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The Influence of Website-Based Learning Media on Science Learning Outcomes in Elementary School Students in the Era of Society 5.0

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ABSTRACT

Objective: In the era of global society 5.0, people worldwide are faced with demands to keep pace with the development of technology and knowledge by developing their "hard skills" and "soft skills." Ever-evolving technologies are utilized to achieve this goal. One example of its implementation in education is the use of websites in science learning. This study aims to evaluate the effectiveness of learning websites in improving student achievement. **Method:** Using the systematic literature review method, the research collects and analyzes twenty articles related to learning websites. **Result:** The results of the twenty journals showed that the use of website media has a positive impact on improving student achievement in the context of science learning. This reflects the critical role of technology in education in the era of global society 5.0. There has been a significant increase in minimum score achievement and student satisfaction with learning. Using the website allows students to learn efficiently and flexibly anywhere. This indicates that learning websites effectively aid students' comprehension of the material, motivate them to learn, and foster interest in learning. **Novelty:** The website learning media must continue to be developed. In the era of a global society, 5.0 technology in education is essential. This is based on an analysis of the data obtained regarding the use of website media for science learning.

INTRODUCTION

Statistical results released by the Ministry of Communication and Information Technology in 2019 showed an increase in internet users by 10% compared to the previous year (Dewi et al., 2021). After the development of the industrial era 4.0, the world entered the era of society 5.0. Those phenomena are a condition of society whose life cannot be separated from the digital world. Almost all daily activities can be completed with the help of digital technology. The digitization process has spread to almost all sectors of life, including economic transaction activities, social activities, cultural dissemination, public information delivery, and health assessment in the education sector (Maikomo et al., 2021; Pettersson, 2021; Prahani et al., 2022; Rizki et al., 2022; Saphira et al., 2023).

The era of society 5.0 has resulted in many digital transformations, especially in education. It includes all activities related to learning and teaching. Activities that occur in the education sector include the teaching and learning process in the classroom, the process of curriculum implementation, national evaluation, and the distribution of learning resources (Aslan et al., 2021; Choppin et al., 2022; Machmud et al., 2021; Rasmitadila et al., 2020). As a result of the development of the era of society 5.0, education actors continue to direct all teaching and learning activities to be digital-based. Learning in elementary schools has begun to develop from conventional models to digital-based (Mardin & Nane, 2020). Every change is made gradually to achieve an

even distribution of technology in education. Education curricula in various countries have also been arranged so that schools can create learning opportunities. Atmosphere with nuances of technology (Alam & Mohanty, 2023; Hall et al., 2020; Kovács Cerović et al., 2022). The digital era requires people, including school-age children, to be technologically literate. Therefore, school learning often uses technology products to support learning (Mardin & Uno, 2020).

Students need interactive learning media. Learning media that can stimulate students are the ones that can provide two-way interaction (Prahani et al., 2022; Saphira & Prahani, 2022; Syahputra & Maksum, 2020; Tan et al., 2020). The concept of the lectures that would be given can be well embedded in the student's knowledge. According to Pebriyanti et al. (2021), interactive media, in general, has many advantages, including learning activities can be more fun and interactive, the use of learning time is shortened, the quality of student learning increases, and the teaching and learning process can improve anywhere and at any time and can improve student learning attitudes. Learning media began to develop interactive models to stimulate students' motoric skills, such as three-dimensional wall magazines, experimental pipes, and artificial displays that could be touched with the senses (Evripidou et al., 2020; Prahanı et al., 2022; Temiz & Çevik, 2020). At the same time, this can help students interact directly with concrete objects. In addition, science is constantly evolving and a new concept of material, more props, and miniatures are needed to achieve student understanding (Hassan et al., 2022; Rahiem, 2021; Stranford et al., 2020; Tu et al., 2021).

