INDONESIAN JOURNAL OF EDUCATIONAL RESEARCH AND REVIEW
Volume 7 Nomor 3 2024, pp 667-678
E-ISSN: 2621-8984; P-ISSN: 2621-4792
DOI: https://doi.org/10.23887/ijerr.v7i3.82242

Effectiveness of Using Animation Videos in Science Learning in Elementary Schools: A Systematic Literature Reviews

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Abstrak

Pembelajaran IPA di SD memiliki peran penting dalam membentuk rasa ingin tahu dan minat siswa terhadap sains, mengembangkan siswa berpikir kritis dan logis, membekali siswa pengetahuan dan keterampilan ilmiah yang bermanfaat untuk kehidupan sehari-hari. Penelitian ini bertujuan untuk menganalisis efektivitas penggunaan video animasi dalam pembelajaran IPA di SD melalui tinjauan literatur sistematis. Penelitian ini memakai metode Systematic Literature Review (SLR), dengan data yang diambil dari google scholar. Literatur yang dianalisis didasarkan pada artikel yang terpublikasi dari tahun 2019-2023, melalui 5 tahap. Hasil penelusuran literatur terkait tema penelitian pada tahap 1 dengan kata kunci "penggunaan video animasi" memperoleh data publikasi sebanyak 1.280 dokumen. Selanjutnya pada tahap 2 literatur dicari dengan pembatasan tahun yang memperoleh 227 dokumen dan tahap 3 penambahan kata kunci "Pembelajaran IPA" memperoleh data sebanyak 246 dokumen. Pada tahap 4 dengan literatur dicari dengan menambahkan kata kunci "sekolah dasar" memperoleh data sebanyak 197 dokumen. Kemudian tahap 5 data yang diperoleh tersebut disaring Kembali dengan pembatasan kriteria yang sesuai dengan tema penelitian. Berdasarkan hasil penelitian, maka bisa disimpulkan bahwa penggunaan video animasi terbukti efektif digunakan dalam pembelajaran IPA di sekolah dasar. Oleh karenanya, bagi para pendidik direkomendasikan untuk menggunkan media pembelajaran yang menarik dalam pembelajaran IPA supaya materi pembelajaran tersebut tersampaikan dengan baik dan efektif salah satunya dengan menggunakan video animasi.

***Kata kunci*:** *Video Animasi, Pembelajaran IPA, SD, Studi Literatur*

Abstract

Science learning in elementary schools plays a crucial role in fostering students' curiosity and interest in science, developing critical and logical thinking skills, and equipping students with scientific knowledge and practical skills applicable in daily life. This study aims to analyze the effectiveness of animated videos in enhancing science learning in elementary schools through a systematic literature review. Employing the Systematic Literature Review (SLR) method, data were sourced from Google Scholar, focusing on articles published between 2019 and 2023. The review was conducted in five stages. In the initial search using the keyword "use of animated videos," 1,280 documents were identified. Refining the search by limiting the publication years yielded 227 documents, while adding the keyword "science learning" identified 246 documents. Further narrowing with the keyword "primary school" produced 197 documents. Finally, the dataset was filtered based on alignment with the research theme. The findings reveal that animated videos are highly effective in enhancing science learning outcomes in elementary schools. These results emphasize the importance of integrating engaging instructional media, such as animated videos, to facilitate effective communication of science concepts. Educators are encouraged to incorporate such tools to create more interactive and impactful learning experiences in science education.

Keywords: Animation Videos, Science Learning, Elementary School, Literature Study

History:
Received : June 07, 2024
Accepted : September 13, 2024
Published : October 25, 2024

Publisher: Undiksha Press

1. INTRODUCTION

The integration of technology into education, particularly in science education, has gained significant momentum. Animation videos have emerged as a promising approach to enhance learning experiences among elementary school students (Abdul et al., 2024; Hanifah Salsabila et al., 2023; Rosalia et al., 2024). These videos can simplify complex scientific ideas by breaking them down into visually digestible components, which can significantly improve retention and understanding, especially for young learners with developing cognitive abilities (Sairine & Balmes, 2022; Si et al., 2020). The combination of auditory and visual stimuli in animated videos caters to multiple learning modalities, appealing to a broader

range of students. Animation videos can also represent abstract concepts in a more concrete manner, such as the water cycle or cellular division, which are often challenging for students to grasp through traditional teaching methods (Anna et al., 2022; Novita et al., 2024; Zaenab & Muh., 2023). By presenting these concepts in a more engaging and relatable format, animation videos can potentially foster a deeper understanding and stimulate curiosity, leading to an enriched learning environment.

