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Journal of Mathematics Instruction, Social Research and Opinion Vol. 4, No. 4, December 2025, pp. 1477 – 1486, https://doi.org/10.58421/misro.v4i4.913 ISSN 2962-7842 1477 Journal homepage: https://journal-gehu.com/index.php/misro Technology in Elementary School Science Learning Media and Resources: A Literature Review with Implications for BiMbeLcc Asthania1, Poppy Yullia Murtiningtyas2, Lukmanul Hakim3 1,2,3Master's Program in Educational Technology, Sultan Ageng Tirtayasa University Article Info ABSTRACT Article history: Received 2025-12-07 Revised 2025-12-22 Accepted 2025-12-27 The rapid development of science and technology has significantly influenced the educational sector, particularly science learning at the 1 elementary school level. This study aims to examine the role of technology in elementary science learning media and learning resources, with implications for fourth-grade learners at the BiMbeLcc tutoring institution in Cilegon. The research employed a descriptive qualitative approach using a literature review method. The literature search was conducted using national databases (Sinta-indexed journals) and international databases such as Google Scholar and ERIC, covering publications from 2015 to 2024. The inclusion criteria consisted of peer-reviewed articles discussing educational technology, science learning media, and elementary education, while articles that were not focused on elementary-level learning, lacked methodological clarity, or were non-academic publications were excluded. Based on the screening and eligibility process, a total of selected articles were analyzed thematically to identify recurring patterns and key findings. The results indicate that the integration of technology in science learning media such as Canva, Kahoot, YouTube, Google Chrome, and artificial intelligence plays an important role in supporting students' learning motivation, engagement, and understanding of scientific concepts. Technology-based learning media provide interactive, visual, and contextual learning experiences that promote student-centered learning and accommodate diverse learning styles. In addition, technology facilitates educators in designing varied and innovative learning media and enables efficient access to broader learning resources. However, the review also identifies potential challenges in technology integration, particularly the risk of students' overdependence on

technological tools, which may reduce learning independence if not properly managed. Therefore, technology should be applied selectively and responsibly in accordance with pedagogical principles. Overall, this study concludes that technology can enhance the quality of elementary science learning when integrated thoughtfully. Strengthening students' scientific reasoning, logic, and critical thinking remains essential in the digital era to ensure that technology functions as a supportive tool rather than a substitute for meaningful learning processes. Keywords: Digital Learning Resources Educational Technology Elementary School Science Learning Media Student Engagement Corresponding Author: Lukmanul Hakim Sultan Ageng Tirtayasa University Email: lukman.nulhakim@untirta.ac.id

https://doi.org/10.58421/misro.v4i4.913 1478 1. INTRODUCTION The development of science and technology continues to advance rapidly and has a significant impact on various sectors, particularly education. Scientific advancement encourages the emergence of new tools and innovations as part of the modernization process, which transforms learning approaches and environments [1]. The development of knowledge supports the creation of effective learning media and learning resources that integrate digital technology and idea-based learning, enabling more flexible access to information anytime and anywhere [2]. Through digital technology, users can more easily access and obtain information whenever and wherever it is needed. The integration of science and digital technology increasingly shapes learning activities, leading to more structured, interactive, and technology-oriented learning processes [3]. Education, as a fundamental process in both developed and developing countries, must continuously adapt to technological advancements to remain relevant and effective. In the context of science education at the elementary level, technology has the potential to facilitate conceptual understanding through visualization, interactivity, and contextual learning experiences [4]. However, in practice, the utilization of technology as learning media and learning resources in science education has not yet been optimized [5]. Several critical aspects contribute to

