



## Learning media transformation: Before, during, and after the COVID-19 pandemic

Fahmi Muhammad Fauzi<sup>1</sup>, Meiyesha Kusdiantie<sup>2</sup>, Muhammad Shidqi<sup>3</sup> Abdul Azzam<sup>3</sup>

<sup>1,2,3</sup>Universitas Pendidikan Indonesia, Bandung, Indonesia

[fahmimuhammadfauzi09@upi.edu](mailto:fahmimuhammadfauzi09@upi.edu)<sup>1</sup>, [meiyesha@upi.edu](mailto:meiyesha@upi.edu)<sup>2</sup>, [abdulazzam@upi.edu](mailto:abdulazzam@upi.edu)<sup>3</sup>

### ABSTRACT

This article discusses the transformation of pre-pandemic, during-pandemic, and post-pandemic learning media, supported by changes in the applicable curriculum. The transition from the Kurikulum 2013 Revisi to the Kurikulum Merdeka is also highlighted. This research aims to understand the development of existing learning media and how the COVID-19 pandemic has influenced it. The study employs a literature review method with a qualitative approach. The findings reveal the development of learning media following the rapid advancement of technology. Before the pandemic, under the Kurikulum 2013 Revisi, traditional media were predominantly used in classrooms with the support of ICT media, which could only be accessed in schools. During the pandemic, digital media significantly grew due to distance learning measures. The emergence of online learning platforms became increasingly popular, with almost all types of learning relying on technology and the internet. In the post-pandemic period, the familiarity with digital media established during the pandemic persisted and was considered easily accessible and highly sought-after. This was further supported by implementing the Kurikulum Merdeka, allowing students to learn anytime and anywhere. Consequently, digital learning media, along with current technology, is currently in high demand.

### ARTICLE INFO

#### Article History:

Received: 26 May 2024

Revised: 9 Aug 2024

Accepted: 14 Aug 2024

Available online: 30 Aug 2024

Publish: 30 Aug 2024

#### Keyword:

kurikulum 2013; kurikulum merdeka; learning media; pandemic; post-pandemic; pre-pandemic

#### Open access

Hipkin Journal of Educational Research is a peer-reviewed open-access journal.

### ABSTRAK

Artikel ini membahas mengenai transformasi media pembelajaran pra atau sebelum pandemi, saat pandemi dan pasca atau setelah pandemi berlangsung. Transformasi media yang didukung pula dengan perubahan kurikulum yang berlaku. Perpindahan dari Kurikulum 2013 Revisi kepada Kurikulum Merdeka. Penelitian ini bertujuan untuk mengetahui perkembangan media pembelajaran yang ada dan bagaimana pandemi COVID-19 mempengaruhi hal tersebut. Penelitian ini menggunakan metode literature review dengan jenis penelitian kualitatif. Dihasilkan perkembangan media pembelajaran yang ada mengikuti kemajuan teknologi yang sekarang berkembang dengan pesat. Pada masa sebelum pandemi dengan Kurikulum 2013 Revisi menggunakan media-media tradisional di dalam kelas dengan dukungan media TIK yang hanya dapat diakses di sekolah. Pada masa pandemi, media digital berkembang pesat karena jarak yang berlaku. Munculnya platform belajar online mulai banyak diminati, hampir semua jenis pembelajaran bergantung pada teknologi dan internet. Pada setelah pandemi, dengan terbiasanya menggunakan media digital saat pandemi, setelahnya pun menjadi terbiasa dan dianggap sebagai media yang mudah digunakan dan banyak diminati, didukung dengan penerapan kurikulum Merdeka, di mana peserta didik dapat belajar di mana dan kapan saja, sehingga media pembelajaran digital dengan teknologi saat ini sedang digemari.

**Kata Kunci:** kurikulum 2013; kurikulum merdeka; media pembelajaran; pandemi; pra-pandemi; pasca pandemi

### How to cite (APA 7)

Fauzi, F. M., Kusdiantie, M., & Azzam, M. S. A. (2024). *Learning media transformation: Before, during, and after the COVID-19 pandemic*. Hipkin Journal of Educational Research, 1(2), 227-238.

### Peer review

This article has been peer-reviewed through the journal's standard double-blind peer review, where both the reviewers and authors are anonymised during review.