One of the uses of technology in learning is a learning website. Education has undergone tremendous changes as knowledge sources are obtained from teachers and can be searched anywhere and anytime online (Abdurrochim et al., 2022). This makes the learning process more efficient. The internet can improve critical thinking skills and the ability to understand the findings of anyone who uses it. Education is an essential part of the development of a country. The teacher is responsible for conveying knowledge to students, which is an essential part of his function in the learning process (Dermawan et al., 2023). Changes in student preferences and learning styles and advances in information and communication technology are encouraging web-based learning to improve learning outcomes (Khasanah et al., 2020).

According to Haniko (2023), using web-based learning materials can significantly facilitate the task of teachers in presenting learning materials. With the rapid advancement of digital technology, technology has become an inseparable part of everyday life, including in the field of education. Some benefits that can be obtained by using web-based learning materials include flexibility of time and location, the ability to access and use interesting multimedia elements, and student interaction. Teachers can use this method to leverage technology to provide students with an engaging and practical learning experience. In addition, teachers can use technology to tailor teaching to each student's unique learning style, improving students' ability to understand and remember material. According to Novialdi et al. (2020), web-based learning tools can make it easier for students to understand concepts excitingly and practically.

Learning resources on the website can greatly assist educators in providing exciting and practical learning to students. The growing digital era makes technology an inseparable part of everyday life, including in the world of education (Arnott & Yelland, 2020; Firman Edi et al., 2021; Liu et al., 2020). A series of outstanding advantages, such as flexibility of time and place of learning, are offered by web-based

learning materials. Teachers can now reach children in more places, even hard-to-reach places, thanks to increased accessibility. "Additionally, using interactive and entertaining multimedia elements such as videos, animations, and simulations can enrich students' learning experience, helping them better understand and absorb material (Lestari et al., 2021).

In elementary school, science lessons are compulsory to provide students with information about the environment and daily activities. This includes many discoveries, experiences, and links to learning theory throughout the learning process. This is very important to apply to elementary school students. Students can experiment and try their science lessons using material from the lessons. Children have easy access to nature, so hands-on experience with nature should be the focus of science lessons (Paulsen et al., 2021; Schilhab, 2021; Skalstad & Munkebye, 2021, 2022). If only the teacher explains, students will avoid losing interest and being less motivated. Therefore, children should actively participate in monitoring nature.

This research aims to expect that students will have soft and hard skills in the 5.0 era. This study aims to evaluate the effectiveness of learning websites in improving student achievement in science lessons. The novelty of this study was that it carried out data analysis from the 2018-2023 time span. The website learning media must continue to be developed. In the era of a global society, 5.0 technology in education is essential. With website media, learning materials can be viewed and studied anytime. Learning materials on this web media can be filled in from various learning sources) such as text, images, audio, video, animation, and digital e-books, and can be updated quickly by teachers. This is also the advantage of this learning media.

RESEARCH METHOD

The Systematic Literature Review (SLR) method, also known as the Systematic Literature Review method in English, was used to develop this article. By bringing together data from various comparative studies, the main objective of an SLR is to determine the optimal approach to a process, technology, method, or tool (Pamungkas & Rochimah, 2019). The SLR approach has several stages: establishing a Research Question (RQ); 2) Selecting a search query (SQ) and searching for related articles; 3) Performing article screening (SP): After reviewing the abstract and content of the article, identify relevant articles that need to be addressed; 4) Use summaries to perform keyword searches with a given classification system; 5) Conduct a systematic data extraction and review process for each manuscript received.

The researchers began to generate RQ based on the previously mentioned process. The RQ that have been prepared are: (RQ1) Describe the nature of learning websites, their functions, and places in global society 5.0. (RQ2) Can students respond positively to science education through educational websites? (RQ3) Whether educational websites can improve student achievement in the classroom?

To complete this article, the researchers searched for articles on Google Scholar and Harzing Publish or Perish that contained the terms "learning achievement," "website learning," and "science education." The collected elements are only from the calendar year 2018-2023. Researchers selected the last twenty articles according to the keywords from the various articles collected. The data is then evaluated as part of the Screening Paper (SP) process against standards such as whether the article was published in 2018-2023, contains research definitions and objectives, and contains supporting information relevant to current research. This research is supported by confidential data analysis.

