



# Web-Based Learning Media for Distance Education: A Review

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**Abstract:** Learning media are all forms of tools or materials used in the learning process to help students understand and master the subject matter. This media can be in the form of physical objects, technology, or a combination of both designed to communicate information more effectively and facilitate understanding and retention of learning concepts. The learning and teaching process that uses web-based learning media for distance education is required to be independent and responsible for the learning process because one can learn anywhere, at any time. The important thing is that the tools are available. This research uses a systematic literature review method using Preferred Reporting Items for Systematic Reviews (PRISMA). The research aims to explain web-based learning media for distance education. The research results show that through web-based learning media, students can search for and retrieve information or learning materials based on the syllabus or criteria set by the teacher or education manager. Students will have a wealth of information because they can access information from anywhere related to their learning material, through web-based learning media used for distance education can be increased by using learning materials that are well-designed professionally and pay attention to and use the characteristics of characteristics of multimedia.

**Keywords:** Education; Media; Learning; Web-based

## Introduction

The education system is defined as a method or strategy applied in a teaching and learning process to develop students' potential and make them more active (Coman et al., 2020; Haleem et al., 2022; Kim et al., 2019; Parker et al., 2022). This change can be seen from changes in the education system, which consists of learning, teaching, curriculum, student development, learning methods, learning tools, facilities and infrastructure, and graduate competencies from time to time. According to behaviorist theory, learning is a change in a person's behavior that can be seen and observed directly, which occurs between stimulus and response by mechanistic principles (Anindyarini et al., 2018; Kwon & Silva, 2020). The development of

education in the world cannot be separated from the development of the industrial revolution that occurred in the world (Bose & Sarma, 1975; Kadau, 2022; Kaplan, 2018; Zumailah et al., 2022) because indirect changes in the economic order also change the education order in a country. What is the Government's policy in providing education in the Era of Industrial Revolution 4.0? The Indonesian government is currently implementing strategic steps determined based on the Making Indonesia 4.0 road map (Mubarok & Umami, 2020; Octa Putri & Ginanjar, 2018a; Rafiah et al., 2022).

Accelerate the realization of the national vision that has been set to take advantage of opportunities in the era of the fourth industrial revolution. The formulation of Making Indonesia 4.0 has a vision, namely to make Indonesia a country that is included in the top 10 with

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the strongest economy in the world by 2030 and has progress in its human resources. Human resources are important to achieve success in implementing Making Indonesia 4.0. (Anggraini et al., 2020; Verma & Venkatesan, 2022). Indonesia plans to overhaul the education curriculum with greater emphasis on STEAM (Science, Technology, Engineering, the Arts, and Mathematics), aligning the national education curriculum with future industrial needs. Indonesia plans to collaborate with industry players and foreign governments to help improve the quality of vocational schools, as well as to increase labor mobility which is used to provide human resources.

To achieve 21<sup>st</sup>-century skills and because student learning outcomes in Biology lessons are less than optimal because learning still uses conventional methods, it is necessary to develop learning media. Learning trends and best practices must also be adjusted, one of which is the effort to develop a learning media that allows students and teachers to interact actively, even without face-to-face contact (Faraniza, 2021). The media that meets these demands is web-based learning media (El-Sabagh, 2021). The web referred to here is an application that periodically contains articles such as written works, a collection of internet links, documents, videos, or images on a web page (Kapoor et al., 2018; Lim & Rasul, 2022; Octa Putri & Ginanjar, 2018b; Voorveld et al., 2018). Apart from written form, this web-based learning media also uses illustrations in the form of pictures to make it clearer for students to understand the material (Abdulrahman et al., 2020; Gayatri & Gaffar, 2023). Apart from being easy to understand, web-based learning media material also makes the learning process easier for students without having to meet face-to-face with the teacher.

The student learning process in learning This can be done by utilizing the menus provided in the media independently (Abuhassna et al., 2020). This ease of operation is supported by basic skills using web-based learning media. The basic skills in question include skills in using Microsoft Office Word, the internet, files, e-mail, and attaching documents when sending e-mail (Dhawan, 2020). Students have mastered the basic skills of using web-based learning media since junior high school (Prayogo, 2022). Web-based learning media is one type of interactive multimedia (Wijaya, 2019). namely a multimedia equipped with a controller that can be operated by the user, so that the user can select the desired one for the next process. One of the benefits obtained from this web multimedia is that the learning process is more interesting, thereby increasing students' interest and attention (Abbas et al., 2019; Barut et al., 2022; Herianto & Wilujeng, 2021; Paul & Jefferson, 2019).

Students in using web-based media in learning, can clarify the presentation of the message so that it is not too verbal, or abstract, and overcome limitations of space, time, and sensory power such as objects that are abstract or too small (Brame, 2016). Web-based learning media is said to be a learning media because it is a tool that can help the teaching and learning process to clarify the meaning or message conveyed and is easy to operate so that teaching objectives can be achieved better even without being accompanied by a teacher, thus supporting the independent learning process (Darling-Hammond et al., 2020; Iqbal et al., 2021). With web-based learning will help teachers make the learning process more effective (Lagoudakis et al., 2022; Vekli & Çalik, 2023). Students can access materials, assignments, and quizzes wherever and whenever the teacher provides them. Both from near and far, however, face-to-face learning is still needed, to explain learning materials. Based on the background explained above, this research aims to examine web-based learning media for distance education, in which we employ a systematic review.

## Method

We conducted this research as a systematic review by following the PRISMA guidelines. The PRISMA guidelines provide several items to be considered in preparing a systematic review. In this case, we used several recognized and trusted databases, such as PubMed, Web of Science, Scopus, ScienceDirect, and Google Scholar. This decision is based on the fact that our research is multidisciplinary and covers a wide range of disciplines. The use of multidisciplinary databases such as Web of Science and Scopus helps ensure that we access relevant literature from a wide range of disciplines, while PubMed focuses more on medical science. ScienceDirect is the primary source for scientific journal articles in various fields of science, while Google Scholar is used as an academic search engine that covers a wide range of source types. Through the use of these diverse databases, we hope to ensure comprehensive and relevant coverage for our systematic review. This study will mainly focus on several keywords: Education; Media; Learning; and Web-Based. This helps form the basis of our assessment. Initially, we collected the latest studies on web-based learning media for distance education, based on a few selected keywords. Then, we apply eligibility criteria to the collection. We only selected literature published in 2017 or later to provide an overview of recent trends. In addition, we limit the types of literature, namely only literature in the form of journals and proceedings.

