Assessment Literate Educators," *Int. Educ. Stud.*, vol. 14, no. 10, p. 65, 2021, doi: 10.5539/ies.v14n10p65.

[24] A. Sanova, A. Bakar, A. Afrida, D. A. Kurniawan, and F. T. Aldila, "Digital Literacy on the Use of E-Module Towards Students' Self-Directed Learning on Learning Process and Outcomes Evaluation Cources," *JPI (Jurnal Pendidik. Indones.*, vol. 11, no. 1, pp. 154–164, 2022, doi: 10.23887/jpi-undiksha.v11i1.36509.

[25] T. Ahmed and M. J. Hossain, "VR Chiriyakhana: A Virtual Zoo Using Google Cardboard," *SN Comput. Sci.*, vol. 1, no. 6, pp. 341–350, 2020.

[26] A. Arjusi and R. Alfiana, "The Relationship of Religious Character to Student Learning Outcomes in Elementary School," *J. Basic Educ. Res.*, vol. 4, no. 2, pp. 70–73, 2023, doi: 10.37251/jber.v4i2.422.

[27] J. W. Creswell, *Educational Research*. Lincoln: University of Nebraska, 2012.

[28] F. I. Putri, "Perbandingan Hasil Belajar Siswi Kelas VII C Dan VII D terhadap Mata Pelajaran IPA Fisika," *Qalam J. Ilmu Kependidikan*, vol. 10, no. 1, pp. 38–47, 2021, doi: https://doi.org/10.33506/jq.v.

[29] P. P. Utami and N. Vioreza, "Teacher Work Productivity in Senior High School," *Int. J. Instr.*, vol. 14, no. 1, pp. 599–614, 2020, doi: 10.29333/IJI.2021.14136A.

[30] N. M. Anikarnisia and I. Wilujeng, "Need assessment of STEM education based based on local wisdom in junior high school," *J. Phys. Conf. Ser.*, vol. 1440, no. 1, 2020, doi: 10.1088/1742-6596/1440/1/012092.

[31] Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D. Cetakan ke-18*. Bandung: CV Alfabeta, 2013.

[32] C. S. Chai and S.-C. Kong, "Professional learning for 21st century education," *J. Comput. Educ.*, vol. 4, no. 1, pp. 1–4, 2017, doi: 10.1007/s40692-016-0069-y.

[33] E. Daniel, "The Usefulness of Qualitative and Quantitative Approaches and Methods in Researching Problem-Solving Ability in Science Education Curriculum," *J. Educ. Pract.*, vol. 7, no. 15, pp. 91–100, 2016, doi: 2222-288X.

[34] J. Tondeur, R. Scherer, E. Baran, F. Siddiq, T. Valtonen, and E. Sointu, "Teacher educators as gatekeepers: Preparing the next generation of teachers for technology integration in education," *Br. J. Educ. Technol.*, vol. 50, no. 3, pp. 1189–1209, 2019, doi: 10.1111/bjet.12748.

[35] W. H. Jeynes, "A Meta-Analysis on the Relationship Between Character Education and Student Achievement and Behavioral Outcomes," *Educ. Urban Soc.*, vol. 51, no. 1, pp. 33–71, 2019, doi: 10.1177/0013124517747681.

[36] S. Evseev, "Adaptive physical education and adaptive sports within the mental health-care system," *Int. J. Cult. Ment. Health*, vol. 11, no. 1, pp. 109–112, 2018, doi: 10.1080/17542863.2017.1394419.

[37] K. Hesbol, "Principal Self-Efficacy and Learning Organizations: Influencing School Improvement.," *Int. J. Educ. Leadersh. Prep.*, vol. 14, no. 1, pp. 33–51, 2019.

[38] D. Casanova, G. Alsop, and I. Huet, "Giving away some of their powers! Towards learner agency in digital assessment and feedback," *Res. Pract. Technol. Enhanc. Learn.*, vol. 16, no. 1, 2021, doi: 10.1186/s41039-021-00168-6.

[39] M. Hariadi, J. Jumadi, I. Wilujeng, H. Kuswanto, W. Wulandari, and S. Sundari, "Inquiry Training Learning Model Assisted by Google Classroom to Improve Creative Thinking Skills of Senior High School Students," *JPI (Indonesian Educ. Journal)*, vol. 8, no. 2, pp. 198-207., 2019.

[40] J. Junaedah, S. B. Thalib, and M. A. Ahmad, "The Outdoor Learning Modules Based on Traditional Games in Improving Prosocial Behaviour of Early Childhood," *Int. Educ. Stud.*, vol. 13, no. 10, p. 88, 2020, doi: 10.5539/ies.v13n10p88.