### Copyright

2024, Fahmi Muhammad Fauzi, Meiyesha Kusdiantie, Muhammad Shidqi<sup>3</sup> Abdul Azzam. This an open-access is article distributed under the terms of the Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0) <https://creativecommons.org/licenses/by-sa/4.0/>, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author, and source are credited. \*Corresponding author: [fahmimuhammadfauzi09@upi.edu](mailto:fahmimuhammadfauzi09@upi.edu)

## INTRODUCTION

The spread of the coronavirus initially had a significant impact on the economy and society, but its effects were also felt in the world of education (Purwanto *et al.*, 2020). The COVID-19 pandemic has forced all educational institutions, from preschool to university level, to adapt to new learning methods. Learning innovations resulting from COVID-19 have actually opened up a new paradigm for educational institutions, which no longer require the learning process to take place face-to-face in the classroom (Fitriyani *et al.*, 2020). The pandemic has led to a new paradigm for education that is more advanced and flexible. Online learning has become important in the context of distance learning. There is an important role for remote information technology systems in online learning, which must be prepared to implement the 'learning from home' method. One alternative is to use Android as a learning medium. The use of Android as a learning medium can be an alternative and a solution to make students more active in the learning process. The more active the students are, the more it will affect their learning outcomes.

In active classroom learning activities, the use of learning media is significant. It can generate enthusiasm, interest, and different desires, as well as motivation and stimulus in carrying out learning activities. It can even bring about psychological changes in students. At the teaching orientation stage, the use of learning media will significantly help the effectiveness of learning activities in terms of delivering lesson material (Rosyiddin *et al.*, 2023; Wulandari *et al.*, 2023). Teaching and learning activities must be improved, necessitating innovation that utilizes learning media as an opportunity to continue delivering education to students (Rahmi, 2020). Although it is not easy, this is the only thing that can bridge the gap in education implementation during the current pandemic. Innovation is also defined as a new idea that is felt by various parties, both individually and in groups. These ideas are evident in the results of information technology (Rahmi, 2020).

The use of media is one of the tools that can be used in systematic learning activities from educators to students. The principles of utilization are also related to the characteristics of the students. A learner may need visual or verbal skills to benefit from learning practices or resources. In this case, it is explained that the use of learning media is an aspect that requires the attention of learners in every learning activity (Amir, 2016). Therefore, learners need to learn how to select appropriate learning media in order to achieve learning objectives effectively in the teaching and learning process.

Previous research on the impact of the COVID-19 pandemic on the online learning process in elementary schools found that the outbreak had a significant effect on the learning experience of students. One of these effects was a feeling of being forced into distance learning, where students felt limited by the lack of adequate facilities and infrastructure in their home environment. This obstacle created a serious challenge in creating an effective learning environment (Purwanto *et al.*, 2020). In addition, students also faced obstacles due to the lack of a culture of distance learning among them. Previously, the education system involved face-to-face interaction at school, so students were accustomed to being in a school environment where they could interact with classmates, play, and share moments. The introduction of distance learning methods requires time to adapt, and this change can indirectly affect students' concentration and learning absorption levels. Learning media before, during, and after the COVID-19 pandemic have undergone many differences and changes. In particular, learning media prior to the COVID-19 pandemic were less innovative and interactive. Consequently, when the pandemic occurred, many changes took place, as the transition from face-to-face to virtual learning occurred.

This study aims to investigate the development of existing learning media and its impact on the COVID-19 pandemic. It is hoped that this study will be helpful for further research, allowing for the analysis of changes in learning media across each period and the identification of the strengths and weaknesses of learning media before, during, and after the COVID-19 pandemic.

## LITERATURE REVIEW

### Learning Media

Learning media consists of two words, namely learning and media. In a book written by Rusman entitled "*Belajar dan Pembelajaran*", it is explained that media is a tool that must be available if we want to make a job easier. Media is a message-carrying technology that can be used for learning purposes (Iskandar, 2020; Premana *et al.*, 2022). Then, "media" can be interpreted as a communication channel tool. Literally, "media" comes from Latin, which is the plural form of the word "medium," meaning an intermediary, i.e., an entity that lies between the source of the message (the source) and the recipient of the message (the receiver). In essence, learning media serve as a vehicle for conveying messages or information from the source to the recipient.

