



Mixed Learning Post Pandemic Solutions

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Abstrak

Ketidakpastian yang ditimbulkan oleh pandemi Covid-19 berdampak pada banyak sektor, termasuk sektor pendidikan. Siswa, guru, dan lembaga harus mampu bertahan dalam kondisi diterapkannya pembelajaran jarak jauh. Blended Learning (BL) menjadi salah satu metode yang diterapkan secara internasional pada masa pandemi. Penelitian ini bertujuan untuk menyelidiki kelebihan, tantangan, dan efektivitas BL. Metode penelitian ini ialah metode tinjauan pustaka sistematis atau systematic literature review (SLR). Dengan jenis penelitian deskriptif kualitatif. Penelitian ini merupakan tinjauan pustaka yang sistematis. Peneliti menggali berbagai literatur dari berbagai jurnal yang terakreditasi Scopus hingga Sinta. Penelitian ini mengungkapkan beragam temuan mengenai kelebihan, tantangan, dan efektivitasnya. Hasil utama penelitian ini adalah menunjukkan bahwa model ini menawarkan fleksibilitas dan efektivitas yang tinggi dalam proses pembelajaran. Penelitian ini menemukan bahwa pembelajaran campuran tidak hanya meningkatkan aksesibilitas pendidikan, tetapi juga mendorong keterlibatan siswa yang lebih tinggi melalui penggunaan teknologi dan media interaktif. Selain itu, model ini memungkinkan personalisasi pembelajaran, di mana siswa dapat belajar sesuai dengan kecepatan dan gaya belajar mereka sendiri, serta memberikan kesempatan kepada pengajar untuk mengembangkan strategi pembelajaran yang lebih inovatif dan responsif terhadap perubahan. Implikasi penelitian ini adalah temuan ini mendorong pengembangan kurikulum yang lebih fleksibel dan adaptif yang dapat memadukan pembelajaran daring dan tatap muka secara optimal.

Kata Kunci: Keunggulan, Blended Learning, Tantangan, Efektivitas

Abstract

The uncertainty caused by the Covid-19 pandemic has impacted many sectors, including the education sector. Students, teachers, and institutions must be able to survive in conditions where distance learning is implemented. Blended Learning (BL) is one of the methods applied internationally during the pandemic. This study aims to investigate the advantages, challenges, and effectiveness of BL. The research method is a systematic literature review (SLR) with a qualitative descriptive research type. This research is a systematic literature review. Researchers explore various literature from various journals accredited by Scopus to Sinta. This study reveals various findings regarding its advantages, challenges, and effectiveness. The main results of this study are to show that this model offers high flexibility and effectiveness in the learning process. This study found that blended learning not only increases the accessibility of education but also encourages higher student engagement through the use of technology and interactive media. In addition, this model allows for personalization of learning, where students can learn according to their own pace and learning style. It also provides opportunities for teachers to develop more innovative and responsive learning strategies to change. This research implies that these findings encourage the development of a more flexible and adaptive curriculum that can optimally combine online and face-to-face learning.

Keywords: Advantages, Blended Learning, Challenges, Effectiveness

1. INTRODUCTION

The virus called SARS-CoV-2 was first detected in Wuhan, Hubei Province, China around the end of 2019. Since it was first detected, the virus and its mutations have spread throughout the world. COVID-19 was then classified as a pandemic by the World Health Organization on March 11 2020. A movement called social distancing was carried out as the only way to reduce transmission. Lockdown cannot be avoided in order to limit social activities unless necessary for basic life needs. Apart from that, several restrictions were also implemented, such as the closure of schools and universities, as well as the cancellation of educational activities such as workshops, laboratories and classes. The social impact is also a

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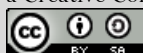
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big impact of this pandemic, so the problem is not only limited to physical and medical risks (Al-Ansi & Al-Ansi, 2020; Nijakowski et al., 2019). In mid-2020, there were student populations in 32 countries affected by this virus and had exceeded 165 million students worldwide. Students from privileged backgrounds receive full support from their parents to continue their education in various ways, and students from disadvantaged families remain out of school when their schools are closed (Nijakowski et al., 2019; Schleicher, 2021) This means that the word "equality" is still a dream in itself for the balance system. Therefore, changes must continue to be reviewed regarding the learning environment.