During the research, several changes were also made in selecting keywords used in the database as a form of keyword adjustment for more precise searches.

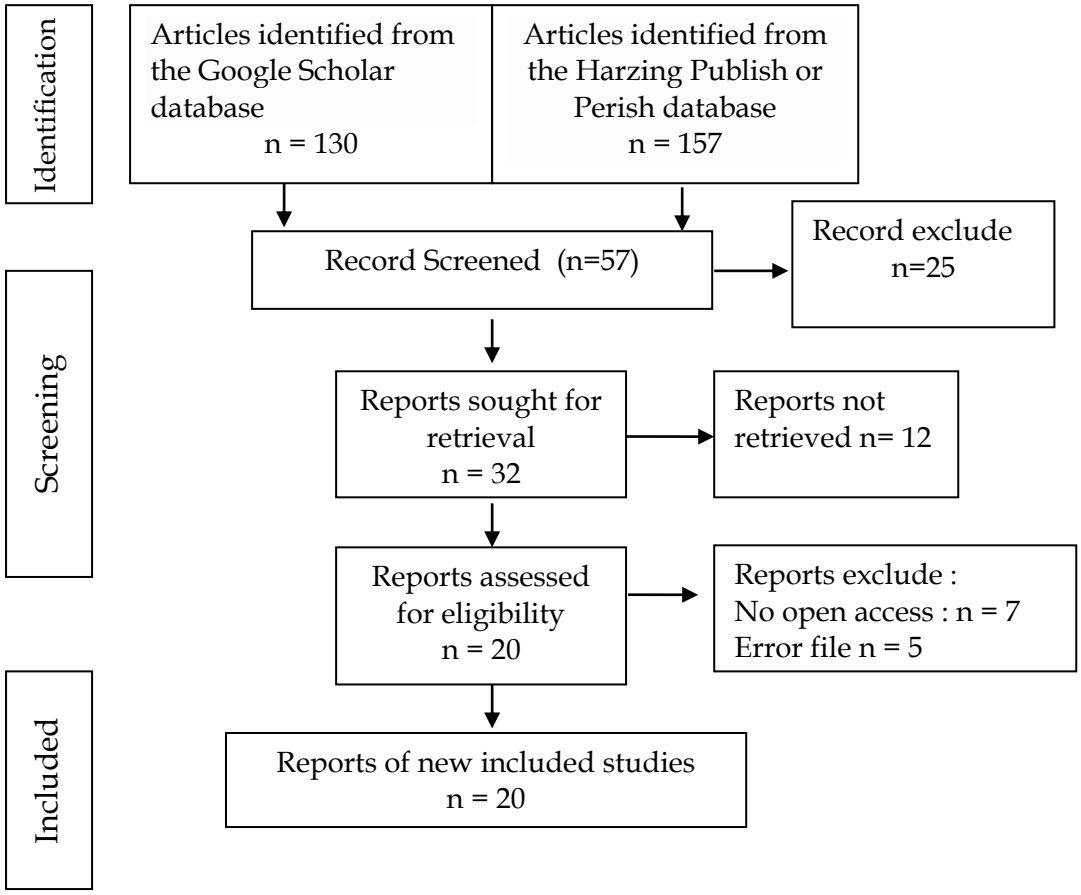

Figure 1. Flow diagram of the process of article exclusion and inclusion in the systematic review stage (Musdary et al., 2021)

RESULTS AND DISCUSSION

Results

The analysis results have been presented in Table 1, which relates to the keywords used in this study. In the research process, researchers examined articles about using websites in the context of learning, especially concerning its effect on students' thinking skills. More information on the articles reviewed can be found in Table 1.