Learning is a system comprising various interconnected components (Dasopang, 2017). The components of learning include objectives, materials, methods, and evaluation. Teachers must consider these four components of learning when choosing and determining the media, methods, strategies, and approaches to be used in learning activities (González-Pérez & Ramírez-Montoya, 2022). Learning is essentially a process of interaction between teachers and students, both direct interaction, such as face-to-face activities, and indirect interaction, namely through the use of various learning media.

According to Undang-Undang Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional (National Education System), Article 1, paragraph 20, learning is a process of interaction between students, educators, and learning resources within a learning environment (Samsinar, 2020). Therefore, there are five types of interactions that can take place in the learning and teaching process, namely 1) interaction between educators and students; 2) interaction between fellow students or peers; 3) interaction between students and resource persons; 4) interaction between students and educators with learning resources that have been deliberately developed; and 5) interaction between students and educators with the social and natural environment. From the above statement, learning is basically a process of communication and interaction between learning resources, teachers, and students. This communication interaction is carried out either directly in face-to-face activities or indirectly using media, where the learning model to be applied has been determined in advance.

Learning media is one component of the teaching and learning process that plays a vital role in supporting the success of the teaching and learning process. Media are various types of components in the student environment that can provide stimuli for learning (Amir, 2016). As previously stated, the use of learning media can also stimulate students to learn. Learning media refers to any tool used to convey messages and stimulate thoughts, feelings, attention, and willingness, thereby encouraging a deliberate, purposeful, and controlled learning process (Hayati & Harianto, 2017).

Learning media is a message-carrying technology that functions as a physical and communication medium to convey learning material (Premana *et al.*, 2022). Learning media is a means of communication in print or audio-visual form, including hardware technology (Linda, 2023). In essence, learning media serve as a vehicle for conveying messages or information from the source to the recipient. The messages or teaching materials conveyed are learning materials designed to achieve specific learning objectives or a set of predefined competencies, so that, in the process, media serve as a learning subsystem. In addition, learning media has a very strategic function in learning. There are several functions of learning media in learning, namely as a tool in the learning process, as a component of the learning subsystem, as a guide, as a game or to arouse the attention or motivation of students, to improve the learning process and outcomes, to reduce verbalism, and to overcome limitations of space, time, energy, and sensory abilities.

The benefits of learning media in the learning process are as follows:

1. Learning will attract more attention from students, thereby fostering motivation to learn.
2. The meaning of the learning material will be more precise, making it easier for students to understand and enabling them to master the learning objectives better.
3. Learning methods will be more varied, not merely verbal communication through the teacher's words, so that students do not get bored and teachers do not run out of energy, especially if teachers have to teach every hour.
4. Students will engage in more learning activities, as they will not only listen to the teacher's explanations but also participate in other activities such as observing, doing, and demonstrating.

Several types of learning media can be used in learning. Broadly speaking, learning media can be categorized into three main types: visual, audio, and audiovisual media.

### Curriculum Before, During, and After the Pandemic

The curriculum is an educational plan used as a guideline for teaching activities carried out in the classroom and is also agreed upon in principle to be implemented throughout Indonesia. Changes to the curriculum imply that it is constantly changing to keep up with the times (Putri *et al.*, 2024). In particular, changes before, during, and after the pandemic have changed the way of life for people around the world. In practice, before and during the pandemic, Indonesia used the Kurikulum 2013 revision in its learning activities. The curriculum emphasizes character development (Darise, 2019). Teachers are required to develop learning by integrating character education, literacy, 21st-century skills, and higher-order thinking skills into their teaching. The school literacy movement was initiated to develop strong literacy skills among students. This includes basic literacy, library literacy, media literacy, technological literacy, and visual literacy (Park *et al.*, 2021). In this case, the Kurikulum 2013 revision requires students to enrich their knowledge by reading and utilizing the media around them to support their learning.

Kurikulum Merdeka is based on the principle of human diversity. It provides opportunities for students to explore their interests and talents, thereby improving their achievement (Aji *et al.*, 2020). This curriculum aims to create an enjoyable learning experience and does not require students to meet existing requirements. Students are given the freedom to learn in their own style and at their own pace, accompanied by teachers and parents. The learning process, which does not rely solely on classroom learning, allows students to learn in more ways and according to their interests.