The only proposed solution is distance teaching and learning (Mahmud, 2020; Nijakowski et al., 2019). This includes the implementation of e-platforms. E-learning is based on the use of online tools. The online tool itself functions as an academic e-learning platform for playing lecturer and seminar recordings, conducting self-tests that can monitor face-to-face progress. Additionally, virtual learning offers a more effective alternative to traditional learning (Al-Samarraie & Saeed, 2019; Boelens et al., 2020). Taking distance teaching and learning as a solution supports the ideas of UNESCO's nine ideas of public action (2020), namely strengthening education as a common good, expanding the definition of the right to education, respecting the teaching profession and teacher collaboration. , encourage the participation and rights of students, youth and children, protect the social space provided by schools, provide free and open source technology for teachers and students, ensure scientific literacy in the curriculum, protect domestic and international public education financing, and advancing global solidarity education to end current levels of inequality.

The key role in the development of the formal education sector is driven by technological advances. The world is now witnessing the revolutionary use of technology, especially in the education sector. This idea requires the ability of students and teachers to operate the technology to support learning objectives. This idea became a new future educational goal. Current technological advances also need to be supported by various ways of delivering learning and innovative communication that can provide certain benefits. It is hoped that the benefits obtained will help achieve the goals of the education sector, such as meeting the need for continuing education at low costs.(Alsalhi et al., 2019; Güzer & Caner, 2017). The next question is, "how to use modern technology to engage distance learners in collaborative learning sessions?". Mixed settings are the answer. This provides an opportunity for instructors and students to communicate well, especially discussing and studying specific learning tasks (Bryan & Volchenkova, 2021; Güzer & Caner, 2017; Uğur et al., 2019; Watrinhos et al., 2019). Promoting the use of innovative technologies as part of routine remains a challenge. In fact, the blended learning environment has contributed a lot to the individual learning experience of students, as long as both parties can make the best use of the blended learning tools. Other research findings reveal that blended learning tools have their own challenges and opportunities. Apart from that, other research adds that BL offers students various opportunities to increase their current or future learning motivation and is considered as alternative learning. (Kaur, 2021; Mahmud, 2020). Blended learning is one of the most popular pedagogical concepts in the early 2000s. Blended Learning (BL) has proven to be one of the best ways to support educational goals. This statement was proven in previous research. Previous research findings state that BL is proven to improve students' academic achievement both internally and externally. They also emphasized that BL is one of the best choices that students and teachers often choose. BL is stated to be the most effective and popular teaching mode adopted by educational institutions. The reason is because BL provides flexibility, effectiveness of time and money, and the possibility of continuous learning (E.C.L.A.C.-U.N.E.S.C.O., 2019; Noour & Hubbard, 2019)

Blended learning is defined as a method that combines face-to-face and online learning—or technology-mediated learning. BL is also believed to exist through an effective combination of various delivery methods, teaching models and learning styles applied in a meaningful, interactive learning environment. (Güzer & Caner, 2017; Kaur, 2021). Many experts believe that BL is a wise integration of face-to-face classroom learning experiences with online experiences. Therefore, BL also has many other names, such as blended, hybrid, flipped, and inverted. The basic concept of BL is two-way reversal. It is believed that BL is an improvement on traditional learning and online learning (Mahmud, 2020; Moore & Kearsley, 2018) The advantage of BL is also considered "the new normal" in running the education system. It is stated that there are five main points for carrying out blended learning, namely live events, self-paced learning, collaboration, assessment, and performance. In addition, using Vygotsky and Maslow's insights, there are four blended learning models, namely structured e-moderation, learning ecology, blended learning continuum, and inquiry-based framework (Noour & Hubbard, 2019; Purba, 2020).

Compared to traditional learning, BL is refreshing in its application because of its hybrid nature. Traditional learning strategies focus more on lectures and in-depth learning through memorization. The learning strategy prioritizes teacher-centeredness where the teacher acts as a provider of information and evaluator to students. The students here passively participate in the learning process. E-learning is of course part of blended learning itself. It refers to anything that is offered for a clear learning purpose, and is enabled and mediated by electronic technology (Rasheed et al., 2018; Schleicher, 2021). Distance learning has subsystems that are attached to a larger system. Strategy is also defined as a form of active learning that includes learner-learner interaction and is supported by the distribution of technology. This allows students to learn at their own pace and of course meets their demands. Apart from that, these arguments reinforce the idea that online learning is more attractive to students around the world because it gives them the opportunity to reach wider opportunities (Sefriani et al., 2017; Siemens et al., 2020).