The law of the Republic of Indonesia Number 20 of 2003, article 4, emphasizes the importance of education in setting an example, creating will, and developing students' creativity. The primary goal is to prepare students to become competent individuals, noble characters, and responsible in social life (Everton et al., 2019; Tukiran, 2023). Education equips students with skills, knowledge, and values for successful and meaningful lives. Natural science, a key subject, is also covered in education (Dilnavoz et al., 2023; Suryawati & Osman, 2018).

Natural science (IPA) is a branch of science that studies natural events, such as weather changes, water cycles, and the solar system (Maison et al., 2020; Nahed, 2021). It helps students understand the world around them and appreciate nature better. Science learning in elementary school is crucial for fostering curiosity, improving thinking abilities, equipping students with scientific knowledge and skills for everyday life, and preparing them for the next level of education (azizah, 2022; Ida & Sadarsih, 2022; Siti, 2022). It is not just about memorizing facts; it also aims to develop a young generation who is curious, critical and has basic science knowledge and skills that are useful for the future.

However, science teaching and learning process in elementary schools face challenges such as cognitive-oriented learning, abstract concepts, lack of interactive and interesting learning media, and lack of student motivation (Irwansyah et al., 2019; Miftahul et al., 2022; Rianti, 2022). These factors hinder the effective teaching and learning of science, making it crucial to address these issues to improve student engagement and understanding These challenges can have a negative impact on students, such as low understanding of science concepts, lack of interest and motivation in learning science, and low critical and creative thinking skills (Desyandri et al., 2021; Shofia et al., 2022). To overcome these problems, efforts are needed to achieve optimal science learning, such as using interactive learning media, one of which is using animated videos.

An animated video is a moving work of visual art created using animation techniques. Animation techniques can take the form of hand drawing, computer animation, stop motion, and so on. Animated videos can be used for various purposes, such as entertainment, education, advertising, arts and culture (Guglielmo, 2023; Muhammad et al., 2023). The use of interesting images, sounds, and visual effects can help students to visualize abstract concepts and make them easier to remember. This can make it easier for students to achieve a deeper understanding of science material. Animated videos have several advantages, namely they can visualize abstract shapes and make them easier for students to understand, they can make learning more interesting and interactive, they can motivate students to learn, and they can train students to learn independently. The use of animated videos also has a positive impact on improving elementary school students' learning outcomes (Evi et al., 2022; Moch et al., 2023).

Research by previous study suggests that animated videos can enhance student learning outcomes by highlighting the properties of materials and changes in object forms (Lubis et al., 2023). These videos have been proven to increase students' understanding of science concepts and interest, compared to conventional methods. However, there is limited research on the use of animated video media in elementary school science learning. Therefore, researchers want to study in more depth the use of animated videos in elementary school. Previous research found that animated videos significantly improved the

understanding of science concepts among fourth-grade elementary students compared to conventional methods (Razzaq et al., 2024). Other study also found that animated videos increased students' motivation in science subjects as they were more engaging and easier to understand than static text or images (Saptenno et al., 2019). Other found that students who learned with animated videos had better critical thinking skills compared to those who learned through traditional methods (Agustin et al., 2020).

Furthermore, previous research focus on the impact of animated videos on elementary students' interest in learning science showed that animated videos could increase students' interest in learning as they found the learning process more engaging and involving (Ismail et al., 2018). Previous study indicated that students with visual learning styles benefited more from the use of animated videos compared to students with other learning styles (Marzuki et al., 2019). Additionally, other study examined the effectiveness of animated videos in enhancing students' analytical thinking skills in science learning, the results showed that animated videos could help students develop better analytical thinking skills (Lubis et al., 2023). The use of animated videos as a learning medium to improve elementary students' science communication skills showed that animated videos could help students develop better science communication skills.

This study analyze the use of animated videos in elementary school science learning through a systematic literature review. The novelty of this study offer the benefits and concept of animated videos, previous research on their effectiveness, and the methodology of the review. The implication elementary school teachers on selecting effective animated videos, learning media developers on producing quality videos, and encourage further research on the use of digital learning media in elementary school science learning.

2. METHODS

This research uses the Systematic Literature Review (SLR) method. Systematic Literature Review (SLR) is a literature review method that is carried out systematically and structured to identify, assess and synthesize all scientific evidence relevant to a particular research topic (Suhartono, 2017). The main goal of SLR is to provide a comprehensive and objective picture of the state of knowledge about a topic, and to answer specific research questions, the approach used is descriptive qualitative. Library research, or SLR, is a research method that uses library sources such as books, scientific journals, articles and research reports to collect data and information.