With the increasing possibility of students learning outside the classroom, this curriculum aligns with the digital technology at their fingertips. This technology is present in both independent learning, allowing students to explore their interests more freely and flexibly, and in classroom learning, where teachers serve as facilitators to create engaging learning experiences that are not monotonous and limited to textbooks. With a student-centered approach as the focus of learning, students are encouraged to take an active role in their own learning. One way this is achieved is through easily accessible technology, which serves as a learning medium for students. In line with the needs of 21st-century learners, who are required to be more creative and innovative, students can develop their creativity by leveraging easy access to technology as a medium for acquiring knowledge.

### The COVID-19 Pandemic on Learning

The COVID-19 pandemic has had a profound impact on almost every aspect of human life. The outbreak, which initially affected only the economy, has gradually spread to various key sectors that support human activities. To date, the impact has also been felt in the world of education. One of the most important sectors that supports human survival has not been spared from the effects of the COVID-19 pandemic. Policies implemented by several countries, including Indonesia, that require the postponement or

cancellation of educational activities as a whole have prompted the government and related institutions to seek alternative solutions for implementing the educational process. One of the efforts made by the Indonesian government is to urge the public to implement physical distancing, avoid activities that involve crowds, and refrain from meetings that involve large gatherings (Pujowati & Sufaidi, 2021). This step was taken in response to emergencies, such as pandemics, which require physical and social restrictions to minimize the spread of disease (Siahaan, 2020).

In facing this challenge, the government is striving to maintain the continuity of education for students who are unable to attend classes at educational institutions in person. Relevant institutions, including the Ministry of Education, universities, and schools, collaborated to design and implement online learning platforms, lecture materials accessible online, and evaluation strategies tailored to distance learning conditions (Ali, 2020). These steps were taken to ensure equal access to and quality of education for all students, despite physical restrictions. The length of the school holidays caused by the distance learning policy can also trigger boredom among children. They begin to miss the school environment, playing with friends, and direct interaction with teachers. These feelings can hurt students' motivation to learn and their overall psychological well-being. The experience of distance learning caused by the COVID-19 pandemic presents several challenges for students, including those related to infrastructure, learning culture, and their psychological and social aspects (Kamysbayeva *et al.*, 2021). Efforts are needed to overcome these obstacles so that the teaching and learning process at home can be more effective and enjoyable for students.

## METHODS

This article primarily focuses on exploring research published in reputable national and international journals, aligning with the topic of Trends in the Evolution of Learning Media discussed in the article. The literature review was conducted consistently by applying an appropriate methodological approach, namely a qualitative literature review. This approach was conducted inductively to avoid further questions. In an inductive approach, researchers collect data openly and then analyze it to identify patterns, themes, or concepts that emerge naturally from the data itself. The induction process involves collecting various relevant sources of information about trends in the evolution of learning media, including reputable national and international journals. Then, the data from these sources is carefully analyzed to identify patterns or themes that emerge consistently, as well as to understand the developments and trends occurring in learning media. This method is considered appropriate for this study because it provides the freedom to explore various perspectives and concepts related to trends in the evolution of learning media without being bound by a specific conceptual framework or hypothesis. Next, an in-depth discussion is conducted on the relevant literature or references that have been reviewed.

## RESULTS AND DISCUSSION

### Media Before the Pandemic

The development of learning media did not only occur during and after the COVID-19 pandemic, but had already been happening since the beginning of the Industry 4.0 revolution. Industry 4.0 is a term that first appeared in Germany in 2011, marking the beginning of a digital revolution in the industrial world (Marsudi & Widjaja, 2019). This concept refers to industrial transformation that occurs through digital connectivity, involving various technologies such as 3D printing and robotics, to increase production efficiency. This revolution has brought about significant changes in the industrial sector, where information and communication technology are fully leveraged. In addition to changes in the production process, business models have also undergone major transformations across the industrial value chain.



In this era of the industrial revolution 4.0, the use of learning media has increasingly utilized technology, especially Information and Communication Technology (ICT). The use of ICT as a source and medium of learning continues to grow and has become an indicator of a school's progress (Lestari & Pratama, 2020). ICT has been widely integrated and developed in the teaching and learning process, contributing positively to the quality of learning and its outcomes in schools. Based on the results of this study, it can be observed that learning media had already developed significantly before the COVID-19 pandemic. One example is the increasing use of ICT in learning media. The successful use of various resources, including ICT equipment, greatly depends on the ability, skills, and creativity of teachers in integrating them into learning.