## Result and Discussion

Selected Reporting Items for Systematic Review (PRISMA) is the reporting technique used in this study. The research was carried out methodically during the necessary research phases. The information provided is comprehensive and impartial and aims to incorporate the results of relevant studies. The steps of a review include developing research questions, searching the literature, screening and selecting relevant articles, screening and selecting the best research results, analyzing, synthesizing qualitative results, and preparing research reports. Writing the background and purpose of the study, collecting research questions, searching the literature, selecting articles, extracting articles, assessing the quality of the baseline study, and summarizing material are steps in the research process of a systematic literature review.

Only studies published from 2017 onwards were included to capture the most recent advancements in web-based learning media. By limiting our scope to peer-reviewed journals and proceedings, we ensured the reliability and credibility of the selected sources. The selected studies were then carefully extracted, synthesizing the qualitative results to provide a comprehensive overview of the topic. This analytical process allowed us to identify gaps in the existing literature and propose directions for future research in the field of web-based learning media for distance education.

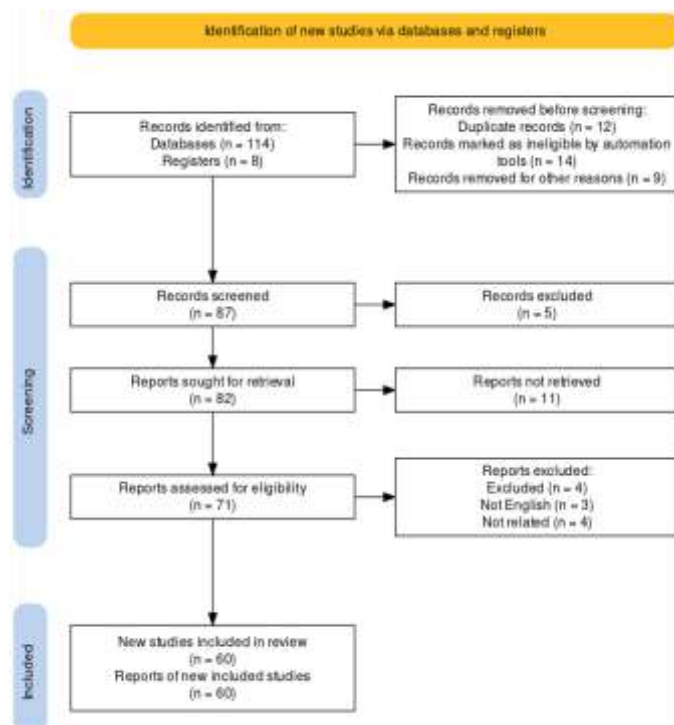


Figure 1. Flow process literature search based on PRISMA guidelines

### Understanding Education

Education is a conscious effort made by an educator to guide his students so that they can develop all the potential that exists within them. This understanding agrees with several experts who express opinions about education. According to Keller (2018), Education is a process of guidance, guidance, or leadership that contains elements such as educators, students, goals, etc. The aspects most considered include awareness, enlightenment, empowerment, and behavior change. The same view was also expressed by Aichner et al. (2021) and Isroani et al. (2022), that education is an effort to foster and develop the human person, both regarding spiritual and physical aspects. Based on the explanations from the two experts above, it can be concluded that education is one of the most important things in life. Education is also an important vehicle for building the nation. In turn, the results of education become development resources, therefore, educators in carrying out their duties, are expected not to make mistakes in educating.

### Elements of Education

The elements in the educational process involve many things, including but not limited to: namely: students, educators, educational interactions, educational goals, educational materials, educational tools and methods, and the educational environment (Fadilah et al., 2022; Gherheş et al., 2021). Students are subjects who are guided or educated. Educators are people who educate. Educational interaction is the interaction between students and educators. Educational interaction is reciprocal communication between students which is directed towards educational goals. Educational objectives are directed by the objectives, educational materials, influence provided in guidance, tools, and methods used in guidance (Brew et al., 2021). Tools and methods are defined as everything that is done or held deliberately to achieve educational goals (Ericsson & Harwell, 2019). Specifically, tools are viewed based on their type, while methods are viewed based on their efficiency and effectiveness (Musheke & Phiri, 2021). Educational tools are differentiated into preventive and curative tools (Raghupathi & Raghupathi, 2020). The educational environment is usually called the triculture of education, namely the family, school, and community where guidance events take place (Nasution et al., 2022).

### Educational Goals

Some researchers agree that the purpose of education is to contain a picture of good, noble, appropriate, true, and beautiful values for life, therefore the purpose of education has two functions (Ashwin, 2022; Malik et al., 2019; Marpanaji et al., 2018; Msaedeh,

2018; Tirri et al., 2016), provides direction to all educational activities and is something that all educational activities want to achieve. In educational practice, especially the school system, in the range between general goals and very specific goals, several intermediate goals function to bridge the achievement of general goals from several specific goals. In general, there are four levels of goals (Islami et al., 2018), namely: general goals are national educational goals. Pancasila is the foundation of the general goals of national education in Indonesia; institutional goals are goals that are the task of a particular educational institution to achieve; curricular goals are goals to be achieved in a field of study or subject; instructional goals are goals to be achieved in a particular material - mastery of certain material. As explained above, educational objectives need to be formulated to arrive at a predetermined point.