Since the Covid-19 pandemic, many teachers have had difficulty designing appropriate learning for students. In conditions full of uncertainty, maintaining the quality of learning is very difficult. (Tika & Agustina, 2019; Uğur et al., 2019). One of the methods applied is Blended Learning. This method is widely applied throughout the world. In implementation, many find this method useful. But many people don't find it. This study aims to investigate the implementation of Blended e-Learning (BL) during the pandemic through a literature review. The main urgency of this research is to see whether Blended e-Learning can be a post-pandemic solution in the educational context. There are three questions answered in this paper. First, the advantages of BL, Second, the challenges faced by teachers, students and institutions; and third, effectively BL during the pandemic.

2. METHOD

This research method is systematic literature review method or systematic literature review (SLR). With this type of qualitative descriptive research. This research is a systematic literature review. This research aims to answer the three research questions. To obtain findings, researchers searched literature from various journals accredited by Scopus and Sinta. Literature is used as the main source to answer the stated research questions. Literature is selected from international and national journals based on accreditation criteria. Five articles were obtained from Elsevier journals. Two articles were obtained from Springer. One article was obtained from the Proceedings of the 5th Progressive and Fun Education International Conference. Four articles were obtained from various Sinta accredited journals. The names of the journals are International Journal of Evaluation and Research in Education,

Journal of Mathematics and Natural Sciences Education, Primary School Scientific Journal, and Journal of Educational Technology.

Article eligibility criteria were adapted from Rasheed et al. (2020) and divided into two; inclusion and exclusion. Inclusion criteria such as, BL must be the center of the topic; empirical studies; his main inquiry is BL in education; and must be from publications at least 10 years old. Exclusion criteria include articles that only focus on face-to-face aspects of BL; book chapter reviews; non-English articles; and articles for which the full text is not available. The research procedure begins by formulating specific research questions to identify the impact and effectiveness of the blended learning model in the post-pandemic era. The next step is to conduct a thorough literature search in various leading academic databases such as Scopus, Sprott, Google Scholar, and PubMed to find relevant studies that have been published. Inclusion and exclusion criteria were established to screen relevant articles, based on year of publication, type of study, educational context, and research focus. After the selection process, the selected studies were analyzed in depth to identify the main findings, methodology used, and existing research gaps. The data obtained is then synthesized qualitatively or quantitatively, depending on the type of data available, to develop comprehensive conclusions regarding the effectiveness and challenges of blended learning as a post-pandemic learning strategy. Finally, the synthesis results are organized into a clear and structured report, including recommendations for practice and further research.

3. RESULT AND DISCUSSION

Result

From a series of empirical literature, we realize that BL has been proven to be implemented effectively and was selected as one of the best alternatives used in the education sector. From the exact data provided by experts, we can confidently conclude that BL is an effective method in assisting teaching and learning activities both in normal and pandemic conditions. Moreover, this method has been proven and supported by many experts. Therefore, BL can confidently survive in the education sector and can become one of the methods that is a post-pandemic solution.

This learning model has various benefits and challenges in the post-pandemic educational context. From the results of the analysis of various academically recognized literature, it was found that blended learning increases flexibility and accessibility for students by allowing a combination of online and face-to-face learning. This model has also been proven to increase student engagement and learning effectiveness through the use of interactive technology and more varied materials. However, research also identifies several challenges, such as the need for adequate digital infrastructure, adequate digital skills for teachers and students, as well as the digital divide which is still an obstacle for some groups in society. In addition, the effectiveness of blended learning is highly dependent on good curriculum design and the support of educational institutions to implement this model optimally. Overall, this SLR concludes that blended learning is an effective strategy to support education in the post-pandemic era, but requires further attention regarding technical and pedagogical readiness.

From the students' perspective, it was found that they were burdened by the need for self-regulation and independence in implementing BL. In addition to the technological competencies that students must possess, understanding their own pace is also necessary for successful BL implementation. Freedom to learn in the context of individual speed and flexibility is always threatened and leads to poor self-regulatory behavior. This context may give them reasons for procrastination, inappropriate time management, and inappropriate utilization of online peer learning and online help-seeking strategies.