The stages in the SLR method including: 1) Planning: clearly define the specific questions the research review aims to answer. This will guide the search and data selection strategy and outline the search strategy, including databases, keywords and inclusion/exclusion criteria for selecting relevant studies. Data conduct a thorough search using keywords and identification in various academic databases and relevant online sources and select studies that meet the inclusion criteria and answer the research questions. 2) Data Extraction and Analysis: collect relevant information from selected studies, such as study design, methodology, findings, and conclusions and identify patterns, trends, and answers to research questions using appropriate analysis techniques. 3) Synthesis: summarize and synthesize key findings from included studies and discuss implications of findings, identify limitations, and suggest directions for future research 4) Reporting: Prepare a comprehensive report that includes research questions, methodology, results, discussion, and conclusions. Research stages systematic literature review method is show in Figure 1.

Figure 1. Research Stages Systematic Literature Review Method

This study used the Google Scholar database to search for articles related to the research themes of "Use of Animation Video" and "Science Learning". The initial search yielded 1,280 published documents, followed by 1,010 documents from 2019-2023, 227 documents from Science Learning and 197 articles from Primary School. Researchers selected data based on criteria related to the research theme to obtain articles for a literature review. The search was conducted from 2019-2023 to 2023.

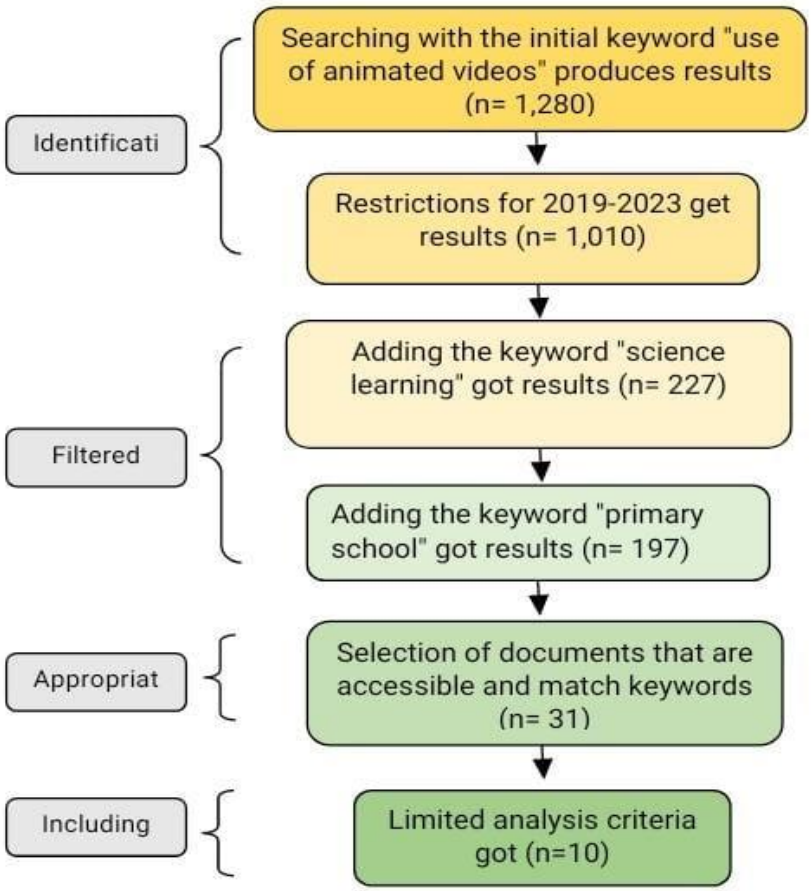

Figure 2. Inclusion Criteria regarding the Use of Animated Videos

3. RESULTS AND DISCUSSION

Results

The results of searching for literature related to the research theme in the Google Scholar database provide a clearer picture of the research results in the form of tables, charts, graphs and diagrams and discussions. Articles regarding the use of animated videos in science learning in elementary schools have been published every year starting from 2019-2023. The development of published articles related to this research theme is shown in the Figure 3.