Although various learning resources are available, the role of teachers remains crucial in the educational process and cannot be entirely replaced by other learning resources. The development of Learning Resource Centers or Pengembangan Pusat Sumber Belajar (PSB) in schools, ranging from simple to sophisticated and comprehensive, is important. The existence of professionally managed PSBs can enhance the effectiveness and efficiency of learning resource utilization in schools, while also helping teachers and students overcome various challenges in the teaching and learning process.

### Media During the Pandemic

Five years have passed since the COVID-19 pandemic began, causing significant changes in every aspect of life, including education. Significant changes were immediately felt by every part of education, including students, teachers, schools, and others. One of the most noticeable changes was in learning activities, which initially took place in classrooms but had to shift to remote learning using smartphones, laptops, or other supporting media. This was certainly not an easy thing to do, because neither students, teachers, nor schools were fully prepared for the changes caused by COVID-19. Other problems, such as the unevenness of the learning process, both in terms of standards and quality, further compounded this issue. The implementation of this online learning system has encountered several obstacles, including the uneven distribution of students and parents who are proficient in operating online media (Suhartini, 2021).

Various learning media applications are available, both from the government and the private sector. The government issued Surat Edaran Menteri Pendidikan dan Kebudayaan No. 9 Tahun 2018 tentang Pemanfaatan Rumah Belajar. The private sector also offers online tutoring such as Ruang Guru, Zenius, Kelasku, Kahoot, and others. These resources can be used to develop knowledge and insight. This is essential to enhance the quality of human resources (HR). The success of a country's education system is primarily a measure of its overall development. Through education, the nation's future generations will become intellectually and emotionally intelligent, skilled, and independent, enabling them to achieve national progress. However, a polemic has arisen in society during this period of the COVID-19 pandemic's metamorphosis.

Educators and students certainly feel this. Educators, in particular, are required to be creative in delivering material through online learning media. This also needs to be adjusted to the level of education they need. The impact will cause physical and psychological (mental) pressure. A positive mindset can facilitate the implementation of online learning media, thereby producing quality learning outcomes (Yolanda *et al.*, 2021). Learning at home using online media requires parents to be role models in assisting their children's learning and dealing with attitude changes. The COVID-19 pandemic can be seen as an opportunity in the world of education. Teachers or lecturers are the only pillars of education. This is a big challenge for teachers, lecturers, and parents. Many parents complain about distance learning media, especially those accessed online (via the internet), for those who work from home (WFH). They must continue to accompany their children, especially young children (Safitri *et al.*, 2021). This is because the introduction of technology in learning media, such as laptops and gadgets, is not yet widespread.

One of the impacts of the COVID-19 pandemic is the transformation of learning media, which previously used a face-to-face system in the classroom. However, due to the COVID-19 pandemic, which spreads quickly through direct contact with infected individuals, gatherings are prohibited. The world of education was also affected, so learning was conducted online. In this regard, several online learning media can be used, including:

1. The first and most widely used communication media during online learning is WhatsApp groups.
2. The next online learning media comes from Google, namely Google Suite for Education.
3. The next online learning platform is Ruangguru.
4. Another online learning platform that can be used is Zenius.
5. Another frequently used online learning medium is Zoom.

Based on the above, considering the situation and conditions during the COVID-19 pandemic, teachers or lecturers must be competent in choosing the learning media to be used in the learning process so that students do not fall behind in their studies. Therefore, educators are required to master many learning media. Not only that, but during the COVID-19 pandemic, numerous experts, including teachers, lecturers, and institutions, have made significant developments in learning media. The learning media developed include e-books, websites, games, learning applications, and so on.

### **Media After the Pandemic**

The new normal requires teachers and students to adapt to the new circumstances that have emerged in the wake of the pandemic. The world has changed, and so has education. After experiencing online schooling, we are now returning to what we are used to, which is face-to-face learning. However, the new normal has also given rise to a new learning method, namely blended learning. In this method, students learn in two ways, namely online learning on screen and offline learning in the classroom. The term for this is hybrid. This learning method provides students with a new experience for acquiring knowledge tailored to their specific class. Post-COVID-19 learning cannot rely solely on online learning, but online learning can be used as a complement to face-to-face learning in the classroom (Rohana & Syahputra, 2021). With this new method, new media are also needed. In the current situation, traditional and digital media have become equally important. To support this blended learning method, effective learning media are needed to support learning. Some of these media include:

1. PowerPoint slides as the primary delivery method  
Before the pandemic, learning with PowerPoint slides was not a widely used instructional method. During and after the pandemic, this media has become the most favorite media in the classroom. It is considered the simplest medium compared to books and writing on the blackboard. Now, projectors are a mandatory tool that schools must have, and are even provided for each classroom.
2. E-books  
In addition to PowerPoint, which is used as the primary medium for delivering teaching materials, there are also digital teaching materials in the form of e-books or electronic books. These are digital versions of books, usually in PDF format. Students and teachers can easily access them on their mobile phones. Therefore, e-books are currently more popular than printed books.
3. Instructional Videos  
With almost all students/teachers owning mobile phones, videos have become a very popular medium for learning. This is because they are easily accessible, and students now enjoy watching videos on social media. This also supports the emergence of microlearning in today's learning, based on short videos that are widely watched, allowing learning to be packaged in a micro format.
4. Games

The popularity of cell phones among students is indeed inseparable from games. In the past, games were primarily used as a medium of entertainment; however, they can now also serve as a medium for learning. Learning is presented engagingly to increase student motivation.

#### 5. Podcast

Podcasts have recently become a popular medium among music/radio listeners. Podcasts are an evolution of digital radio. The popularity of podcasts is certainly also being utilized to transfer knowledge. Now, it is easy to find meaningful podcasts, and teachers can use or even create their own podcasts as part of their teaching.

#### 6. Digital Assessment

It is not only teaching materials that have been transformed into electronic or digital form. Nowadays, assessments can also utilize digital media. These range from simple media, such as Google Forms and CBT, to interactive quizzes, including Quizizz and Kahoot. Perhaps even before the pandemic, digital assessments were already in use, but manual assessments remained more prevalent. Currently, the majority prefer this digital form due to its ease of use and efficient data processing.

From several popular learning media available today, it is evident that digital technology dominates the learning media landscape due to its ease of use, making it highly popular. Therefore, in this case, teachers as educators need to constantly update their teaching methods with the help of digital technology. Additionally, students must utilize technology correctly and appropriately in their learning activities. This way, digital media can become a support for 21st-century learning.

## Discussion

The COVID-19 pandemic has brought about significant changes, including changes in the education curriculum. These changes not only cover curriculum content but also transform pedagogy as a whole. Technological advancements play a crucial role in transforming the education sector. This has led to the emergence of technology-based learning approaches, replacing traditional technology (Purnasari & Sadewo, 2020). Amidst the pandemic, there has been a drastic increase in the use of technology for learning. As a result, preferences for types of learning media have also changed. In this context, existing curriculum principles provide guidelines for teachers in choosing the right media to achieve the desired learning objectives.

Kurikulum 2013 Revisi enriches their learning by focusing on teaching with a student-centered learning approach. Shifting from teacher-centered learning to student-centered learning, the learning system has undergone many changes. Indonesia is also one of the countries that uses a learner-centered learning system (Putra et al., 2024). However, in reality, this is not easy to implement. Teacher-centered learning still dominates over student-centered learning. Therefore, before the pandemic, learning media were still based on what was provided by teachers and schools, such as printed books and ICT media in schools. Of course, even though the use of digital media was not yet widespread, students already had their smartphones. They had begun to get accustomed to using Google media to aid their learning.

The arrival of the pandemic supported the shift in the learning approach to student-centered learning. Since online learning was conducted at home, students were provided with a range of digital media for their asynchronous learning. Due to physical distancing, almost all of the media used was in digital form to facilitate its distribution. Following the pandemic and the transition to the new normal period, with the introduction of the new curriculum, namely the Kurikulum Merdeka, learning media have become more diverse in their use. Social media can be effectively utilized in learning. Learning videos are in high demand due to their ease of access and are considered an engaging medium. Digital versions of printed books are more popular because they can be accessed on a smartphone. All books can be accessed easily. Not



only that, but technology has also shown significant improvement during this period, not only as a teaching medium but also as a testing medium. The application of information technology can help improve educational conditions and answer or overcome problems in the new normal era (Agarwal *et al.*, 2024). The development of learning media will continue to evolve and change in response to shifting learning needs. 21st-century learning requires teachers and students to continually innovate in their learning, aligning with the development of technology. With the implementation of 21st-century learning in line with current demands, progress in education will be inevitable.