We don't just need to pay attention to self-organization and time management. We are also starting to open our eyes to the fact that not all students have the same access to technology. This is largely influenced by the technological complexity of both software and hardware required by institutions. This creates technological illiteracy. This challenge coupled with poor time management skills causes delays in receiving feedback from teachers. The challenges found explain the phenomenon of student bullying towards technology. Transactional interactions are emphasized in this research where interaction conditions push students to isolation and alienation due to students' reluctance to take online classes. These challenges are influenced by several factors, such as, personality, sense of transactional distance in an online setting, lack of self-confidence and trustworthiness of online community participants, lack of communication cues, connection difficulties, poor writing skills, and language barriers.

From the teacher's perspective, challenges are also found that burden them. This is related to the need for them to have technological competence. Apart from that, being able to utilize and manage technology effectively for effective classes is a must. Apart from that, creating and uploading materials for student learning materials is also a burden. The technological illiteracy faced by teachers causes a lack of confidence, time, and willingness to learn new technology for teaching BL subjects. Another form of challenge mentioned is material creation. Lack of teacher experience in creating learning content and learning management systems. In addition, it was found that in the BL context, teachers focus too much on distance students, wasting time in solving technical problems, the challenge of managing students in dual mode is the main challenge that teachers have to face. Apart from that, teachers' beliefs about the effectiveness of technology is a big challenge that needs to be considered. There are many teachers who believe that technology is a barrier to competence and this gives rise to skeptical thinking about the success of technology.

Discussion

From an institutional perspective, BL mandates facilitating the necessary training and technological support for teachers and students. This must be done to ensure effective use of available technology, and in addition, to make efficient use of online components. Institutions feel challenged in determining the level of innovation, resilience and complexity of technology that is suitable for teachers and students (Watrianthos et al., 2019; Widiara, 2023). They find it difficult to manage the level of technological complexity for teaching. Additionally, it was found that institutions hesitate to provide quality training support for several reasons; blended learning means that some misunderstandings in online learning can be clarified through face-to-face sessions, and not all institutions can afford the cost of quality training. Application of Blended Learning; Revealing its effectiveness during the pandemic, where many of us believe that there will be a silver lining in the global pandemic that the world is experiencing. Many sectors are trying their best to survive or at least start to crawl to adapt to post-pandemic life. Including the education sector. The biggest question is what learning methods, strategies or techniques are suitable and will be a solution for the post-pandemic learning process

Challenges of Implementing Blended Learning. Although heavy BL has many advantages, such as being effective in a pedagogical context, providing time and money effectiveness, providing flexibility for learners, BL also has several challenges that we need to recognize and if possible, prevent in order to implement it more effectively. and efficient. There is some empirical literature that classifies BL challenges into 3 parts, namely technical challenges, organizational challenges, and instructional challenges. The technical challenge consists of ensuring the success of the program by utilizing and supporting appropriate technology. Additionally, organizational challenges focus on the failure of the BL concept. In

addition, instructional design challenges the BL design itself (Anugrahana, 2020; Nohoba, 2021)

Technical challenges include ensuring participants can use the technology successfully, and resisting the urge to use the technology simply because it is available. Organizational challenges include, overcoming the notion that blended learning is not as effective as traditional classroom training, redefining the role of the facilitator, and managing and monitoring participant progress (Anggita, 2021; Asmuni, 2020). Instructional design challenges include, looking at how to teach, not just what is taught, matching the best delivery medium with performance goals, keeping online offerings interactive versus just “talking” to participants, ensuring participant commitment and follow-up with “no-live elements”, and ensure all elements of the mix are coordinated.