“The goal point of education is more imaginary than real” (*Academia Peruana de Psicología & Lamas*, 2015). Education carried out without a purpose will fail (Höpfner & Keith, 2021). Normatively, the goals of education in Indonesia are mandated in Law No. 20 of 2003 concerning the National Education System, it is stated that education aims to develop the potential of students so that they become human beings who believe and are devoted to God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. Academic explanation: education has several goals, namely, optimizing the cognitive, affective, and psychomotor potential of students. Second, passing on cultural values from generation to generation to prevent as much as possible children from being uprooted from the roots of culture and national and state life.

Third, develop students' adaptability to face future situations that continue to change, both in terms of intensity and requirements in line with advances in science and technology. Fourth, increase and develop students' moral responsibility in the form of the ability to distinguish between right and wrong, with the spirit or belief to choose and uphold it. As explained above, it can be concluded that the purpose of education is to change all kinds of bad habits that exist within humans into good habits that occur throughout life, intending to improve the quality of oneself to become a person who can compete and answer various challenges in the future.

#### *Educational Benefits*

The benefits of education according to Aweid et al. (2022), Nur Afifah et al. (2022), and Stone et al. (2013) are as follows: Obtaining knowledge that will be needed for the future; Studying outside of school can broaden your

horizons; By gaining broader knowledge and insight, we can achieve the goals we dream of; Make people have noble character. By the meaning and goals of education, education is very beneficial for everyone's lives to become complete human beings, because education is a tool for making the life of the nation and state more intelligent.

#### *Educational Function*

Education carries a noble mission as a process of humanity and humanization, both natural and artificial. National education is conceptualized as having the function of developing abilities and forming a dignified national character and civilization to make the nation's life more intelligent. Idris et al. (2012) and Nowell et al. (2017) explain that the true function of education is to build people who are faithful, intelligent, competitive, and dignified. Faith means that humans acknowledge the existence of God follow his teachings and avoid his prohibitions. Based on the explanation above, it can be concluded that the function of education is a benefit from the results of education that humans can feel in everyday life. In general, the function of education is to change human thought patterns toward a better life (Lodge et al., 2018).

#### *Education Level*

According to the Law of the Republic of Indonesia of 2003 Number 20 concerning the National Education System article 13, what is meant by educational pathways consists of formal, non-formal, and informal education which can complement and enrich each other (Souto-Otero, 2021) Article 14 states that what is meant by the level of education consists of basic education (Primary School, Junior High School), secondary education (High School), higher education (Diploma, Masters, Specialist and Doctorate) (Heymann et al., 2014).

#### *Basic Education*

Basic education is organized to develop attitudes and abilities provide basic knowledge and skills needed to live in society and prepare students who meet the requirements to attend secondary education (Article 13). Citizens aged six years have the right to attend basic education, while those aged seven years are obliged to attend basic education until completion. The implementation of compulsory education is determined by government regulations (Article 14). Basic education is education at Elementary School (SD) and three years at Junior High School (SLTP) (Meriyanti & Jasmina, 2022).

### *Secondary Education*

Secondary Education is organized to continue and expand basic education and prepare students to become members of society who can have reciprocal relationships with the surrounding social, cultural, and natural environment and can develop further abilities in the world of work or higher education. Secondary education is education that lasts three years after basic education and is held at a Senior High School (SLTA) or equivalent educational unit (Article 15) (Kosim et al., 2023).

### *Higher Education*

Higher education is the level of education after secondary education which includes diploma education programs: Bachelor's, Master's, Doctoral, and Specialist organized by tertiary institutions. Higher education is education that is organized to prepare students to become members of society who have academic and professional abilities who can apply, develop, and create knowledge, technology, and art (Kromydas, 2017).

### *Learning in Distance Education*

Distance learning (or so-called *Pembelajaran Jarak Jauh* or PJJ) is a type of learning that is carried out using a medium that allows interaction between students and teachers (Agustina & Nandiyanto, 2021). The interaction in question is the interaction between students and teachers who do not meet face to face, such as learning which is usually carried out in the classroom or the same place. However, interactions in PJJ are not carried out face to face, which means that students and teachers are in different places, even very far away (Hollister et al., 2022; Mahmud, 2020). With the implementation of distance learning, the presence of students and teachers are not always physically present at the same time in the classroom. The implementation can also be completely using a distance system (hybrid) or a mixture or collaboration of distance learning and classroom learning (blended) (Selvaraj et al., 2021). In its implementation, several important factors must be considered so that the distance education (learning) system can run well, namely the level of attention (concentration) of students and teachers, teacher confidence, experience, creativity in carrying out the learning process, understanding in using the internet or e-learning, and the ability to interact with students (Pham et al., 2021).

Easy interaction is one of the advantages of learning using a distance system which can be used as a means to develop access to education among the general public because the flexible system is not limited to time, distance, and place (Joaquin et al., 2020; Turan et al., 2022). It can also be used by many people from various geographical, social, cultural, and economic

backgrounds. Even though distance learning has various advantages, it also has several disadvantages, namely the quality of technology which cannot fully meet the needs of all levels of society, the interaction between students and teachers is inadequate and the experience in implementing distance learning is still lacking (Lassoued et al., 2020). Networked (online) learning is divided into 2, namely:

### *E-Learning*

Sagita et al. (2020) and Dona Fitriawan (2022) state that e-learning is information and communication technology that will help students learn anytime and anywhere. E-learning has a broad concept, meaning that the media used in e-learning learning is not only media that must be connected to the internet but can also use media that is not connected to the internet (offline). Examples include radio, interactive TV, and LCD projectors.

### *Online Learning*

Online learning is defined as a learning method in which the entire delivery of learning is carried out using the help of the internet and is supported by other technology (Mohd Basar et al., 2021). Online learning is also part of e-learning which means learning using a computer network connected to the internet. The media used in online learning must be connected to the internet (online) making Indonesia 4.0 (Suci et al., 2022).