Table 1. Analysis of the influence of website-based learning media on science learning outcomes in elementary school students in the era of Society 5.0

Authors	Title	Research Results
Meduri et al. (2022)	"The effectiveness of website applications in learning to increase students' interest in learning"	The findings of this study show that the use of learning media in the form of websites has the potential to motivate students and assist teachers in carrying out extracurricular learning activities outside the school environment. This aims to avoid boredom in

Authors	Title	Research Results
		the learning process and stimulate students' interest in learning remain high.
Dewi et al. (2021)	"Media Development of Web-Based Natural Science Crossword Game for Elementary School Students"	The results of this study show that the web-based "TTS IPA" game media developed has obtained high validation results, with a decent score of 84% from the material expert team and 86% from the design expert team. In addition, teacher and student trial responses also showed outstanding results, with a score of 84%. This finding indicates that this web-based "TTS IPA" game media is a feasible and effective additional alternative as a learning media in the learning process.
Novianto et al. (2018)	"Development of Interactive Multimedia Science Subjects Subject of Human Circulatory System for Class VIII Smk Wahid Hasyim Malang"	The development of interactive multimedia is an appropriate and positively impactful approach to be used independently by students as a learning medium.
Syahidatil Maghfirah & Sulaiman (2022)	"The influence of the website-based Wordwall platform in increasing students' interest in learning PAI subjects"	Results of using the web-based Wordwall platform at Padang 2nd vocational school: First, the average result of using the Wordwall platform in Islamic subjects reached 53.97, showing that Wordwall educational game-based media can increase student focus, engagement, and interest in learning. Second, students' interest in learning increased significantly by an average of 85, eliminating a lack of focus and restoring students' enthusiasm for learning. Third, statistical analysis showed a significant influence between Wordwall use and student learning interest, with the independent variable influencing the dependent variable by 51%."
Ferdiansyaha et al., (2020)	"Website-Based Learning Media Development For Computer And Basic Network"	Based on the analysis results, it was concluded that website-based learning media creates active, practical, and interactive learning. The delivery of material using website-based media makes it easier for students to understand the material, and the improvement of learning outcomes is evident through test results before and after using the developed media. The response from teachers and students to the development of website-based learning media on primary computer and network subjects in the Department of Network Computer Engineering at Padang 2nd Vocational School indicates that this media is efficient and suitable for use as part of

Authors	Title	Research Results
		learning."
Jannah et al., (2022)	"Digital Media in Empowering 21st Century Critical Thinking Skills in Science Learning in Elementary Schools"	The results showed that in learning natural sciences in elementary schools, various forms of innovation in digital media can enhance critical thinking skills in the 21st century. Some of these innovations include digital educational games that stimulate student interactions and engagement, videos that visualize the subject matter in an engaging way, YouTube as an extensive supplementary learning resource, and PowerPoint presentation tools for presenting structured information. In addition, media such as Macromedia/Adobe Flash, digital comics, e-books, and flipbooks also support students understanding in different ways. Advanced technologies such as augmented reality and virtual reality provide immersive learning experiences. In addition, educational websites, television, and various educational applications such as Ruang Guru, Quipper School, and Kelas Pintar also enrich learning resources.
Fadilah (2019)	"Development of Science-Based Learning Media for Style and Motion Material to Improve Student Learning Outcomes IV Grades MI Imami Kepanjen"	The results of developing website-based learning media with a focus on style and motion in grade IV learning meet the validation criteria. Material experts provided a validity rate of 80%, design experts gave 84%, and learning practitioners 82%. In terms of student learning outcomes, significant differences were observed between classes that use learning media and those that do not. In the experimental class, as many as 19 out of 25 students reached or exceeded the minimum score, while in the control class, only six students achieved the minimum score needed. The results of the statistical t-test showed a significant difference at the significance level of 0.05, with a count (6.8) more significant than table (2.01), indicating the rejection of H0 and the acceptance of H1. In other words, using learning media significantly improved student learning outcomes. These results show that the product developed was practical and feasible for learning. In addition, this product has an attractive design and is easy to use so that students can use it independently in the learning process."
Harahap et al. (2019)	"The Effect of Blended Learning on Student's Learning	The results of this study show that blended learning strategies are significantly more effective than conventional learning strategies