Previous research findings state that this is related to the research identifying four key BL challenges. The challenge is to combine flexibility, stimulate interaction, facilitate the student learning process, and foster an affective learning climate. First, incorporate flexibility. BL provides flexibility for students in choosing between online and face-to-face learning. However, this flexibility raises the question, namely how to combine flexibility, followed by the next question, how much flexibility is desired. Second, stimulate interaction. BL provides opportunities for students and teachers to interact flexibly. However, this condition brings problems where this flexibility enlarges the psychological and communication space called transactional distance. As transactional distance increases, social interactions become increasingly difficult. The question is how to facilitate interaction in a blended learning environment. High transactional distance closes the opportunity for teachers to see students' problems, let alone not knowing what students have learned. In this context, misunderstandings between student-teachers cannot be avoided. However, in online learning, two-way communication between students and teachers is very important. Ironically, most students dream of the learning flexibility that BL provides without being willing to lose the social interaction and human touch they use in a face-to-face environment.

Third, facilitating the student learning process. BL requires students to be able to carry out self-regulation in its implementation, such as organization, discipline, time management, skills in using technology to support the learning process, and self-efficacy to control the learning process. However, increasing learner flexibility and control is only particularly beneficial for high achievers compared to low achievers. This means that not all students are able to master the concept of independent learning. Fourth, foster an affective learning climate. BL provides a choice of online and face-to-face learning methods. However, in reality, online learning is increasing, especially because of the pandemic. Continuous online interactions make interactions considered less spontaneous than face-to-face communication (Mauliya et al., 2018; Zuhary & Hidayati, 2023).

This in fact creates feelings of isolation in students. This results in a lack of student motivation which can make the dropout rate even higher. This is different from the results which state that BL provides motivation to students internally and externally. Students in this context need to be in a healthy learning climate. Healthy here means BL needs to foster a motivating and influencing learning environment where students feel safe, accepted and valued, and encourage positive attitudes towards courses and teachers. A positive learning climate supports the learning process and promises extraordinary results, such as higher intrinsic motivation, creativity, and well-being (Fahlevi, 2022; Rahmasari, 2021). Previous research findings found anxiety during the implementation of BL. Anxiety itself is found in students, teachers and educational institutions. They found that the main challenge students face in implementing BL is self-regulation. They also found that teachers' challenges in the BL context were the use and operation of technology. In addition, the challenges that institutions consider regarding the implementation of BL are the provision of appropriate

learning technology and effective training support for teachers (Azhari et al., 2022; Gultom et al., 2022).

Benefits of Blended Learning The success of a learning method/technique is determined by the quality of its implementation. Success is determined by several factors, such as meeting student needs, learning styles, preferences, and many more (Al-Samarraie & Saeed, 2019). Previous research confirms that BL has been successful in the education sector. This is proven by the results which show that students have a very positive opinion towards the BL method. In addition, they stated that its implementation was much more positive than traditional or e-learning. This means that students give a positive attitude towards the application of BL. They even stated that they did not want to continue the learning process purely traditional or e-learning. They also stated that this experience was useful and they would recommend the course offered in a blended format to others conducted (Bryan & Volchenkova, 2021). Even though this method was a new situation for them, they testified that the learning method was flexible and student-oriented.

The advantages of BL were discovered. First, it is a shift from passive learning to active learning. This means that BL places students in situations that encourage them to read, speak, listen and think. Second, provide opportunities for students to work in groups or work individually. Because BL emphasizes a combination of two types of learning methods, it allows students to access material in a variety of modes. This allows students to have a higher chance of achieving course outcomes compared to fully online and traditional ways of learning. BL provides greater opportunities to reduce school dropout rates, increase test scores, and increase student learning motivation. Third, add a human touch to teaching. Interactive content allows teachers to create a high level of engagement, accountability, and real-world assessment. Fourth, increase individualization, personalization and relevance. In other words, providing opportunities for teachers to carry out the learning process according to students' needs. Fifth, it offers students the best choices representing two ways of learning. (Kaur, 2021). This is due to the amount of flexibility students and teachers have without sacrificing face-to-face contact. BL is an approach that offers effective and low-risk strategies that are able to answer the challenges of the education sector.

Previous research aimed to assess the effectiveness of blended learning in the context of conservative dentistry with endodontics. This study is based on the urgency of issues related to vocational subjects; that the important issue is that teaching manual skills cannot be replaced by distance learning. Therefore, blended learning is an important subject to look at more deeply to find out the best learning methods for vocational subjects during the pandemic (Nijakowski et al., 2019). Most participants responded by stating that their learning effectiveness increased during the pandemic, especially with the implementation of asynchronous learning. This increase is mainly influenced by the advantages of blended learning, such as increased efficiency and speed of individual learning, independent learning, reduced anxiety about contracting the virus from direct practice with patients meaning reduced stress levels and more concentration. in studying the content. The students are very positive about the implementation of blended learning. Most students said they want to adopt blended teaching and learning activities even after the pandemic is over.