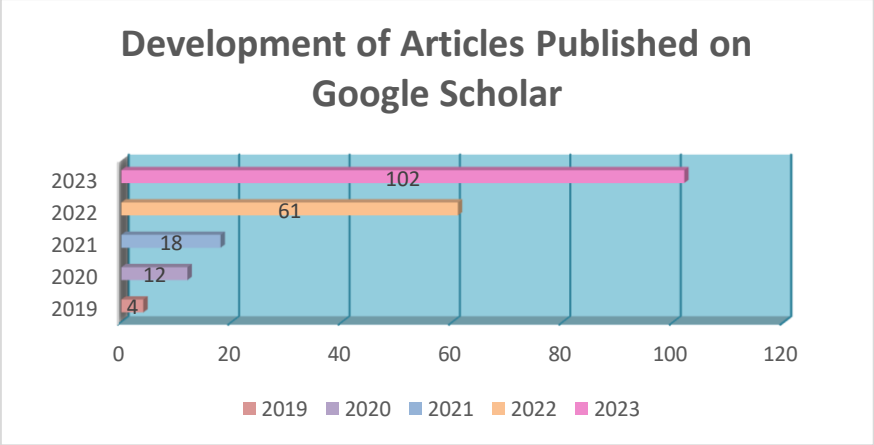

Figure 3. Development of Articles in the Google Scholar Database

In Figure 3, it can be seen that the development of article publications related to the use of animated videos in science learning in elementary school on Google Scholar has increased from 2019-2023. This is shown in 2019 and 2020, there were 4 articles and 12 articles published on Google Scholar, then in 2021 18 published articles were found, and this number continues to increase in 2022 and 2023, where 61 articles were found and 102 articles published on the Google database, scholar related to the research theme. In 2023, the highest number of published articles will be found on Google Scholar.

The average number of articles published in the Google Scholar database per year is 39, with 94 cited articles published between 2019-2023. The search for articles related to the research theme continues, with a graphic presentation of articles cited in the Google Scholar database for the last 5 years regarding the use of animated videos in elementary school science learning. Percentage of the number of articles cited regarding the use of animated video in science learning in elementary school is show in Figure 4.

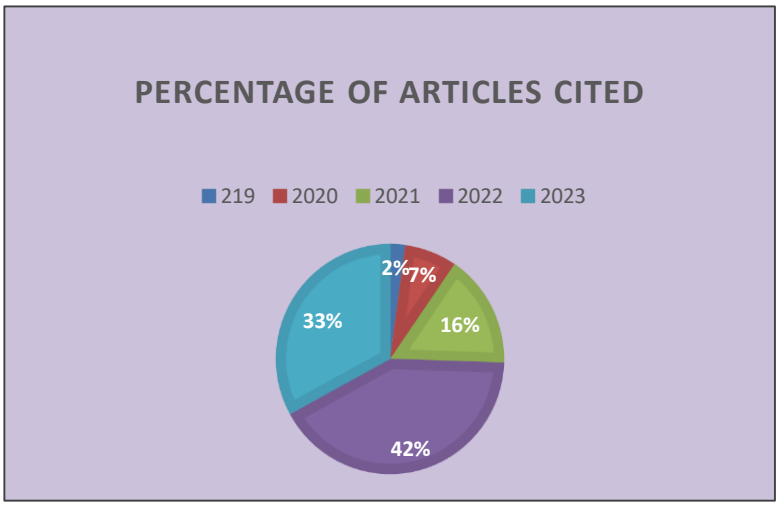

Figure 4. Percentage of the Number of Articles of Animated Video

Figure 4 shows the increasing trend of cited articles in the Google database from year to year, exceptt 2023. In 2019 the percentage of cited articles was as low as 2%. Furthermore, in 2020 the percentage of cited articles increased to 7%, the following year, namely in 2021

the percentage of cited articles jumped to 16%. In 2022, the percentage of cited articles will reach its peak, namely 42%. Finally, in 2023, the percentage of cited articles decreased slightly to 33%.

Based on a literature search related to the use of animated videos in science learning in elementary schools, 1,280 articles were found using the keyword "use of animated videos" in the Scholar database, 1,010 articles focused on the last 5 years (2019-2023). Furthermore, by adding the keyword "science learning", 227 articles were found and limited to adding the keyword "primary school", 197 articles were found. Of the 197 articles discussing the effectiveness of animated videos in elementary school science learning, 10 articles were selected for review. The results of a review of 10 articles related to the use of animated videos in science learning in elementary schools are presented in Table 1.

Table 1. The Results of a Review Articles of Animated Videos

Article Title & Author	Article Identity	Research Findings	Research Result
The Effect of Using Zoom Meeting-Based Animation Video Learning Media on Primary School Students' Interest and Science Learning Outcomes. (Anna et al., 2022)	Basicedu Journal, volume 5 number 4 2022 pages 1940 - 1945	Learning outcomes using animated video learning media have increased very well, while using other media used by teachers, science learning scores remain the same as before.	The results of the research show that the use of animated video media increases students' interest in learning, then influences the science scores of students in classes VA and VB at SDN Kalisari 01, so that it has a good impact on increasing interest in learning and improving science learning outcomes.
The Effect of Using Animation Videos for Science Learning on Student Learning Outcomes (Amalia, 2022)	Journal of Basic Education and Social HumanitiesVol. 2, No.2 December 2022, pages 289-299	Animated videos can make it easier for students to understand science learning material and can increase students' interest in learning.	The research results show that animated videos in science learning can improve student learning outcomes and help students understand learning material.
Implementation of animated video-based science learning to increase elementary school students' interest in learning (Barbara & Bayu, 2021)	Pendas: Scientific Journal of Basic Education, volume 08 number 03, December 2021	With the help of animated videos, students will be easy to observe and will not need a long time to understand science material and the use of animated videos also makes science more meaningful.	The research results show that animated video learning materials in science learning are very good for increasing students' interest in learning, because the characteristics of elementary school students imitate, participate and are very interested in animated cartoons.
The Influence of Using Animation Videos on Students'	Journal of Elementaria Edukasi,	The animated video media that was applied to	The research results showed that before the use of animated video media,