Facing the rapidly growing digital economy, the government is committed to improving the national industry by launching the "Making Indonesia 4.0" Roadmap. This launch was inaugurated directly by the President of the Republic of Indonesia, Joko Widodo, on Wednesday (4/4) in Jakarta. The Making Indonesia 4.0 policy which finally produced a road map, of course, went through a long process. The public policy process itself has several stages. Hermawan (2021) and Mishra et al. (2020) state that the public policy process goes through at least 6 stages, starting from invention/initiation, namely the problem formulation stage, continuing to the estimation stage, namely the stage of creating alternatives. The available alternatives are then selected at the selection stage. The best alternative will be realized in a policy that is in the implementation stage. The policies created are then evaluated at the evaluation stage and finally at the termination stage, the policies that have been implemented will be adjusted. The Indonesian government also went through these stages before formulating the Making Indonesia 4.0 policy. Visits, mapping of the problems faced, and issuing policies are the processes that go through in formulating policies. Apart from that, improving Human Resources (HR) is a

special concern and the government has prepared vocational education and training programs. Researchers highlight the Making Indonesia 4.0 policy issued by the government as containing 10 National Priority Programs (Astuti et al., 2020; Roziqin et al., 2021); Improve material flow by strengthening upstream sector material production. An example of this is that 50 percent of petrochemical raw materials are still imported.

Redesign industrial zones by building a national road map, for example, industrial belts, overcoming problems faced in several industrial zones. Accommodation of sustainability standards. Opportunities for competitiveness through global sustainability trends include EVs, biofuels, and renewable energy. Empowerment of MSMEs, including micro businesses by empowering 3.7 million MSMEs including micro businesses through technology. For example, MSME e-commerce, and technology funding. Build national digital infrastructure by building digital networks and platforms. For example, 4G becomes 5G, 1Gbps fiber optic, data center, and Cloud. Attract foreign investment by targeting leading global manufacturing companies through attractive offers and incentives for accelerated technology transfer. Improving the quality of Human Resources (HR), such as redesigning the education curriculum to adapt to the industrial era 4.0 and talent mobility programs for professionals. Establishment of an innovation ecosystem by developing Research & Development & Design (R&D&D) centers by the government, private sector, public sector, and universities. Implement technology investment incentives by introducing tax exemptions or subsidies for technology adoption and funding support. Harmonization of rules and regulatory policies across ministries.

#### *Understanding Learning Media*

Learning media is a tool teachers provide to stimulate or encourage students to make learning easier (Cilliers, 2021). The form of this learning tool can be audio, visual, or audio-visual media. Dziuban et al. (2018) state that media are various types of components in a student's environment that can stimulate him to learn. Meanwhile, Cheung et al. (2021) and Sung et al. (2016) argue that media is any physical tool that can present messages and stimulate students to learn. Books, films, cassettes, and frame films are examples (Tan, 2018). According to the Association for Educational Communication Technology in Sutisnawati (2021), learning media is everything people use to convey messages. Based on several descriptions, it can be concluded that learning media is a tool used to channel messages or information (learning materials) as well as

to stimulate students in the teaching and learning process to achieve the learning objectives that have been formulated.

#### *Learning Media Function*

Learning media has a function as a carrier of information from the teacher (source) to the student (recipient). The function of the media can be known based on the advantages of the media and obstacles that may arise in the learning process. According to Putri et al. (2019), Fitriani Dinda Fadhilah et al. (2021), Aswir et al. (2021), and Sari et al. (2022), the general uses of learning media are as follows: clarifying the presentation of the message that it is not too verbalistic; overcome limitations of space, time and sensory power; appropriate and varied media can overcome the passive nature of students; assist students and teachers in teaching and learning activities. Khusniyah (2022) suggested 4 functions of learning media, namely the attentional function of attracting and directing students' attention; the affective function of visual media can be seen from students' level of enjoyment when learning; the cognitive function; the compensatory function of learning media helps students who are weak in reading to organize information in the text and remember it again. According to the expert opinion above, it can be concluded that learning media must be able to motivate students in the learning process because media is a communication tool for teachers and students in the teaching and learning process to achieve the desired learning goals.

#### *Various Learning Media*

The development of science and technology influences teaching and learning activities in schools, so the learning media must follow the learning process's needs. Susilo et al. (2021) and Vebrianto et al. (2011) stated that learning media can be grouped into four groups, namely: media resulting from print technology, media resulting from audio-visual technology, computer-based technological media; media resulting from a combination of print and computer technology. Ghofur (2022) states that "The various learning media are audio media (radio, recording equipment, and audio tape), visual media (magazines, newspapers, modules, comics, posters, atlases), audiovisual media (films, videos, television) and multimedia". Based on the opinion above, it can be concluded that learning media can be categorized into four parts: visual media, audio media, audiovisual media, and interactive media.

## Conclusion

Through Web-based learning media, students can search for and retrieve information or learning materials based on the syllabus or criteria the teacher or education manager sets. Students will have a wealth of information because they can access information from anywhere related to their learning material. Students can also discuss online with experts in their fields via e-mail or chat. Thus, it is clear that students' activeness greatly determines the learning outcomes they obtain. Learning outcomes obtained through Web-based learning media used for distance education can be improved by using learning materials that are designed professionally and pay attention to and use the characteristics of multimedia. This means that besides text, these learning materials can also contain images, graphics, animations, simulations, audio and video. Designing a good and appropriate website template will also improve its appearance on the monitor screen. Put forward several criteria that should be considered in selecting media, namely by the objectives to be achieved; appropriate to support lesson content that is facts, concepts, principles, or generalizations; practical, flexible, and persistent; skilled teachers use it; target grouping; technical quality. With web-based learning media that is used according to its function and by the era of education 4.0, it can simplify and provide benefits in the face-to-face and remote teaching and learning process.

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## Author Contributions

Conceptualization. D. N., A. P. W., R., M. N. N., W. A. S. S.; methodology. D. N.; validation. A. P. W and R.; formal analysis. M. N. N.; investigation, W. A. S. S., and D. N.; resources, A. P. W and R.; data curation. M. N. N.: writing – original draft preparation, W. A. S. S. and D. N.; writing – review and editing A. P. W.: visualization, R. and M. N. N. All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors declare no conflicts of interest.

## References

Abbas, J., Aman, J., Nurunnabi, M., & Bano, S. (2019). The Impact of Social Media on Learning Behavior for Sustainable Education: Evidence of Students from Selected Universities in Pakistan.