Let's go back a few years to look at the research done to investigate BL. In fact, their statements support the findings. Previous research added that the BL method is known as an educational method in accessing daily insight and information, social interaction, personal agency, bringing effectiveness, and ease of revision and stated that BL has many benefits, including improving the perception of the educational environment, problem solving, thinking. critical skills, decision-making skills and clinical skills, as well as the acquisition of knowledge through standardization (Güzer & Caner, 2017; Noour & Hubbard, 2019). In addition, previous research findings reveal the benefits of BL, including the use of VL tools

which have an impact on improving students' attitudes, interactions between teachers and students, students' learning experiences, and the flexibility of individual learning. (Mahmud, 2020; Uğur et al., 2019) Which means that BL provides higher intrinsic and extrinsic motivation in student learning.

A study revealed that there are several benefits that BL brings. First, supporting students to collaborate and understand the topic. Second, focus on problem solving because it takes the form of project-based learning. Third, reduce the time spent in class and more effectively remember class time. Fourth, students become more active and creative, so they are better prepared. Fifth, it is also more attractive to students and has the potential to offer education from many sources while providing the highest efficiency and lowest costs (Rasheed et al., 2018). This study also emphasizes that after BL was implemented, it was discovered that Higher Diploma students in the field of education were positively impacted, especially on their achievements. This also leads to the next result which confirms that the experimental group students have a positive attitude towards the use of blended learning in their courses. Through this research we also provide the fact that students' computer skills become very good after implementing BL.

Then, other research emphasized the very important results of the analysis, that BL is a post-pandemic solution. He formulated the application of BL into three varying conditions. First, under normal conditions. Where BL can be implemented with an adjunct-flex model, at the additional-enabling level, the use of the internet and the web at the web-enhanced course level and course resources on the web with a composition of 1-29% using the inquiry community interaction model. In this condition, educators and students can carry out the full learning process as usual, but still have to pay attention to (Mahmud, 2020; Tika & Agustina, 2019).

Second, in the new normal conditions, where BL can be applied with a blended-rotation model at the transformation-communal level, internet and web utilization is only at the web centric level as well as substantive and multilevel web activities. , with a composition of 30-79% using an online collaborative interaction model. In this condition, BL can be implemented using a blended-rotation model where teaching materials, assignments and assessments are partly presented online, and partly face-to-face. In its implementation, students and teachers must also implement strong health protocols, such as wearing masks and maintaining physical distance.

Third, in pandemic conditions. BL implementation can be carried out with a virtual model that is enriched completely online, at the immersive enhancement level, using the internet and web at the course web level and curving activities that go beyond the classroom with a composition of 80-100% using an independent learning interaction model. In this condition, assignment and assessment materials are all presented online. The implementation can be carried out by educators using Google Class and the Learning Management System (LMS), for practical activities it can be carried out using a simulator or virtual laboratory.

Other results revealed by previous research state that BL with Edmodo is effective and can be used as a virtual learning solution. These findings emphasize that students are very enthusiastic and enjoy learning statistics with blended learning using Edmodo. Its implementation forces students to continuously observe its implementation, because learning materials and assignments are delivered, explained, and responded to via Edmodo. This also makes students access the Edmodo application. Its application also trains students to be punctual because there are time constraints or deadlines that determine the accessibility of the application. Blended learning with Edmodo is also considered a smart solution to face this pandemic because educators and students can carry out learning activities from home. It is also said that the expected learning objectives and competencies are achieved (Boelens et al., 2020; Uğur et al., 2019).