Article Title & Author	Article Identity	Research Findings	Research Result
Interest in Learning on the Theme of Animal Movement Organs in Class V of Elementary Schools (Oates, 2019)	Volume 6, No. 2, June 2019, pages 398-407	experimental class students received significant final results compared to the results before the application of animated video media in science learning.	there was no significant difference in students' initial abilities between the experimental and control classes. However, after implementing animated video media, students' final abilities and interest in learning science material in the experimental class showed a significant increase compared to the control class.
The Influence of Animation Video Learning Media on Students' Understanding and Learning Motivation in Class V Science Subjects UPTD SDN Tanjung Bumi 04 (Astafiria & Bayu, 2021)	Pendas: Scientific Journal of Basic Education, volume 08 number 01, June 2023	There is a difference in average understanding between students who use animated videos and students who do not use animated videos in science learning.	The results of this research show that there is an influence of the use of animated video learning media on students' understanding and learning motivation in science subjects in elementary schools.
Use of Strategy Guide Note Taking Assisted by Motion Graphic Animation Videos on Science Material at SDN 12 East Pontianak (Berkup, 2014)	Journal of Scientific Work of Elementary & MI Educators and Practitioners (JKIPP), Vol. 2 numbers 2, pages 137-143	The average pretest result for the control class was 67.976, while for the experimental class it was 75.35. Meanwhile, the control class post-test was 76.68, and the experimental class was 89.59.	The results of the research show that there is an influence of the Guide Note Taking strategy assisted by motion graphic animated video media on students' science learning outcomes, namely 0.60 in the medium category.
Analysis of Innovative Animation Videos in Science Learning During the Covid 19 Pandemic (Ratnaningrum et al., 2021)	Synectic Journal Volume 4, Number 2 2021, pp. 188-195	Based on the results of questionnaires from all class V students, it shows that the application of animated video media in science learning during the Covid-19 pandemic is efficient. The results of many students' answers showed a positive	The research results show Science learning using animated video media by the class V teacher is said to be effective and allows students to understand the science learning material presented by the teacher and students appear more enthusiastic in studying and learning the science material.

Article Title & Author	Article Identity	Research Findings	Research Result
		response to the application of animated video media.	
Improving Science Learning Outcomes Material on Changes in Form of Objects Using Animation Videos for Class IV Students at SDK 077 Kewapante (Zulherman et al., 2021)	Journal on Education Volume 05, No. 03, March-April 2023, pp. 6681-6687	The results of the pre-test cycle I with an average of 39.9, increased to the results of the post-test cycle I where the average score was 81.8 and the percentage of completeness was 51.3%, while in cycle II there was an increase with the average score of students being 93.2 and the completion percentage is 100%.	The research results show that the learning process using animated videos is possible improve student learning outcomes in science subjects.
Stad Learning Model Combined with Animation Videos to Improve Learning Outcomes of Human Respiratory System Concepts for Class V Students of State Elementary Schools Practice I Ambon (Sekarini, 2022)	Pedagogika: Journal of Pedagogics and Educational Dynamics. Vol 10, No.1, April 2022 (80-88)	In the practical data results, the Minimum Completeness Criteria was around 36.67%, in cycle I it increased to 56.66% and in cycle II the student's KKM was 83.33%.	The research results s application of the Student Teams Achievement Division (STAD) learning model combined with animated videos can increase learning motivation and learning outcomes for Class V students at State Elementary School Training I Ambon regarding the human respiratory system.
The Effect of Animation Videos on Knowledge of the Photosynthesis Process in Grade IV Elementary School Students (Zulherman et al., 2021)	Scientific Journal of Educational Vehicles, February 2023, 9 (3), 494-501	The students' pre-test data results before using the animated video had an average score of 58.8 and after using the animated video the post-test results averaged 72.	The research results show there is an influence in the use of animated videos on the knowledge of the photosynthesis process in class IV D students at SDN 1 Citalang. The use of these animated videos has been quite effective in the learning process in class because they look interested.

Base on Table 1, the 10 articles that have been analyzed and reviewed, the researchers found several findings. Research has been found regarding the use of animated videos in science learning in elementary schools starting from 2019-2025. The use of animated videos in science learning in elementary schools has been proven to be able to improve students' learning outcomes, motivation, interests, activities and critical thinking abilities. The use of animated videos has been proven to have a positive effect on elementary school science learning, students find it easier to understand science material explained by teachers through animated video media.