Authors	Title	Research Results
	Achievement and Science Process Skills in Plant Tissue Culture Course"	in improving scientific process skills and student learning achievement in plant tissue culture courses at Medan State University."
Astuti et al., (2020)	"The Development of Web-Based Learning Using Interactive Media For Science Learning On Levers In Human Body Topic"	The results of the questionnaire analysis from junior high school students for the website-based learning application reached a score of 82 out of 100, which means "very good ."The internal consistency result using Cronbach's Alpha method for the science teacher questionnaire was 0.825, and for the student questionnaire, it was 0.863. Both results indicate that the questionnaire was reliable because it exceeded the standard by more than 0.6. In conclusion, most students prefer science learning after using educational websites that contain interactive games as instructional material to learn the human circuit because learning science through books and ordinary lecture methods was less exciting and not engaging."
Firmansyah et al., (2023)	"Development Of Google Sites Web-Based Learning Media On Economist Subjects"	The results are based on research that researchers have carried out: (1) the average percentage value obtained from material experts is 80% in the appropriate category. (2) The results of the validation of media experts obtained an average percentage value of 80% in the proper category. (3) The results of the small group trials obtained an average percentage value of 88.7% with a very decent category. (4) The results of the small group trials obtained an average percentage value of 93% with a very decent category. It can be concluded that media-based learning Web Google Sites in class XI economics subjects stated "Very Eligible" used for learning.
Islam et al. (2018).	"To Boost Students' Motivation and Achievement through Blended Learning"	The results showed evidence that students with high Internet self-efficacy had better information retrieval strategies and learned better than those with low Internet self-efficacy in web-based learning tasks.
Aini et al. (2019).	"Effects of iLearning Media on Student Learning Motivation"	This study concluded that optimizing management report tasks through a web-based Content Management System (CMS) is very effective and efficient. The advantage of using this platform is that it allows the students to report assignments anywhere and anytime. In addition, they can easily manage data on every report they have. The user-friendly interface of the CMS not only creates a comfortable atmosphere for students to do

Authors	Title	Research Results
		assignments and a pleasant learning atmosphere. Using a CMS also enhances students' creativity in exploring the process of writing their assignment reports. Thus, optimizing assignment reports through a web-based CMS provides several significant advantages for students.
Demir et al. (2018)	"The Effect of Mobile Learning Applications on Students' Academic Achievement and Attitudes toward Mobile Learning"	The study shows that mobile learning significantly positively impacts student academic achievement compared to conventional learning. In addition, the students who participated in mobile learning had a positive attitude towards this learning method.
Chopra et al., (2019)	"Effectiveness of e-learning portal from students' perspective: A structural equation model (SEM) approach"	This study shows that the system's quality and service contribute more to the e-learning system than the quality of information. A student's perception might be that the information on the website could be more helpful because it is a one-way mode of communication. The authors also found that all three dimensions of e-learning systems (system quality, service quality, and information quality) contribute to user satisfaction and net benefits. Students are satisfied with the website and intend to continue using it. They also benefit from using e-learning as it helps them in "career progression and increases job opportunities."
Dewi et al. (2023)	"Development Of Website-Based Learning Media On The Practice Of Pancasila On Student Learning Motivation"	This article captures that web-based media provides a motivational boost for students to learn. The utilization of this kind of media will improve the achievement of learning outcomes in the future. Using web-based media enhances students' understanding of the concepts taught in learning and fosters their motivation to apply these concepts. However, the effectiveness of using this platform is highly dependent on internet access and adequate equipment, such as smartphones, laptops, or computers.
Rihani et al., (2022)	"Literature Study: Ispring Suite Interactive Media on Learning Outcomes of Grade V Elementary School Students"	This article found that using iSpring Suite interactive media in 5th-grade elementary school students provided positive benefits and improved learning outcomes. The importance of using this media lies in its suitability and contribution to the learning objectives. This media helps students understand learning material and makes it easier for teachers to give lectures.
Novitasari et al.,	"Design a Website-	The results of the study concluded that the