Current blended learning which combines online and traditional classroom teaching is also considered appropriate to deal with this pandemic (Noour & Hubbard, 2019; Sefriani et al., 2017). This benefits students by allowing them to learn independently without the constraints of location and time. BL is also considered effective because it greatly improves student learning outcomes during the pandemic. Apart from that, BL also improves students' critical thinking skills. Not only can it be implemented alone, the application of BL can also be combined with other techniques/methods/strategies which strengthens the argument that BL is a very promising method to be applied in post-pandemic learning. This is supported by research findings which reveal that BL has an effective impact on students. This has a significant effect on students' scientific attitudes and student learning outcomes. This research compares students' scientific attitudes between students who were given a project learning model based on blended learning and students who were given conventional learning. The research results show that BL-assisted Project Based Learning can improve students' scientific attitudes and student learning outcomes (Azhari et al., 2022; Widiara, 2023). It was further explained that BL makes the learning atmosphere in the classroom enjoyable. In this atmosphere, students are given the opportunity to express opinions, ask questions, draw conclusions, and contribute answers without feeling embarrassed or afraid. This learning makes learning more meaningful. Students are actively involved in solving problems and are also linked to real situations. Students can brainstorm together and delve deeper into information to support their arguments. This increases students' curiosity. It also trains students to work in groups by exploring creative ideas. Student-centeredness is also an effect of implementing BL.

The BL model combined with the Flipped Classroom has proven to be effective as a learning medium, especially when learning from home. It is stated that learning activities are positively enhanced towards the values of learning activities in an individual context. The research results show that the application of Blended Learning combined with Flipped Classroom produces better individual grades and qualities. This underlines the idea that its implementation supports the quality of learning from home. Students' creative thinking is also proven to be higher. By analysing previous literature, it can be concluded with confidence that there are several aspects, including its benefits, that make the BL method suitable for application in the learning process in post-pandemic conditions. Indirectly, the BL method has been proven to be effective and is considered one of the best methods to be applied as a solution to the post-pandemic teaching and learning process. Moreover, one of the advantages is saving time and costs, which is one of the ingredients needed by every institution after facing a pandemic.

Implications of this research covers various aspects that are significant for stakeholders in the education sector, such as government, educational institutions, teachers and students. For governments and policymakers, the results of this research demonstrate the need for continued investment in digital infrastructure and training of teaching staff to effectively adopt learning technologies. For educational institutions, these findings encourage the development of more flexible and adaptive curricula that can optimally combine online and face-to-face learning. For teachers, this research emphasizes the importance of improving digital and pedagogical skills to manage more interactive and personalized blended classes. Meanwhile, for students, the implication is the need to develop independent learning skills and digital literacy in order to maximize the benefits of the blended learning model. Overall, this research underlines that the successful implementation of blended learning as a post-pandemic solution requires cross-sector collaboration and continuous adaptation to changing educational needs in the future.

This research has several limitations. One of the main limitations is limited access to several articles and journals that may be relevant but cannot be accessed freely or are not

included in the database used. Additionally, this research relies heavily on previously published studies, so the resulting data may not fully reflect recent developments or current practices in the field. In addition, variations in the geographic, economic, and social context of the studies analyzed may influence the generalizability of the findings, given the differences in infrastructure conditions, technology, and readiness to implement blended learning in different regions. Based on these limitations, several recommendations are proposed for further research. First, additional empirical research is needed that is more specific and focused on local contexts to better understand how blended learning can be adapted and implemented in various educational settings. Second, the development of a more comprehensive training program for teachers regarding the use of digital technology and blended learning-based curriculum design is very necessary. Finally, collaboration between government, educational institutions and technology providers is recommended to ensure the availability of adequate digital infrastructure and support equal access to blended learning at all levels of society. In this way, the effectiveness of blended learning as a long-term solution in the post-pandemic era can be further improved.

4. CONCLUSION

In conclusion, there are three main findings revealed in this research. First, the benefits of Blended Learning. The advantages of blended learning include being student-centered, flexible, meeting learning objectives, supporting personal independence, reducing anxiety about contracting the virus, and proven to be effective in terms of time and cost. In addition, the challenges of blended learning include, mastery of technology, funding and technical and quality support, confusion in combining flexibility, misunderstanding of interactions, facilitating the student learning process, fostering an affective learning climate, and inequalities in self-regulation and independence. Finally, the effectiveness of Blended Learning has been proven by much literature. In short, blended learning is a method that has been proven to have many strong benefits for learning activities, especially during the pandemic. The challenges actually arise to be evaluated and reflected on for further utilization of BL. Its effectiveness has also been proven to improve many aspects of student learning. Therefore, blended learning has material that is convincing to be one of the post-pandemic learning solutions.

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