Discussion

Based on the research results above, several studies show that the use of animated video media in science learning can increase student interest in learning and learning outcomes. Previous research show that animated videos can increase interest in learning and learning outcomes of science students (Guglielmo, 2023; Muhammad et al., 2023). This is shown by an increase in learning outcomes in the post test, apart from that the use of animated videos can make it easier for students to understand the lesson material. Furthermore, animated videos can increase interest in learning and final abilities of science students (Zulherman et al., 2021). This is indicated by the response of students who feel interested when learning using animated videos and after implementing animated videos in experimental classes there is a significant impact on students' science learning outcomes in that class. According to previous study there is a significant influence between the use of animated video media on students' understanding and learning motivation in science subjects (Hadi et al., 2022).

The results of research prove that the motion graphic animation video media improves the science learning outcomes of students in the medium category (Anna et al., 2022). The use of animated video media in the science learning process is effective and helps students understand the material, this is addressed by the results of the student questionnaire who gave positive responses and looked more enthusiastic when learning in class using animated videos. Learning with animated videos improves learning outcomes and learning motivation for science students which is aimed at increasing the average score of students in cycle II (Desyandri et al., 2021; Shofia et al., 2022). Furthermore, the use of animated videos had a positive impact on class IV students' knowledge about photosynthesis, which is aimed at increasing the results of students' pretest and posttest data in that class.

Based on the explanation above, overall, there is strong evidence that animated video media can be a useful tool for improving science learning in elementary schools. This media can help students understand the material better, increase learning motivation, and improve learning outcomes. Furthermore, animated video media can be an effective tool for improving science learning. Apart from that, the use of animated videos makes students more interested and enthusiastic in participating in science learning.

4. CONCLUSION

Based on the explanation above, it can be concluded that the use of animated video-based learning media has proven to be effective in science learning in elementary schools, both in high and low classes. The use of animated videos has a positive impact on students' science learning outcomes in elementary school. Apart from that, the use of animated videos in science learning can increase students' activity, motivation, interest and critical thinking abilities in these learning activities. Elementary school students' understanding of science learning material increases when using animated videos. Therefore, it is recommended for

educators to use interesting learning media in science learning so that the learning material is conveyed well and effectively, one of which is by using animated videos.

5. REFERENCES

Abdul, G., Bin, M., Din., O., Bin, M., Din., I., Tohyala., R., Taher., M., Azizul, R., Bin, Z., Popoola, K., & Hamed. (2024). 11) Modern Technology of the Education: A Bibliometric Analysis. *International Journal of Academic Research in Business & Social Sciences*. https://doi.org/10.6007/ijarbss/v14-i1/20596.

Agustin, Y., Oktavia, B., Alizar, & Rahadian, Z. (2020). *Critical Thinking Ability and Student Learning Outcomes Through the STEM-5E (Bybee) Approach in Chemistry Learning About Molecular Shapes*. *20*(2), 265–272. https://doi.org/10.52155.

Amalia, I. N. (2022). Improving Learning Interest Of Elementary School Students Through Indonesian Language Learning Animation Videos. *International Journal Of Elementary School*, *6*(3), 664–671. https://doi.org/10.23887/ijee.v6i4.47423.

Anna, S.-L., David, A., & Manuel, I. (2022). The Effect of an Instructional Intervention Based on the Use of Video-Worked Examples to Promote Elementary Students' Science Process Skills. *International Journal of Education in Mathematics, Science and Technology*. https://doi.org/10.46328/ijemst.2158.

Astafiria, N. S., & Bayu, G. W. (2021). Digital Learning Media Assisted by Quizizz Application (METALIQ) on Science Content of Ecosystem Topic for Sixth Grade Elementary School. *Jurnal Ilmiah Sekolah Dasar*, *5*(3), 485. https://doi.org/10.23887/jisd.v5i3.39539.

azizah, ismaiyah. (2022). *The nature-based school curriculum: A solution to learning-teaching that promotes students*. https://doi.org/10.21831/cp.v41i3.47903.

Barbara, N. K. R., & Bayu, G. W. (2021). Powtoon-Based Animated Videos as Learning Media for Science Content for Grade IV Elementary School. *International Journal of Elementary Education*, *6*(1), 29–37. https://doi.org/10.23887/ijee.v5i4.39821.

Berkup, S. B. (2014). Working with generations X and Y in generation Z period: Management of different generations in business life. *Mediterranean Journal of Social Sciences*, *5*(19), 218. https://doi.org/10.5901/mjss.2014.v5n19p218.