Authors	Title	Research Results
(2021)	Based Learning Media Information System (Case Study: De Potlood Tutoring)"	design of the Learning Media Information System, which is based on the De Potlood Tutoring Website, is a system that is highly effective and feasible for implementation. This system, which Admins, Teachers, and Students can use, improves time efficiency in calculating grades on exam questions and facilitates teachers in creating grade recapitulation reports. In testing the usability aspect according to the ISO/IEC Standard 25010, the system achieved a result of 88%, indicating that the system is excellent in terms of its usability.
Nabilah & Dewina (2023)	"The Effect Of Using Google Sites Media On The Learning Outcomes Of Science And Technology Students In Grade V"	This research indicates that using learning media, such as Google Sites, does not significantly affect the learning outcomes of grade 5 students in Natural Sciences subjects at elementary school Beji Timur. Although teachers are anticipated to be innovative facilitators utilizing learning media, this study's results demonstrate that using Google Sites as a medium does not affect the improvement of learning outcomes.
Mayasari et al., (2022)	"Meta-analysis of the influence of electronic learning media on student learning outcomes and concept understanding"	The analysis results show that electronic teaching materials or media in the form of websites significantly improve both the learning outcomes and the student's understanding of concepts.
Nasution et al., (2022)	Systematic Literature Review: Web-Based Learning Media on Biology Subjects	The result of the analysis shows that the use of web-based learning media is feasible to be used in the learning process with an average presentation result of more than 80%, which was obtained by conducting three tests, namely, individual, small-scale, and large-scale tests and validation test results with an average of 79%-88%. Based on the literature studies conducted, this web-based media can be developed as a medium to facilitate the process of learning biology.

Discussion

Role and Purpose of Learning Website in the Era of Global Society 5.0

In the context of global society 5.0, the learning website is an online education platform that provides global access to various educational resources. The aim is to facilitate learning and knowledge enhancement for various groups of learners, including students, university students, and individuals who wish to continue lifelong learning (Al Salman et al., 2021; Anthonysamy et al., 2020; Brown et al., 2021; Endres et al., 2020; Lock et al., 2021). Learning websites provide the possibility of more efficient and flexible distance learning, which is particularly relevant to the high mobility found in

the global society 5.0. With the personalization tools available, learning websites can design learning experiences that fit individual needs, accommodate cultural differences, and integrate diverse views and knowledge from around the world (Hur et al., 2020; Kerkhoff & Cloud, 2020; Kistyanto et al., 2022; Prahani et al., 2022; Prasetya, 2021; Pristianti & Prahani, 2022).

The website learning can be used anywhere and anytime; it makes it easier for students to learn. In this opinion, Alifah et al. (2023) of the use of learning media that updates digital technology can improve student learning outcomes. This is evidenced by the ease of students in obtaining and understanding the subject matter, minimizing boredom in students, and increasing students' focus to digest the learning, which, of course, can be adjusted to the needs and changes of today. Online learning is a new way of learning by utilizing electronic devices in the form of devices or laptops, especially internet access in its delivery learning, so online learning is entirely dependent on internet network access (Hamid et al., 2020; Ngurah & Laksana, 2020; Suryasa et al., 2020).

In addition, learning websites enable collaboration and interaction between learners from different countries and cultures, reflecting the importance of cross-border cooperation in this global era. With access to a wide array of resources such as videos, e-books, simulations, and other multimedia content, learning websites provide diverse ways to deepen understanding and skills. In addition, the learning website also supports the concept of lifelong learning, where individuals can continue to learn and develop their skills throughout their working life by the demands of the era of global society 5.0, which is full of change and innovation. As such, learning websites play a crucial role in connecting individuals with global educational resources, enabling collaborative learning, and supporting lifelong skills development in the era of global society 5.0."