this condition. First, teachers' digital competence remains uneven, particularly in terms of selecting, designing, and integrating technology-based learning media that align with instructional objectives. Second, the variety of learning media used in science learning is often limited, resulting in repetitive and less engaging learning experiences. Third, supporting infrastructure, such as access to digital devices and stable internet connectivity, is not always adequately available or evenly distributed. Fourth, suboptimal technology integration may reduce student engagement, as learning activities fail to fully encourage active participation, exploration, and interaction [6]. Furthermore, not all educators possess adequate skills in integrating digital technology into science learning. As a result, technology is often used merely as a supporting tool rather than being maximized as an interactive and meaningful learning medium and resource [7]. From a theoretical perspective, the integration of technology in learning media and resources should be grounded in established learning theories and technology integration frameworks [8]. Multimedia learning theory emphasizes that students learn more effectively when information is presented through a combination of visual and verbal elements, provided that cognitive load is well managed [9]. In addition, constructivist learning theory highlights the importance of active learner involvement in constructing knowledge through meaningful learning experiences [10]. Gamification principles further support student motivation and engagement by incorporating game elements such as challenges, feedback, and rewards into learning activities [11]. Meanwhile, technology integration frameworks such as the Technological Pedagogical Content Knowledge (TPACK) model emphasize the need for a balanced integration of content knowledge, pedagogy, and technology to achieve effective learning outcomes [12].

https://doi.org/10.58421/misro.v4i4.913 Previous research has highlighted that learning media play an essential role in transferring knowledge and creating enjoyable learning experiences that encourage active student participation [13]. Learning media function as tools, methods, and strategies that support communication and collaboration

between teachers and students [14]. Other studies indicate that teaching materials are a crucial component of the learning process and should be developed in line with current digital advancements [15]. The development of digital-based teaching materials such as e-modules and student worksheets (LKPD) using contextual approaches has been proven to improve learning outcomes effectively and efficiently, particularly in science education [16]. Despite the growing body of literature on technology integration in science learning, most studies focus primarily on formal educational settings. Research that examines the role of technology as learning media and learning resources within nonformal educational institutions remains limited. This gap is particularly evident in tutoring institutions, where learning processes tend to be more flexible and adaptive to students' needs. Therefore, this study offers novelty by focusing on the role of technology in science learning media and learning resources within the context of the BiMbeLcc tutoring institution. Rather than positioning BiMbeLcc as a direct research subject, this study examines relevant literature to identify patterns, strategies, and best practices in technology integration, with implications for science learning at BiMbeLcc. Based on the above discussion, this study aims to examine and describe the role of technology in science learning media and learning resources through a qualitative descriptive literature review. The findings are expected to provide conceptual insights and practical implications for improving the effectiveness of science learning processes, particularly for fourth-grade learners at BiMbeLcc, through thoughtful and pedagogically grounded technology integration. 2. METHOD This study employed a qualitative research design using a literature-based approach. The study was conducted through a systematic review and analysis of relevant scholarly literature to obtain an in-depth understanding of concepts, theories, and empirical findings related to the role of technology in science learning media and learning resources at the 14 elementary school level. The literature search was carried out using national and international databases, including Google Scholar, ERIC, and Sinta-indexed journals. The search employed a combination of keywords and search strings such as technology in science learning, digital learning media, elementary science education, science learning

resources, and educational technology. The publication period was limited to studies published between 2015 and 2024 to ensure the relevance and currency of the reviewed literature. The inclusion criteria for this study were as follows: (1) peer-reviewed journal articles, conference proceedings, and scholarly books; (2) publications discussing the use of technology as learning media or learning resources in science education; (3) studies focusing on elementary education or relevant to the characteristics of fourth-grade students; and (4) publications written in English or Indonesian. The exclusion criteria

https://doi.org/10.58421/misro.v4i4.913 1480 included: (1) non-academic publications such as opinion articles or popular media; (2) studies not related to science learning or technology integration in education; and (3) publications with unclear or insufficient methodological descriptions. The literature screening process was conducted in several stages. First, titles and abstracts were reviewed to identify studies relevant to the research objectives. Articles that met the initial criteria were then subjected to full-text review to ensure content relevance and methodological adequacy. A descriptive quality appraisal was conducted by considering the clarity of research objectives, the appropriateness of research methods, and the relevance of findings to elementary science learning contexts. The selected literature was analyzed using qualitative descriptive analysis. The analysis process involved data reduction, data organization, and interpretation to identify key themes related to the role of technology in science learning media and learning resources in the era of Society 5.0. The findings were then synthesized to provide a comprehensive understanding of how technology supports effective science learning processes. 5 The results of the review were interpreted contextually as implications for fourth-grade learners at the BimbelCC tutoring institution in Cilegon, without involving direct data collection from students. 3. RESULTS AND DISCUSSION 3.1. Results Based on the previous discussion, this section specifically describes how technology plays a role in science education at the 2 elementary school level. Education is a continuous process experienced by individuals to develop