## CONCLUSION

From the results of this study, it is evident that the use of digital learning media had already begun before the COVID-19 pandemic, although it was not yet widespread. However, when the pandemic struck, there was a significant acceleration in the adoption of digital learning media, with distance learning becoming the norm. This created a paradigm shift toward more student-centered learning, with a greater emphasis on student independence and active participation in the learning process. After the pandemic, this trend appears to be continuing, signaling a sustainable change in the approach to education. The shift towards student-centered learning opens up opportunities to improve the overall quality of education. By focusing on student independence and active participation in learning, teachers can pay more attention to the individual needs of students and provide appropriate support. This can result in a more engaging, relevant, and effective learning experience for each student. Therefore, although the pandemic has brought serious challenges, this transformation also opens up opportunities to create an education system that is more adaptive, inclusive, and centered on the individual needs of students. Future research can explore the effectiveness of learner-centered learning, analyze the use of technology in 21st-century education, and develop adaptive learning models. In addition, attention to the influence of learner-centered learning on student well-being and the development of pedagogy for flexible learning can also be a focus of relevant research.

## AUTHOR'S NOTE

The author declares that there are no conflicts of interest related to the publication of this article. The author confirms that the data and content of the article are free from plagiarism.

## REFERENCES

- Agarwal, P., Swami, S., & Malhotra, S. K. (2024). Artificial intelligence adoption in the post COVID-19 new-normal and role of smart technologies in transforming business: a review. *Journal of Science and Technology Policy Management*, 15(3), 506-529.
- Aji, R.H.S. (2020). Dampak COVID-19 pada pendidikan Indonesia: Sekolah, keterampilan, dan proses pembelajaran. *Jurnal Sosial dan Budaya Syar'Il*. 7(5), 394-402
- Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher Education Studies*, 10(3), 16-25.
- Amir, A. (2016). Penggunaan media gambar dalam pembelajaran Matematika. *Jurnal Eksakta*, 2(1), 34-40.
- Darise, G. N. (2019). Implementasi Kurikulum 2013 Revisi sebagai solusi alternatif pendidikan di Indonesia dalam menghadapi Revolusi Industri 4.0. *Jurnal Ilmiah Iqra'*, 13(2), 41-53.