- Sustainability*, 11(6), 1683. <https://doi.org/10.3390/su11061683>
- Abdulrahman, M. D., Faruk, N., Oloyede, A. A., Surajudeen-Bakinde, N. T., Olawoyin, L. A., Mejabi, O. V., Imam-Fulani, Y. O., Fahm, A. O., & Azeez, A. L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon*, 6(11), e05312. <https://doi.org/10.1016/j.heliyon.2020.e05312>
- Abuhassna, H., Al-Rahmi, W. M., Yahya, N., Zakaria, M. A. Z. M., Kosnin, A. Bt. M., & Darwish, M. (2020). Development of a new model for utilizing online learning platforms to improve students' academic achievements and satisfaction. *International Journal of Educational Technology in Higher Education*, 17(1), 38. <https://doi.org/10.1186/s41239-020-00216-z>
- Academia Peruana de Psicología, & Lamas, H. A. (2015). School Performance. *Propósitos y Representaciones*, 3(1), 351–386. <https://doi.org/10.20511/pyr2015.v3n1.74>
- Agustina, S., & Nandiyanto, A. B. D. (2021). The Effectiveness of Distance Learning Using Learning Management System Media and Whatsapp Groups at Senior High School. *Indonesian Journal of Multidisciplinary Research*, 1(1), 89–98. <https://doi.org/10.17509/ijomr.v1i1.33786>
- Aichner, T., Grünfelder, M., Maurer, O., & Jegeni, D. (2021). Twenty-Five Years of Social Media: A Review of Social Media Applications and Definitions from 1994 to 2019. *Cyberpsychology, Behavior, and Social Networking*, 24(4), 215–222. <https://doi.org/10.1089/cyber.2020.0134>
- Anggraini, R. I., Tirdasari, N. L., & Indrawan, D. (2020). Family Business Challenge in Technology and Engineering: Human Capital in Industrial 4.0. In *Proceedings of the First ASEAN Business, Environment, and Technology Symposium (ABEATS 2019)*. <https://doi.org/10.2991/aebmr.k.200514.019>
- Anindyarini, A., Rokhman, F., & Mulyani, M. (2018). Behavioristic Theory and Its Application in the Learning of Speech. *KnE Social Sciences*, 3(9), 522. <https://doi.org/10.18502/kss.v3i9.2714>
- Ashwin, P. (2022). The educational purposes of higher education: Changing discussions of the societal outcomes of educating students. *Higher Education*, 84(6), 1227–1244. <https://doi.org/10.1007/s10734-022-00930-9>
- Astuti, P. A. S., Assunta, M., & Freeman, B. (2020). Why is tobacco control progress in Indonesia stalled? - A qualitative analysis of interviews with tobacco control experts. *BMC Public Health*, 20(1), 527. <https://doi.org/10.1186/s12889-020-08640-6>

- Aswir, A., Hadi, M. S., & Dewi, F. R. (2021). Google Meet Application as an Online Learning Media for Descriptive Text Material. *Jurnal Studi Guru Dan Pembelajaran*, 4(1), 189–194. <https://doi.org/10.30605/jsjp.3.3.2020.533>
- Aweid, B., Haider, Z., Wehbe, M., & Hunter, A. (2022). Educational benefits of the online journal club: A systematic review. *Medical Teacher*, 44(1), 57–62. <https://doi.org/10.1080/0142159X.2021.1963424>
- Barut Tugtekin, E., & Dursun, O. O. (2022). Effect of animated and interactive video variations on learners' motivation in distance Education. *Education and Information Technologies*, 27(3), 3247–3276. <https://doi.org/10.1007/s10639-021-10735-5>
- Bose, K. S., & Sarma, R. H. (1975). Delineation of the intimate details of the backbone conformation of pyridine nucleotide coenzymes in aqueous solution. *Biochemical and Biophysical Research Communications*, 66(4), 1173–1179. [https://doi.org/10.1016/0006-291x\(75\)90482-9](https://doi.org/10.1016/0006-291x(75)90482-9)
- Brame, C. J. (2016). Effective Educational Videos: Principles and Guidelines for Maximizing Student Learning from Video Content. *CBE – Life Sciences Education*, 15(4), es6. <https://doi.org/10.1187/cbe.16-03-0125>
- Brew, E. A., Nketiah, B., & Koranteng, R. (2021). A Literature Review of Academic Performance, an Insight into Factors and their Influences on Academic Outcomes of Students at Senior High Schools. *OALib*, 08(06), 1–14. <https://doi.org/10.4236/oalib.1107423>
- Cheung, S. Y., & Ng, K. Y. (2021). Application of the Educational Game to Enhance Student Learning. *Frontiers in Education*, 6, 623793. <https://doi.org/10.3389/feduc.2021.623793>
- Cilliers, E. J. (2021). Reflecting on Social Learning Tools to Enhance the Teaching-Learning Experience of Generation Z Learners. *Frontiers in Education*, 5, 606533. <https://doi.org/10.3389/feduc.2020.606533>
- Coman, C., Țiru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97–140. <https://doi.org/10.1080/10888691.2018.1537791>
- Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 49(1), 5–22. <https://doi.org/10.1177/0047239520934018>
- Dona Fitriawan. (2022). The Effect of Online Learning Using Online Media on Learning Achievement. *Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, 5(1), 1–9. <https://doi.org/10.30605/proximal.v5i1.1546>
- Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: The new normal and emerging technologies. *International Journal of Educational Technology in Higher Education*, 15(1), 3. <https://doi.org/10.1186/s41239-017-0087-5>
- El-Sabagh, H. A. (2021). Adaptive e-learning environment based on learning styles and its impact on the development of students' engagement. *International Journal of Educational Technology in Higher Education*, 18(1), 53. <https://doi.org/10.1186/s41239-021-00289-4>
- Ericsson, K. A., & Harwell, K. W. (2019). Deliberate Practice and Proposed Limits on the Effects of Practice on the Acquisition of Expert Performance: Why the Original Definition Matters and Recommendations for Future Research. *Frontiers in Psychology*, 10, 2396. <https://doi.org/10.3389/fpsyg.2019.02396>
- Fadilah, M., Utari, P., & Wijaya, M. (2022). Government Communication in Implementing Inclusive Education for Working Towards the Sustainable Development Goals. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v7i5.10592>
- Fadhilah, F. D., Harahap, F. H., Sofia, N. Z., Prayoga, S., & Ihsan, M. T. (2021). The Utilization of Information Technology As Learning Media. *Jurnal Riset Dan Inovasi Pembelajaran*, 1(2), 164–173. <https://doi.org/10.51574/jrip.v1i2.48>
- Faraniza, Z. (2021). Blended learning best practice to answer 21st-century demands. *Journal of Physics: Conference Series*, 1940(1), 012122. <https://doi.org/10.1088/1742-6596/1940/1/012122>
- Gayatri, D. D., & Gaffar, M. A. (2023). The Implementation of Picture Series as Learning Media to Improve Students' Writing Ability Related to Historical Events in Recount Text. *Edunesia: Jurnal Ilmiah Pendidikan*, 4(2), 790–803. <https://doi.org/10.51276/edu.v4i2.429>
- Gherheș, V., Stoian, C. E., Fărcașiu, M. A., & Stanici, M. (2021). E-Learning vs. Face-To-Face Learning: Analyzing Students' Preferences and Behaviors. *Sustainability*, 13(8), 4381. <https://doi.org/10.3390/su13084381>
- Ghofur, A. (2022). *Analysis the Quality of Learning Media For English Language Teaching* [Preprint]. Open