independence and personal growth in order to sustain and improve their quality of life; therefore, becoming an educated individual is essential [17]. Education systems also reflect how learning is organized and delivered within a country, influenced by social and institutional structures [18]. In Indonesia, education is categorized into three main types: formal, informal, and non-formal education. Formal education includes kindergarten, elementary school, junior high school, senior high school, and higher education. Within this system, science education encompasses subjects such as mathematics, physics, biology, and chemistry at various levels. Science itself represents a systematic classification of empirical findings into organized bodies of knowledge. At the elementary school level, science learning emphasizes understanding natural phenomena through inquiry-based activities, including experiments on the forms of matter and their transformations. In the current Society 5.0 era, digital technology is increasingly utilized as a supporting tool for learning activities across all educational levels. Technology serves not only as a medium for delivering content but also as an enabler of interactive and student-centered learning experiences. Educational technology fulfills several important functions in science learning, including supporting instructional design, providing access to diverse information sources, facilitating students' expression of ideas and arguments, increasing productivity and optimizing learning activities, and contributing to the achievement of educational goals [19]. The availability of digital learning applications exemplifies how technology supports more productive and effective learning processes.

https://doi.org/10.58421/misro.v4i4.913 One practical example of technology integration is the use of the Canva application to design educational game-based learning media, such as a modified snakes and ladders game. This digital learning tool incorporates question cards, challenge cards, praise cards, and reflective activities that encourage students to identify their own strengths as well as those of their peers. Such interactive media create a fun, engaging, and highly participatory learning environment, which enhances students' motivation and active involvement in science learning. Educational

technology can be understood as a systematic approach to designing, implementing, and evaluating learning processes through the integration of technological resources and human potential. Educational technology refers to both conceptual and practical efforts aimed at supporting learning activities by improving performance through the organization, utilization, and management of information using appropriate technological tools [20]. In this context, educational technology functions as a bridge that connects instructional goals with effective learning strategies, resulting in optimized and meaningful learning outcomes. Another prominent example of technology use in elementary science learning is the application of Kahoot as a digital assessment and learning platform. Analysis of various relevant studies indicates that the use of Kahoot generally leads to improved student learning outcomes. Several studies report statistically significant differences between pretest and post-test scores, suggesting enhanced student understanding after the implementation of this application. Statistical analyses in the reviewed studies further confirm that Kahoot has a significant positive effect on students' academic performance. Similarly, research examining the use of YouTube as an internet-based learning medium demonstrates that this platform can significantly enhance students' knowledge. Videobased learning provides concrete visual representations that help students better grasp abstract concepts and improve their confidence in communicating ideas, as they develop a stronger conceptual understanding of the subject matter. Overall, the reviewed findings confirm that technology-based media such as YouTube, Canva, and Kahoot play a crucial role in improving the quality of learning processes at the elementary school level. These technologies not only support students' comprehension of learning materials but also increase motivation, engagement, and active participation. The existing literature highlights that technology integration in learning activities offers multiple benefits, including broader access to learning resources, increased enthusiasm for learning, and the development of digital skills that are essential in today's modern era. Technology facilitates enjoyable and active learning experiences while allowing students to learn according to their individual pace and learning styles. Moreover, technology expands

learning opportunities and enables students to actively grow and develop in alignment with their educational needs. 3.2. Discussion The findings of this study indicate that technology plays a significant role in improving the quality of science learning media at the elementary school level, particularly for fourth-grade students. These results are consistent with Nulhakim [21] who argued that the use of learning media can enhance students' critical thinking skills, including the ability to analyze, evaluate, and draw accurate conclusions. Technology-based media,