Desyandri, D., Yeni, I., Mansurdin, M., & Dilfa, A. H. (2021). Digital Student Songbook as Supporting Thematic Teaching Material in Elementary School. *Jurnal Ilmiah Sekolah Dasar*, *5*(2), 342. https://doi.org/10.23887/jisd.v5i2.36952.

Dilnavoz, S., Feruza, S., & Jasmina, K. (2023). Education is an important factor in human and country development. *Current Research Journal of Pedagogics*. https://doi.org/10.37547/pedagogics-crjp-04-01-04.

Everton, de, Souza., M., Custódio, S., Laís, S., & Santos. (2019). A contribuição do ensino de ética no desenvolvimento da competência moral de discentes em administração pública. *Education Policy Analysis Archives*. https://doi.org/10.14507/EPAA.27.4088

Evi, H., Setyarini., A., Mudiono., C., & Utama. (2022). Analisis pentingnya media dalam pembelajaran untuk meningkatkan hasil belajar ipa di sekolah dasar. *JURNAL Ilmiah Global Education*. https://doi.org/10.55681/jige.v3i2.390.

Guglielmo, S. (2023). *The use of animation in NGOs' audio-visual communication about solidarity and migration*. Media, Culture & Society. https://doi.org/10.1177/01634437231169908.

Hadi, W., Yuksafa, R., Yarmi, G., Safitri, D., Lestari, I., Suntari, Y., Umasih, Marini, A., Sudrajat, A., & Iskandar, R. (2022). Enhancement of Students' Learning Outcomes through Interactive Multimedia. *International Journal of Interactive Mobile Technologies*, *16*(7), 82–98. https://doi.org/10.3991/ijim.v16i07.25825.

Hanifah Salsabila, U., Fatimah, R. A., Anisa Indriyani, R., Dirahman, F., & Anendi, Y. (2023). Analysis of Technology Involvement in Islamic Religious Education Learning. *Borneo Educational Journal (Borju*, *5*(1), 70–77. https://doi.org/10.24903/bej.v5i1.1167.

Ida, M., & Sadarsih. (2022). *Upaya meningkatkan prestasi belajar ipa pada materi interaksi mahkluk hidup dengan lingkungannya melalui metode pembelajaran discovery learning*. https://doi.org/10.52060/pti.v3i2.983.

Irwansyah, F. S., Yusuf, Y. M., Sugilar, H., Nasrudin, D., Ramdhani, M. A., & Salamah, U. (2019). Implementation of fun science learning to increase elementary school students' skill in science and technology. *Journal of Physics: Conference Series*, *1318*(1), 12063. https://doi.org/10.1088/1742-6596/1318/1/012063.

Ismail, M. E., Utami, P., Ismail, I. M., Hamzah, N., & Harun, H. (2018). Development of massive open online course (MOOC) based on addie model for catering courses. *Jurnal Pendidikan Vokasi*, *8*(2), 184. https://doi.org/10.21831/jpv.v8i2.19828.

Lubis, R. R., Dwiningrum, S. I. A., & ... (2023). Development Powtoon Animation Video in Indonesian Language Learning to Improve Student Learning Outcomes Elementary Schools. *Journal of Computer Science, Information Technology and Telecommunication Engineering*, *4*(2). https://doi.org/10.30596/jcositte.v4i2.15990.

Maison, M., Haryanto, H., Ernawati, M. D. W., Ningsih, Y., Jannah, N., Puspitasari, T. O., & Putra, D. S. (2020). Comparison of student attitudes towards natural sciences. *International Journal of Evaluation and Research in Education*, *9*(1), 54–61. https://doi.org/10.11591/ijere.v9i1.20394.

Marzuki, Asih, E. C. M., & Wahyudin. (2019). Creative thinking ability based on learning styles reviewed from mathematical communication skills. *Journal of Physics: Conference Series*, *1315*(1). https://doi.org/10.1088/1742-6596/1315/1/012066.

Miftahul, K., Diana, E., Handayani., F., & Prima, A. (2022). *Analisis Faktor-Faktor Kesulitan Belajar Materi IPA Semester I Kelas V Sekolah Dasar. Dikdas matappa*. https://doi.org/10.31100/dikdas.v5i2.1594.

Moch, A., Cholik., S., & Tri, U. (2023). *Pemanfaatan video animasi sebagai media pembelajaran di era digital*. https://doi.org/10.29100/jipi.v8i2.4121.

Muhammad, M., Chairun, N., & Delma, S. (2023). Developing a video-animated learning media of the human skeletal system using Powtoon. *Research and Development in Education*. https://doi.org/10.22219/raden.v3i1.23315.

Nahed, A.-R. (2021). Natural Sciences Curricula and their Role in Improving the Quality of Life: Reality and Ambitions. *Journal of Research in Curriculum Instruction*. https://doi.org/10.21608/JRCIET.2021.134630.