- Science Framework.  
<https://doi.org/10.31219/osf.io/3uchq>
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Herianto, & Wilujeng, I. (2021). Increasing the attention, relevance, confidence, and satisfaction (ARCS) of students through interactive science learning multimedia. *Research in Learning Technology*, 29. <https://doi.org/10.25304/rlt.v29.2383>
- Hermawan, I. (2021). The Impact of Industrial Revolution 4.0 on Indonesian Export and Welfare: Food and Beverage Case. In *4th International Conference on Sustainable Innovation 2020-Accounting and Management (ICoSIAMS 2020)* (pp. 355-360). Atlantis Press. <https://doi.org/10.2991/aer.k.210121.050>
- Heymann, J., Raub, A., & Cassola, A. (2014). Constitutional rights to education and their relationship to national policy and school enrolment. *International Journal of Educational Development*, 39, 121–131. <https://doi.org/10.1016/j.ijedudev.2014.08.005>
- Hollister, B., Nair, P., Hill-Lindsay, S., & Chukoskie, L. (2022). Engagement in Online Learning: Student Attitudes and Behavior During COVID-19. *Frontiers in Education*, 7, 851019. <https://doi.org/10.3389/feduc.2022.851019>
- Höpfner, J., & Keith, N. (2021). Goal Missed, Self Hit: Goal-Setting, Goal-Failure, and Their Affective, Motivational, and Behavioral Consequences. *Frontiers in Psychology*, 12, 704790. <https://doi.org/10.3389/fpsyg.2021.704790>
- Idris, F., Hassan, Z., Ya'acob, A., Gill, S. K., & Awal, N. A. M. (2012). The Role of Education in Shaping Youth's National Identity. *Procedia-Social and Behavioral Sciences*, 59, 443–450. <https://doi.org/10.1016/j.sbspro.2012.09.299>
- Iqbal, M. H., Siddiqie, S. A., & Mazid, Md. A. (2021). Rethinking theories of lesson plan for effective teaching and learning. *Social Sciences & Humanities Open*, 4(1), 100172. <https://doi.org/10.1016/j.ssaho.2021.100172>
- Islami, X., Mulolli, E., & Mustafa, N. (2018). Using Management by Objectives as a performance appraisal tool for employee satisfaction. *Future Business Journal*, 4(1), 94–108. <https://doi.org/10.1016/j.fbj.2018.01.001>
- Isroani, F., & Huda, M. (2022). Strengthening Character Education through Holistic Learning Values. *QUALITY*, 10(2), 289. <https://doi.org/10.21043/quality.v10i2.17054>
- Joaquin, J. J. B., Biana, H. T., & Dacela, M. A. (2020). The Philippine Higher Education Sector in the Time of COVID-19. *Frontiers in Education*, 5, 576371. <https://doi.org/10.3389/feduc.2020.576371>
- Kadau, I. (2022). Behaviorism theory in teaching and learning English as a second language in primary schools. *International Journal of English and Literature*, 13(3), 33–38. <https://doi.org/10.5897/IJEL2022.1511>
- Kaplan, D. E. (2018). Behaviorism in Online Teacher Training. *Psychology*, 09(04), 570–577. <https://doi.org/10.4236/psych.2018.94035>
- Kapoor, K. K., Tamilmani, K., Rana, N. P., Patil, P., Dwivedi, Y. K., & Nerur, S. (2018). Advances in Social Media Research: Past, Present and Future. *Information Systems Frontiers*, 20(3), 531–558. <https://doi.org/10.1007/s10796-017-9810-y>
- Keiler, L. S. (2018). Teachers' roles and identities in student-centered classrooms. *International Journal of STEM Education*, 5(1), 34. <https://doi.org/10.1186/s40594-018-0131-6>
- Khusniyah, N. L. (2022). Digital Learning Media Needs Analysis for English Reading Comprehension Class. *AL-ISHLAH: Jurnal Pendidikan*, 14(1), 241–248. <https://doi.org/10.35445/alishlah.v14i1.1920>
- Kim, S., Raza, M., & Seidman, E. (2019). Improving 21st-century teaching skills: The key to effective 21st-century learners. *Research in Comparative and International Education*, 14(1), 99–117. <https://doi.org/10.1177/1745499919829214>
- Kosim, M., Muqoddam, F., Mubarak, F., & Laila, N. Q. (2023). The dynamics of Islamic education policies in Indonesia. *Cogent Education*, 10(1), 2172930. <https://doi.org/10.1080/2331186X.2023.2172930>
- Kromydas, T. (2017). Rethinking higher education and its relationship with social inequalities: Past knowledge, present state, and future potential. *Palgrave Communications*, 3(1), 1. <https://doi.org/10.1057/s41599-017-0001-8>
- Kwon, H. R., & Silva, E. A. (2020). Mapping the Landscape of Behavioral Theories: Systematic Literature Review. *Journal of Planning Literature*, 35(2), 161–179. <https://doi.org/10.1177/0885412219881135>
- Lagoudakis, N., Vlachos, F., Christidou, V., & Vavougiou, D. (2022). The effectiveness of a teaching approach using brain-based learning elements on students' performance in a Biology course. *Cogent Education*, 9(1), 2158672. <https://doi.org/10.1080/2331186X.2022.2158672>
- Lassoued, Z., Alhendawi, M., & Bashitialshaer, R. (2020). An Exploratory Study of the Obstacles to Achieving Quality in Distance Learning during the