https://doi.org/10.58421/misro.v4i4.913 especially YouTube videos, are effective in presenting scientific concepts visually and contextually, thereby supporting students' understanding of abstract science material. This finding also supports of Lestari et al. [22] assertion that web-based learning media are highly feasible for use in instructional activities. Interactive learning through multimedia enables students to explore learning content more actively and meaningfully. Compared to conventional teaching approaches, digital media provide richer learning experiences by integrating text, images, audio, and animations into a single learning environment, which enhances students' cognitive engagement. Furthermore, the results demonstrate that the use of technology-based learning media such as Kahoot and Canva significantly increases students' motivation and engagement. This is evidenced by the observable improvement in learning outcomes, as reflected in differences between pre-test and post-test scores reported in previous studies. These findings align with earlier research showing that gamification elements and visually appealing digital designs contribute to enjoyable learning environments and stimulate students' interest in learning. Thus, technology functions not merely as a tool for content delivery but as a medium that fosters meaningful and engaging learning experiences. Technology also provides students with opportunities to learn in ways that are enjoyable, active, and aligned with their individual learning styles [23]. The flexibility of technology allows students to access learning materials anytime and anywhere, thereby supporting independent and self-paced learning [24]. This

result corroborates previous research emphasizing that technology-enhanced learning promotes personalized learning and increases students' confidence in mastering academic content. For fourth-grade elementary students, technology serves as both an instructional delivery tool and a motivational medium. The findings reveal that technology significantly expands access to learning resources. Students are able to utilize various digital materials, such as e-books, instructional videos, and other educational resources, through digital devices. This broader access enables students to deepen their knowledge beyond classroom instruction and encourages independent learning, consistent with findings from earlier studies on digital resource accessibility. In addition, technology enhances students' engagement in learning activities. Technology-based media such as educational applications, interactive videos, and digital learning games—such as snakes and ladders, Quizizz, and Kahoot—create enjoyable learning environments and promote active participation [25]. Through real-time responses, positive competition, and immediate feedback, students become more motivated and enthusiastic about learning [26]. These results are in line with previous studies highlighting interactivity as a key factor in increasing student participation. Technology also supports student-centered learning by allowing learners to adjust learning activities according to their abilities, interests, and learning preferences [27]. Various learning platforms enable students to practice skills at their own pace without excessive pressure, which contributes to increased self-confidence and gradual conceptual understanding. Moreover, technology facilitates collaborative learning. Platforms such as Google Classroom, Zoom, Google Meet, and Microsoft Teams enable students to share ideas, engage in discussions, and complete group projects, even when they are not

 physically in the exact location. This collaborative learning environment not only enhances academic performance but also develops students' social and emotional skills, which are essential during the elementary school years [28]. The integration of technology in learning significantly increases

student engagement by fostering active interaction during instructional activities. Interactive multimedia, visually appealing designs, and online learning activities create dynamic and stimulating learning environments. The use of gamification elements and incentive systems within educational applications further strengthens students' motivation to participate in learning actively. These findings reinforce the view that teachers play a crucial role in the successful integration of technology into the learning process. Teachers are key agents in creating high-quality learning experiences, and teachers' technological competencies strongly influence the development of students' scientific literacy [29]. Through effective technology integration, educators can establish more flexible, personalized, and adaptive learning environments that respond to students' needs [30]. Overall, this discussion demonstrates that the findings of this study are consistent with previous research, underscoring the importance of technology integration in elementary science education. Technology not only enhances students' conceptual understanding and learning outcomes but also increases motivation, active engagement, collaboration, and digital literacy skills that are essential for students in the digital era. Despite the comprehensive findings, this study has several limitations. First, the evidence is entirely literature-based, meaning no direct empirical data were collected from students at BimbelCC. Second, the contextual mapping to fourth-grade learners at BimbelCC is indirect, based on literature interpretation rather than field observations. Consequently, the generalizability of the findings should be considered with caution. While the study provides valuable conceptual insights and practical implications, future research involving direct empirical investigation at non-formal educational institutions like BimbelCC is recommended to validate and extend these findings. 4. CONCLUSION Based on the findings of this study, technology plays a crucial role in supporting elementary science learning by enhancing both the learning process and outcomes. The integration of modern technologies such as Canva, Kahoot, YouTube, Google Chrome, and artificial intelligence positively contributes to the development of students' scientific understanding, critical thinking, and collaborative skills. In addition, technology facilitates teachers in