The Use of Learning Websites Can Prove That There is a Positive Response in Students in Learning Science

In "various studies that have been conducted, the use of learning websites and digital media in the context of Natural Sciences learning has been proven to impact student motivation and interest positively. Dewi et al. (2021) results of this study show that the web-based TTS IPA game media developed has obtained high validation results, with a score of 84% from the material expert team and 86% from the design expert team, both the very decent category. In addition, teacher responses and student trial responses also showed excellent results, with a score of 84%. This finding indicates that this web-based TTS IPA game media is a feasible and effective additional alternative as a learning medium in the learning process.

Similarly, research conducted by Novianto et al. (2018) underlines that "interactive multimedia development is an appropriate approach and has a positive impact to be used as a learning medium that is done independently by students." The results of this study show that students respond positively to the use of interactive multimedia as a learning aid that enables independent learning.

Furthermore, Maghfirah and Sulaiman's (2022) research on using website-based Wordwall platforms in Islamic learning achieved exciting results. They found that Wordwall-based websites "increased student focus, engagement, and interest in learning." Statistical analysis also reinforced these findings, with independent variables

influencing the dependent variable by 51%, suggesting a positive impact of using these platforms on Islamic learning.

Finally, Jannah & Widianto (2022), in their research on digital media innovation in science learning, emphasized that various forms of innovation, such as digital educational games, videos, YouTube, and advanced technologies such as augmented reality and virtual reality, all have a positive impact on student learning motivation. They create more prosperous and more engaging learning experiences." This reflects students' positive response to using digital media in science learning. Thus, using learning websites and digital media in science learning has created a positive response from students, increasing their motivation, interest in learning, and understanding of science material.

Learning Websites Can Improve Student Achievement

Based on several studies that have been reviewed, there is strong evidence that using learning websites can improve student achievement in various learning contexts. Research conducted by Fadilah (2019) regarding the development of website-based learning media in grade IV learning showed positive results. The results of this study achieved a high level of validity, with a validity rate of 80% from material experts, 84% from design experts, and 82% from learning practitioners. In addition, significant differences are seen in student learning outcomes. Students who use learning media achieve or exceed the minimum in significant numbers compared to students who do not use these media. The results of the statistical test t showed" a significant difference, confirming that the use of learning media effectively increases student achievement.

Research by Astuti et al. (2020), which focuses on developing website-based learning with interactive content for science lessons, also shows positive results. The results of the questionnaire analysis from junior high school students to web-based learning applications reached a score of 82 out of 100, which means an excellent level of satisfaction. In addition, the internal consistency results showed that the questionnaire used was very reliable. Students prefer science learning after using educational websites, reflecting increased learning achievement and interest. Thus, based on several of these studies, the use of learning websites can prove that there is a positive response in students and can increase their learning achievement. This reflects the effectiveness of digital media in the context of learning.

CONCLUSION

Fundamental Finding : From the 20 articles research that has been described, the use of learning websites positively impacts student achievement. The results showed that developing website-based learning media, including interactive media, interactive content, and educational games, can improve student learning outcomes. There is a significant increase in the achievement of minimum scores and student satisfaction with learning. This reflects that learning websites are effective in helping students understand the material, motivating them to learn, and increasing interest in learning.
Implication: Using learning websites also affects various aspects of learning, such as student satisfaction, critical thinking skills, and positive responses to science learning. Learning websites allow students to learn independently, increase student engagement, and provide an engaging learning experience. In addition, the use of web-based formative assessment strategies also affects student achievement. Students with various learning styles can achieve increased achievement, and using web-based formative

assessment strategies provides better results than other strategies. In an increasingly connected and technology-based global society, 5.0 learning websites are becoming increasingly relevant. Learning websites can help students to learn independently, access information quickly, and improve their learning achievement. Thus, using learning websites can play an essential role in improving the quality of education in the era of global society 5.0. **Limitation:** This study is limited to analysis of the influence of website-based learning media on science learning outcomes in elementary school students in the era of society 5.0. and the last ten years. **Future** research: The next researcher may be more involved in analyzing journals.

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