- COVID-19 Pandemic. *Education Sciences*, 10(9), 232. <https://doi.org/10.3390/educsci10090232>
- Lim, W. M., & Rasul, T. (2022). Customer engagement and social media: Revisiting the past to inform the future. *Journal of Business Research*, 148, 325–342. <https://doi.org/10.1016/j.jbusres.2022.04.068>
- Lodge, J. M., Kennedy, G., Lockyer, L., Arguel, A., & Pachman, M. (2018). Understanding Difficulties and Resulting Confusion in Learning: An Integrative Review. *Frontiers in Education*, 3, 49. <https://doi.org/10.3389/feduc.2018.00049>
- Mahmud, R. (2020). Blended learning model implementation in the normal, pandemic, and new normal era. In *The 5th Progressive and Fun Education International Conference (PFEIC 2020)* (pp. 130-139). Atlantis Press. <https://doi.org/10.2991/assehr.k.201015.021>
- Malik, A., Heyman-Schrum, C., & Johri, A. (2019). Use of Twitter across educational settings: A review of the literature. *International Journal of Educational Technology in Higher Education*, 16(1), 36. <https://doi.org/10.1186/s41239-019-0166-x>
- Marpanaji, E., Mahali, M. I., & Putra, R. A. S. (2018). Survey on How to Select and Develop Learning Media Conducted by Teacher Professional Education Participants. *Journal of Physics: Conference Series*, 1140, 012014. <https://doi.org/10.1088/1742-6596/1140/1/012014>
- Meriyanti, M., & Jasmina, T. (2022). Access of Information, Communication, and Technology (ICT) and Learning Performance of Junior High School Students in Indonesia: Analysis at the District Level. *Jurnal Perencanaan Pembangunan: The Indonesian Journal of Development Planning*, 6(3), 304–326. <https://doi.org/10.36574/jpp.v6i3.267>
- Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during the lockdown period of the COVID-19 pandemic. *International Journal of Educational Research Open*, 1, 100012. <https://doi.org/10.1016/j.ijedro.2020.100012>
- Mohd Basar, Z., Mansor, A. N., Jamaludin, K. A., & Alias, B. S. (2021). The Effectiveness and Challenges of Online Learning for Secondary School Students – A Case Study. *Asian Journal of University Education*, 17(3), 119. <https://doi.org/10.24191/ajue.v17i3.14514>
- Msaedeh, R. (2018). Levels of Educational Goals Used by Teachers in the Light of Some Variables in Amman Directorate of Education in Jordan. *International Education Studies*, 12(1), 103. <https://doi.org/10.5539/ies.v12n1p103>
- Mubarok, K., & Umami, M. K. (2020). Cloud Manufacturing: An Approach to Strengthen Global Competitiveness of the Indonesian Small and Medium Manufacturing Enterprises: *Proceedings of the International Conference on Culture Heritage, Education, Sustainable Tourism, and Innovation Technologies*, 185–192. <https://doi.org/10.5220/0010305901850192>
- Musheke, M. M., & Phiri, J. (2021). The Effects of Effective Communication on Organizational Performance Based on the Systems Theory. *Open Journal of Business and Management*, 09(02), 659–671. <https://doi.org/10.4236/ojbm.2021.92034>
- Nasution, Y. P. A., Siahaan, A., & Zulheddi, Z. (2022). The Role of Islamic Religious Education Teachers and Parents in Discipline Students's Worship in Madrasah Tsanawiyah. *AL-ISHLAH: Jurnal Pendidikan*, 14(3), 4325–4332. <https://doi.org/10.35445/alishlah.v14i3.1212>
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, 16(1), 160940691773384. <https://doi.org/10.1177/1609406917733847>
- Nur Afifah, R., Simanullang, T., & Madhakomala, R. (2022). Various Advantages in Education. *International Journal of Business, Law, and Education*, 3(3), 145–156. <https://doi.org/10.56442/ijble.v3i3.65>
- Octa Putri, S., & Ginanjar, G. (2018). Industry 4.0 in Electronics and Automotive Sectors and Its Prospect for Indonesia's Economic Diplomacy. In *International Conference on Business, Economic, Social Science and Humanities (ICOBEST 2018)* (pp. 324-327). Atlantis Press. <https://doi.org/10.2991/icobest-18.2018.71>
- Parker, R., Thomsen, B. S., & Berry, A. (2022). Learning Through Play at School – A Framework for Policy and Practice. *Frontiers in Education*, 7, 751801. <https://doi.org/10.3389/feduc.2022.751801>
- Paul, J., & Jefferson, F. (2019). A Comparative Analysis of Student Performance in an Online vs. Face-to-Face Environmental Science Course from 2009 to 2016. *Frontiers in Computer Science*, 1, 7. <https://doi.org/10.3389/fcomp.2019.00007>
- Pham, T. T. T., Le, H. A., & Do, D. T. (2021). The Factors Affecting Students' Online Learning Outcomes during the COVID-19 Pandemic: A Bayesian Exploratory Factor Analysis. *Education Research International*, 2021, 1–13. <https://doi.org/10.1155/2021/2669098>
- Prayogo, J. A. (2022). English Language Teaching in Indonesia in the 21st Century: What Needs Reinforcing and Enhancing for the Teachers. *KnE*