- Dasopang, M. D. (2017). Belajar dan pembelajaran. *Fitrah: Jurnal Kajian Ilmu-ilmu Keislaman*, 3(2), 333-352.
- Fitriyani, Y., Fauzi, I., & Sari, M. (2020). Motivasi belajar mahasiswa pada pembelajaran daring selama pandemi COVID-19. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran*, 6(2), 165-175.
- González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of education 4.0 in 21st century skills frameworks: Systematic review. *Sustainability*, 14(3), 1493-1504.
- Hayati, N., & Harianto, F. (2017). Hubungan penggunaan media pembelajaran audio visual dengan minat peserta didik pada pembelajaran pendidikan agama Islam di SMAN 1 Bangkinang Kota. *Al-Hikmah: Jurnal Agama dan Ilmu Pengetahuan*, 14(2), 160-180.
- Hikmah, A. N., & Chudzaifah, I. (2020). Blanded learning: Solusi model pembelajaran pasca pandemi COVID-19. *Al-Fikr: Jurnal Pendidikan Islam*, 6(2), 83-94.
- Iskandar, R. (2020). Penggunaan grup Whatsapp sebagai media pembelajaran terhadap peserta didik dta at-tawakal kota bandung. *Comm-Edu (Jurnal Pendidikan Masyarakat)*, 3(2), 97-101.
- Kamysbayeva, A., Koryakov, A., Garnova, N., Glushkov, S., & Klimenkova, S. (2021). E-learning challenge studying the COVID-19 pandemic. *International Journal of Educational Management*, 35(7), 1492-1503.
- Lestari, I., & Pratama, MH (2020). Pemanfaatan TIK sebagai media pembelajaran dan sumber belajar oleh guru TIK. *Edumatik: Jurnal Pendidikan Informatika*, 4(2), 95-102.
- Linda, L. (2023). Strategi pembelajaran dengan memadukan teknologi dan media. *Kenduri: Jurnal Pengabdian dan Pemberdayaan Masyarakat*, 3(2), 74-78.
- Mansyur, A. R. (2020). Dampak COVID-19 terhadap dinamika pembelajaran di Indonesia. *Education and Learning Journal*, 1(2), 113-123.
- Marisa, M. (2021). Inovasi kurikulum merdeka belajar di era society 5.0. *Santhet: (Jurnal Sejarah, Pendidikan dan Humaniora)*, 5(1), 72-83.
- Marsudi, A. S., & Widjaja, Y. (2019). Industri 4.0 dan dampaknya terhadap financial technology serta kesiapan tenaga kerja di Indonesia. *Ikraith-Ekonomika*, 2(2), 1-10.
- Park, H., Kim, H. S., & Park, H. W. (2021). A scientometric study of digital literacy, ICT literacy, information literacy, and media literacy. *Journal of Data and Information Science*, 6(2), 116-138.
- Premana, A., Wijaya, A. P., Yono, R. R., & Hayati, S. N. (2022). Media pembelajaran pengenalan bahasa pemrograman pada anak usia dini berbasis game. *Jurnal Ilmiah Teknik Informatika (Tekinfo)*, 23(2), 66-75.
- Pujowati, Y., & Sufaidi, A. (2021). The COVID-19 pandemic: Analysis of large-scale social restrictions (PSBB) policies for the community in various prevention efforts. *Jurnal Magister Administrasi Publik (JMAP)*, 1(2), 102-111.
- Purwanto, A., Pramono, R., Asbari, M., Hyun, C. C., Wijayanti, L. M., & Putri, R. S. (2020). Studi eksploratif dampak pandemi COVID-19 terhadap proses pembelajaran online di sekolah dasar. *EduPsyCouns: Journal of Education, Psychology and Counseling*, 2(1), 1-12.
- Putra, A. P., Iman, M. I. N., Pane, S. A. F., & Pane, N. H. A. U. (2024). Kerentanan stres mahasiswa ditinjau dari perbedaan gender dalam menghadapi model pembelajaran SCL (student centered learning). *Educate: Journal of Education and Learning*, 2(1), 1-9.

- Putri, M. R., Farhan, A. A., & Hanif, S. M. (2024). Use of metaverse as innovation into educational technology to drive curriculum progress. *Hipkin Journal of Educational Research*, 1(1), 25-36.
- Rahmi, R. (2020). Inovasi pembelajaran di masa pandemi COVID-19. *Al-Tarbiyah: Jurnal Pendidikan*, 30, 111-123.
- Rohana, S., & Syahputra, A. (2021). Model pembelajaran blended learning pasca new normal COVID-19. *At-Ta'Dib: Jurnal Ilmiah Prodi Pendidikan Agama Islam*, 13(1), 48-50.
- Rosyiddin, A. A. Z., Fiqih, A., Hadiapurwa, A., Nugraha, H., & Komara, D. A. (2023). The effect of interactive PowerPoint media design on student learning interests. *Edcomtech: Jurnal Kajian Teknologi Pendidikan*, 8(1), 12-24.
- Safitri, A., Bendriyanti, R. P., Imran, R. F., & Hermawansa, H. (2021). Efektivitas video interaktif sebagai media pembelajaran dimasa pandemi COVID-19 di Paud Putri Ayu Kota Bengkulu. *Journal of Dehasen Educational Review*, 2(3), 12-17.
- Samsinar, S. (2020). Urgensi learning resources (sumber belajar) dalam meningkatkan kualitas pembelajaran. *Didaktika: Jurnal Kependidikan*, 13(2), 194-205.
- Siahaan, M. (2020). Dampak pandemi COVID-19 terhadap dunia pendidikan. *Jurnal Kajian Ilmiah*, 1(1), 73-80.
- Suhartini, D. (2021). Transformasi model pembelajaran di masa pandemi COVID-19 di SMAN 5 Bogor. *JPG: Jurnal Pendidikan Guru*, 2(4), 225-245.
- Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya media pembelajaran dalam proses belajar mengajar. *Journal on Education*, 5(2), 3928-3936.
- Yolanda, R., Rejeki, S. I., & Salsabilah, L. S. (2021). Alternatif pembelajaran matematika menggunakan media online. *Jurnal Pendidikan dan Pembelajaran Terpadu*, 3(1), 73-82.