accessing a broader range of learning resources and designing more varied, interactive, and engaging learning media. However, the study also highlights certain challenges in technology use. Excessive reliance on technological tools may reduce students' learning independence and motivation, potentially leading to passive learning behaviors. Therefore, both teachers and students are encouraged to use technology wisely and selectively, emphasizing its educational benefits while minimizing negative impacts. Several practical implications can be drawn for tutoring contexts. First, YouTube can be used to visualize scientific concepts, followed by inquiry-based worksheets to

https://doi.org/10.58421/misro.v4i4.913 1484 deepen understanding and promote active exploration. Second, Kahoot should be employed for formative assessments, not merely as a competitive game, allowing teachers to monitor learning progress and provide immediate feedback. Third, Canva can be used for student-created artifacts such as posters or concept maps, enhancing reasoning, creativity, and ownership of learning. Fourth, the use of technology should be balanced with discussion, hands-on activities, or non-digital tasks to maintain student engagement, autonomy, and critical thinking. Overall, when applied thoughtfully and responsibly, the integration of technology in science education can significantly improve the quality of learning. Its effectiveness is maximized when guided by pedagogical principles and supported by both educators and learners in a purposeful and balanced manner.

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REFERENCES [1] A. F. Daulai, 'Modernisasi Pendidikan Pada Muhammadiyah', Tazkiya J. Pendidik. Islam, vol. 8, no. 2, Jan. 2020, doi: 10.30829/taz.v8i2.576. [2] A. Siti, F. R. Ayu, E. W. Anggitae. W. Anggita, and Astutik Choli, 'Pemanfaatan teknologi digital sebagai media pembelajaran interaktif untuk siswa sekolah dasar', J. Sade. Publ. Ilmu Pendidik. Pembelajaran Dan Ilmu Sos., vol. 3, no. 1, pp. 388–401, 2024. [3] L. Naibaho and D. A. Rantung, 'Peran teknologi dalam proses pembelajaran', J. Kolaboratif Sains, vol. 7, no. 1, pp. 444–448, 2024. [4] D. R. N. Jannah and I. R. W. Atmojo, 'Media Digital dalam Memberdayakan Kemampuan Berpikir Kritis Abad 21 pada Pembelajaran IPA di Sekolah Dasar', J. Basicedu, vol. 6, no. 1, pp. 1064–1074, Jan. 2022, doi: 10.31004/basicedu.v6i1.2124. [5] N. Utami and I. R. W. Atmojo, 'Analisis Kebutuhan Bahan Ajar Digital dalam Pembelajaran IPA di Sekolah Dasar', J. Basicedu, vol. 5, no. 6, pp. 6300–6306, Dec. 2021, doi: 10.31004/basicedu.v5i6.1716. [6] H. Fuadi, A. S. Melita, S. Siswadi, J. Jamaluddin, and A. Syukur, 'Inovasi LKPD dengan Desains Digital Sebagai Media Pembelajaran IPA di SMPN 7 Mataram pada Masa Pandemi Covid-19', J. Ilm. Profesi Pendidik., vol. 6, no. 2, pp. 167–174, July 2021, doi: 10.29303/jipp.v6i2.184. [7] K. A. Astiti, A. Supu, I. W. Sukarjita, and V. Lantik, 'Pengembangan Bahan Ajar IPA Terpadu Tipe Connected Berbasis Pembelajaran Berdiferensiasi Pada Materi Lapisan Bumi Kelas VII', J. Pendidik. Dan Pembelajaran Sains Indones. JPPSI, vol. 4, no. 2, pp. 112–120, Oct. 2021, doi: 10.23887/jppsi.v4i2.38498. [8] R. L. Bell, J. L. Maeng, and I. C. Binns, 'Learning in context: Technology integration in a teacher preparation program informed by situated learning theory', J. Res. Sci. Teach., vol. 50, no. 3, pp. 348– 379, 2013, doi: 10.1002/tea.21075. [9] J. R. Bajracharya, 'Technology Integration Models and Frameworks in Teaching and Training', J. Train. Dev., vol. 6, no. 01, pp. 3–11, Dec. 2021, doi: 10.3126/jtd.v6i01.41674.