- Social Sciences*.  
<https://doi.org/10.18502/kss.v7i7.10645>
- Putri, M. P., & Solfema, S. (2019). The Relationship Between Variations in the Use of Learning Media and the Learning Activity of Citizens Learning. *Indonesian Journal of Contemporary Education*, 1(1), 36–40. <https://doi.org/10.33122/ijoce.v1i1.9>
- Rafiah, K. K., Widiyanto, S., Kamal, I., Shofiana, A., Fajar, A. M., & Rudini, A. A. (2022). Digital readiness of SMEs: An Insight from Indonesia. *AFEBl Management and Business Review*, 7(1), 12. <https://doi.org/10.47312/ambr.v7i01.517>
- Raghupathi, V., & Raghupathi, W. (2020). The influence of education on health: An empirical assessment of OECD countries for the period 1995–2015. *Archives of Public Health*, 78(1), 20. <https://doi.org/10.1186/s13690-020-00402-5>
- Roziqin, A., Mas'udi, S. Y. F., & Sihidi, I. T. (2021). An analysis of Indonesian government policies against COVID-19. *Public Administration and Policy*, 24(1), 92–107. <https://doi.org/10.1108/PAP-08-2020-0039>
- Sagita, M., & Khairunnisa, K. (2020). E-Learning for Educators in Digital Era 4.0. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 3(2), 1297–1302. <https://doi.org/10.33258/birci.v3i2.974>
- Sari, V. N. I., & Suwandi, S. (2021). Multimedia-Based Interactive Learning Media in the Text Material of the Observation Report. In *International Conference of Humanities and Social Science (ICHSS)* (pp. 224–230). <https://doi.org/10.4108/eai.8-12-2021.2322747>
- Selvaraj, A., Radhin, V., Ka, N., Benson, N., & Mathew, A. J. (2021). Effect of pandemic-based online education on teaching and learning system. *International Journal of Educational Development*, 85, 102444. <https://doi.org/10.1016/j.ijedudev.2021.102444>
- Souto-Otero, M. (2021). Validation of non-formal and informal learning in formal education: Covert and overt. *European Journal of Education*, 56(3), 365–379. <https://doi.org/10.1111/ejed.12464>
- Stone, M. J., & Petrick, J. F. (2013). The Educational Benefits of Travel Experiences: A Literature Review. *Journal of Travel Research*, 52(6), 731–744. <https://doi.org/10.1177/0047287513500588>
- Suci, W., Muslim, S., & Chaeruman, U. A. (2022). Use of Social Media for Collaborative Learning in Online Learning: A Literature Review. *AL-ISHLAH: Jurnal Pendidikan*, 14(3), 3075–3086. <https://doi.org/10.35445/alishlah.v14i3.833>
- Sung, Y.-T., Chang, K.-E., & Liu, T.-C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, 94, 252–275. <https://doi.org/10.1016/j.compedu.2015.11.008>
- Susilo, A., & Sofiarini, A. (2021). Use of WhatsApp Group as Learning Media in Higher Education During the Covid-19 Pandemic. *Edunesia: Jurnal Ilmiah Pendidikan*, 2(2), 400–410. <https://doi.org/10.51276/edu.v2i2.139>
- Sutisnawati, Y., Ramdani, I. L., Fitriyani, A. M., Ariska, I., & Rafdhi, A. A. (2021). Information and Communication Technology in Online Learning Process. *International Journal of Education, Information Technology, and Others*, 4(1), 19–26. <https://doi.org/10.5281/ZENODO.4683425>
- Tan, E. S. (2018). Psychology of the film. *Palgrave Communications*, 4(1), 82. <https://doi.org/10.1057/s41599-018-0111-y>
- Tirri, K., Moran, S., & Menon Mariano, J. (2016). Education for purposeful teaching around the world. *Journal of Education for Teaching*, 42(5), 526–531. <https://doi.org/10.1080/02607476.2016.1226551>
- Turan, Z., Kucuk, S., & Cilligol Karabey, S. (2022). The university students' self-regulated effort, flexibility, and satisfaction in distance education. *International Journal of Educational Technology in Higher Education*, 19(1), 35. <https://doi.org/10.1186/s41239-022-00342-w>
- Vebrianto, R., & Osman, K. (2011). The effect of multiple media instruction in improving students' science process skill and achievement. *Procedia - Social and Behavioral Sciences*, 15, 346–350. <https://doi.org/10.1016/j.sbspro.2011.03.099>
- Vekli, G. S., & Çalik, M. (2023). The Effect of Web-Based Biology Learning Environment on Academic Performance: A Meta-analysis Study. *Journal of Science Education and Technology*, 32(3), 365–378. <https://doi.org/10.1007/s10956-023-10033-4>
- Verma, A., & Venkatesan, M. (2022). HR factors for the successful implementation of Industry 4.0: A systematic literature review. *Journal of General Management*, 47(2), 73–85. <https://doi.org/10.1177/03063070211019141>
- Voorveld, H. A. M., van Noort, G., Muntinga, D. G., & Bronner, F. (2018). Engagement with Social Media and Social Media Advertising: The Differentiating Role of Platform Type. *Journal of Advertising*, 47(1), 38–54. <https://doi.org/10.1080/00913367.2017.1405754>
- Wijaya, M. C. (2019). The Impact of Using Multimedia Interactive Based for Learning Media on Teacher and Student Communication in Bandung. *Journal*

- Pekommas*, 4(1), 53.  
<https://doi.org/10.30818/jpkm.2019.2040106>
- Zumailah, E., Nur, T., & Darmiyanti, A. (2022).  
Application of Behavioristic Learning Theory in  
Developing Healthy Life Behavior for Student.  
*Edukatif: Jurnal Ilmu Pendidikan*, 4(5), 6724–6731.  
<https://doi.org/10.31004/edukatif.v4i5.3848>