Novita, P., Dewi., A., Tri, P., & Arif, W. (2024). The Effect of Using Water Cycle Animation Videos on the Scientific Literacy and Cognitive Learning Outcomes of Elementary School Students. *International Journal of Research and Review*. https://doi.org/10.52403/ijrr.20240231.

Oates, S. (2019). The Importance of Autonomous, Self-Regulated Learning in Primary Initial Teacher Training. *Frontiers in Education*, *4*(September). https://doi.org/10.3389/feduc.2019.00102.

Ratnaningrum, I., Nurharini, A., Supriyanto, T., Yulianto, S., & Andrijati, N. (2021). The use of "powtoon" online animation video-based education media in dance learning in primary schools during the COVID-19 pandemic. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 3701–3707. https://doi.org/10.46254/an11.20210670.

Razzaq, F., Siddiqui, A., Ashfaq, S., Bin Ashfaq, M., & Muschert, G. (2024). Assessing the impact of a video literacy program on emotional intelligence and resilience to

extremism in primary school children. *Humanities and Social Sciences Communications*, *11*(1), 1–11. https://doi.org/10.1057/s41599-024-04011-3.

Rianti, A. (2022). Efforts To Increase Learning Motivation Using Problem Based Learning Models In Integrated Ips Lessons. *Social Landscape Journal*. https://doi.org/10.56680/slj.v3i1.30927.

Rosalia, N., Yunita., M., & Nur, W. (2024). Development of Sexual Education Animation Videos to Improve Sexual Understanding and Understanding of Forms of Sexual Harassment Behavior of Yogyakarta Elementary School Students. *International Journal of Social Service and Research*. https://doi.org/10.46799/ijssr.v4i02.736.

Sairine, R., & Balmes. (2022). Technology Integration and Transformative Innovation in Education. *International Journal of Research Publications*. https://doi.org/10.47119/ijrp1001061820223743.

Saptenno, A. E., Tuaputty, H., Rumahlatu, D., & Papilaya, P. M. (2019). The improvement of learning motivation and creative thinking skills of senior high school students through modified problem based learning model. *Journal for the Education of Gifted Young Scientists*, *7*(4), 1175–1194. https://doi.org/10.17478/jegys.597519.

Sekarini, N. N. (2022). Implementation of the STAD Learning Model as an Effort to Improve Civic Education Learning Outcomes in Elementary Schools. *Journal of Education Action Research*, *6*(3). https://doi.org/10.23887/jear.v6i3.45863

Shofia, N., Deka, S., & Siti, M. (2022). *Analisis Kesulitan Belajar dalam Pembelajaran Daring Pada Muatan IPA di Sekolah Dasar*. *WASIS*. https://doi.org/10.24176/wasis.v3i1.7473.

Si, M., Tan., Z., & Abdullah. (2020). Integrating Animation with Experiential Learning Approach to Enhance Students' Engagement in the Learning Process. *International Journal of Academic Research in Progressive Education and Development*. https://doi.org/10.6007/IJARPED/V9-I4/8452.

Siti, M. (2022). *Pendekatan Pembelajaran Kontekstual Dalam Meningkatkan Pemahaman Materi Ilmu Pengetahuan Alam Pada Tingkat Sekolah Dasar*. https://doi.org/10.36418/japendi.v3i9.1148.

Suhartono, E. (2017). Systematic Literatur Review (SLR): Metode , Manfaat , dan Tantangan Learning Analytics dengan Metode Data Mining di Dunia Pendidikan Tinggi. *Jurnal Ilmiah INFOKAM*, *13*(1), 73–86. https://doi.org/10.53845/infokam.v13i1.123.

Suryawati, E., & Osman, K. (2018). Contextual learning: Innovative approach towards the development of students' scientific attitude and natural science performance. *Eurasia Journal of Mathematics, Science and Technology Education*, *14*(1), 61–76. https://doi.org/10.12973/ejmste/79329.

Tukiran, T. (2023). Earlier Formation of Noble Characters and National Character Education. *Proceedings Series on Social Sciences & Humanities*. https://doi.org/10.30595/pssh.v8i.607.

Zaenab, H., & Muh., Y. (2023). Sumber Daya Lembaga Dalam Praktek Dunia Pendidikan. *Journal on Education*. https://doi.org/10.31004/joe.v6i1.3241.

Zulherman, Z., Aji, G. B., & Supriansyah, S. (2021). Android Based Animation Video Using Millealab Virtual Reality Application for Elementary School. *JPI (Jurnal Pendidikan Indonesia)*, *10*(4), 754–764. https://doi.org/10.23887/jpi-undiksha.v10i4.29429.