https://doi.org/10.58421/misro.v4i4.913 1485 [10] A. A. Omilabu, O. O. Olusanya, and A. O. Adebare, ‘Enhancing Educational Technology Integration: A Comprehensive Framework’, J. Speacialised Prof. Educ., vol. 7, no. 1, pp. 1–6, Aug. 2023. [11] M. Woldemariam, A. Ergado, and W. Jimma, ‘Factors influencing effective integration of educational technology in the colleges of teacher education in Ethiopia: A constructivist grounded theory’, Australas. J. Educ. Technol., vol. 41, no. 2, pp. 50–70, Aug. 2025, doi: 10.14742/ajet.9993. [12] M. L. Schad, M. D. Greene, and M. Jones, ‘A Review of Theory, Theoretical and Conceptual Frameworks in Educational Technology’, presented at the International Journal on E-Learning, Association for the Advancement of Computing in Education (AACE), Apr. 2021, pp. 187–198. Accessed: Dec. 22, 2025. [Online]. Available: https://www.learntechlib.org/primary/p/218631/ [13] C. Indriani, ‘Pengaruh Penggunaan Aplikasi Canva dalam Media Pembelajaran IPA di Sekolah Dasar’, J. Inov. Eval. Dan Pengemb. Pembelajaran JIEPP, vol. 4, no. 2, pp. 330–339, Aug. 2024, doi: 10.54371/jiepp.v4i2.505. [14] Y. G. Tanesib, K. A. Astiti, and A. S. Hali, ‘Pengembangan Bahan Ajar Ipa Terpadu Tipe Connected Pada Materi Pencemaran Lingkungan Berbasis Pembelajaran Berdiferensiasi’, J. Pendidik. Dan Pembelajaran IPA Indones., vol. 12, no. 3, pp. 122–128, Dec. 2022, doi: 10.23887/jppii.v12i3.54705. [15] R. R. Suryaningrat, B. Basrowi, and K. Rahmadani, ‘Pengembangan Media Pembelajaran Interaktif pada Pembelajaran IPA berbasis Website di SMPN 6 Cilegon’, J. PTI Pendidik. DAN Teknol. Inf. Fak. Kegur. ILMU Pendidik. Univ. PUTRA Indones. YPTK PADANG, pp. 62–68, Oct. 2023, doi: 10.35134/jpti.v10i2.175. [16] R. Pratama, M. Alamsyah, M. F. Siburian, G. Marhento, and J. Jupriadi, ‘Pemanfaatan Canva Sebagai Media Pembelajaran IPA di Madrasah Aliyah’, EduBiologia Biol. Sci. Educ. J., vol. 3, no. 1, pp. 40– 46, Jan. 2023, doi: 10.30998/edubiologia.v3i1.16070. [17] F. Salsabila and A. Aslam, ‘Pengembangan Media Pembelajaran Berbasis Web Google Sites pada Pembelajaran IPA Sekolah Dasar’, J. Basicedu, vol. 6, no. 4, pp. 6088–6096, 2022, doi: 10.31004/basicedu.v6i4.3155. [18] A. W. Syakhrani, A. Maulani, A. Saubari, M. Yusuf, and M. Ilham, ‘Sistem Pendidikan di Negara Maju Amerika Serikat’, Adiba J. Educ., vol. 2, no. 3, pp. 311–317, 2022. [19] U. H.

Salsabila, D. S. Riyadi, U. A. Farhani, and M. R. Arrozaq, ‘Peran Teknologi Pendidikan Dalam Pembelajaran Pai Di Masa Pandemi Covid-19’, EDISI, vol. 3, no. 3, pp. 489–499, 2021. [20] K. Prayoga, ‘Peran Teknologi Dan Tantangan Dalam Pembelajaran Sains Di Masa Pandemi Covid-19’, Konf. Integrasi Interkoneksi Islam Dan Sains, vol. 4, no. 1, pp. 340–344, 2022. [21] L. Nulhakim, ‘Pengembangan Media Video Berbasis Powtoon Pada Mata Pelajaran Ipa Di Kelas V’, J. Pendidik. Sains Indones., vol. 8, no. 2, pp. 269–279, Aug. 2020. [22] E. Lestari, L. Nulhakim, and D. I. Suryani, ‘Pengembangan e-modul berbasis flip pdf professional tema global warming sebagai sumber belajar mandiri siswa kelas VII’, PENDIPA J. Sci. Educ., vol. 6, no. 2, pp. 338–345, 2022. [23] D. Oktafiani, L. Nulhakim, and T. P. Alamsyah, ‘Pengembangan media pembelajaran IPA berbasis multimedia interaktif menggunakan Adobe Flash pada Kelas IV’, Mimb. PGSD Undiksha, vol. 8, no. 3, pp. 527–540, 2020. [24] E. Andriana, A. Hasani, L. Nulhakim, and P. N. Rasendriya, ‘Optimalisasi Kinerja Guru Dalam Mengembangkan Keterampilan Literasi Sains Kelas IV SDN Karang Tengah 07’, J. Elem. Edukasia, vol. 6, no. 4, pp. 1828–1834, 2023. [25] I. N. Rahman, S. Hidayat, and L. Hakim, ‘Pengembangan LKPD Berbasis Pembelajaran Kontekstual Untuk Meningkatkan Hasil Belajar’, JTPPm J. Teknol. Pendidik. Dan Pembelajaran Edutech Intructional Res. J., vol. 7, no. 1, 2020, Accessed: Dec. 17, 2025. [Online]. Available: https://jurnal.untirta.ac.id/index.php/JTPPm/article/view/10678 [26] N. S. Alifa, S. Hanafi, and L. Nulhakim, ‘Pengembangan media video pembelajaran animasi berbasis kinemaster untuk meningkatkan pemahaman pada mata pelajaran IPA siswa kelas IV SDN kedaleman IV’, JTPPm J. Teknol. Pendidik. Dan Pembelajaran Edutech Intructional Res. J., vol. 8, no. 2, 2021, Accessed: Dec. 17, 2025. [Online]. Available: https://jurnal.untirta.ac.id/index.php/JTPPm/article/view/13125 [27] D. Pristiwanti, B. Badariah, and L. Nulhakim, ‘Kompetensi Guru Dalam Pengembangan Kurikulum Sd’, J. Pendidik. Dan Konseling JPDK, vol. 4, no. 6, pp. 10621–10625, 2022. [28] D. Pristiwanti, B. Badariah, and L. Nulhakim, ‘Kompetensi Guru Dalam Pengembangan Kurikulum Sd’, J. Pendidik. Dan Konseling JPDK, vol. 4, no. 6, pp. 10621–10625, 2022.

[29] Y. Yuliyanti, E. Damayanti, and L. Nulhakim, ‘Perkembangan kurikulum sekolah dasar di Indonesia dan perbedaan dengan kurikulum di beberapa negara’, Lingua Rima J. Pendidik. Bhs. Dan Sastra Indones., vol. 11, no. 3, pp. 95–106, 2022. [30] S. Nurfadhillah, Media pembelajaran di jenjang SD. CV Jejak (Jejak Publisher), 2021. Accessed: Dec. 17, 2025. [Online]. Available:

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