

## Effectiveness of blended learning in the new normal era

Sukirman Sukirman<sup>1</sup>, Yusron Masduki<sup>2</sup>, Suyono Suyono<sup>3</sup>, Dian Hidayati<sup>1</sup>, Hanif Cahyo Adi Kistoro<sup>2</sup>,  
Sutipyo Ru'iyah<sup>2</sup>

<sup>1</sup>Postgraduate Management Education, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

<sup>2</sup>Department of Islamic Education, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

<sup>3</sup>Postgraduate Management Education, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia

### Article Info

#### Article history:

Received Aug 26, 2021

Revised Feb 28, 2022

Accepted Apr 3, 2022

#### Keywords:

Blended learning

Educational technology

New normal

Online learning

### ABSTRACT

The effects of the pandemic in the world of education have as many influences as the adjustment of learning models. This study aimed to determine the effectiveness of blended learning as an alternative to online education in the new normal era. This was an experimental study with a one-shot case study design conducted in several public high schools in the Special Region of Yogyakarta, Indonesia. The respondents involved in this study were 70 teachers who were determined using a simple random sampling technique. The data was collected by using a questionnaire. Multiple regression analysis was used to analyze the effect of the effectiveness of the application of the blended learning model during the COVID-19 pandemic. The results showed that the effectiveness of educational programs after using blended learning is 95.05%, much higher than the effectiveness of educational programs before using blended learning with a score of 73.24%. The blended learning model affects the effectiveness of learning during the COVID-19 pandemic by 85.20%. Learning during the COVID-19 pandemic that implements the blended learning model will run more effectively and more successfully. Schools need to apply the blended learning model because the use of this method is effective, efficient, and more successful in the new normal era.

*This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.*



### Corresponding Author:

Yusron Masduki

Department of Islamic Education, Universitas Ahmad Dahlan

Banguntapan, Bantul, Special Region of Yogyakarta 55191, Indonesia

Email: [yusron.masduki@pai.uad.ac.id](mailto:yusron.masduki@pai.uad.ac.id)

## 1. INTRODUCTION

The world is currently experiencing the effects of the COVID-19 pandemic. Higher education institutions are considered to be one of the fastest responders to the wave of the spread of the corona virus [1]. The pandemic period gave rise to many technical and substantive changes in implementation strategies, materials, and even learning evaluation. Facing this situation, educational institutions reacted quickly because they were considered to have the potential to increase the distribution of the spread of COVID-19. In addition, schools with large numbers of students are very influential in the process of spreading COVID-19 [2]. In addition, all university activities are also temporarily closed and carried out online, both lecture activities and other academic services. In other words, all university services are carried out from home or work from home. With this rare phenomenon, the teaching-learning process finally stagnated [3]. This can happen because the method of distribution of knowledge is considered less than optimal and adequate.

The sudden change in the learning system due to the COVID-19 pandemic has made many parties not fully ready to carry out online learning or study from home. However, so far there are still many teaching methods used by education that only use the lecture method [4]. Learning that is only carried out using the

lecture method without any other variations of learning methods will affect the ability of students to capture the knowledge conveyed by the teacher. Students' abilities are not honed because students are not used to thinking outside the context of the teacher [5]. In addition, students become passive in choosing additional learning resources outside of the teacher's learning resources. Whereas various learning resources around students' lives can be used to help make it easier to understand learning material. In addition, teachers should not be the only source of learning, especially in today's digital era, various learning resources can be accessed by every student through the help of information technology [6]. Therefore, it is necessary to find an alternative to classical learning that can overcome these problems without eliminating the social ties between students and classmates and between students and teachers. In other words, education is not enough to do face-to-face classically as has been done so far. However, with technological advances in learning, it is hoped that teachers can take advantage of these technological advances to facilitate the learning process, so that learning can be carried out with a variety of methods.

During online learning, many students complain and get bored because the teaching methods used by teachers are increasingly monotonous and ineffective. Many teachers still stutter or are less adaptive in teaching using the online system because they are used to doing conventional lectures [7]. In addition, most teachers are already in a comfortable and well-established state of conventional habits, so that with the changes that occur in learning, especially in technology, they are less adaptive and think that all these changes can shake the sustainability of these comfortable conditions [8]. Meanwhile, during online learning, most teachers have also recently used online learning support media such as Moodle. However, with the lack of adaptability of teachers in implementing online learning support media such as Moodle, many teachers only use it as a place to put teaching materials and assignments that can be downloaded by each student [9].

Some teachers also do not provide feedback such as explanations of the material and assignments that have been studied. On the other hand, the teacher only gives a larger portion of the task than teaching activities [10]. This results in a greater student learning burden and they lose playing time to socialize in the community. Many teachers think that giving a lot of assignments can help students be more active, creative, and independent learning [11]. However, this is certainly not appropriate because students not only learn cognitive abilities, but affective, psychomotor, and social skills. Moreover, the assignments given to students are large and the processing time is short, and often coincides with the work on assignments in other subjects.

The transition process from conventional learning systems to online learning requires students, teachers, and other learning elements to adapt and be technology literate as soon as possible [12]. In addition, schools need to apply new learning models that are adaptive to the current conditions in life so that learning continues to run optimally as well as using the blended learning model. Blended learning is a combination of online and conventional face-to-face learning models [13]. This learning model combines many conventional learning methods such as lectures and face-to-face with independent learning methods such as projects, assignments, and laboratory activities as well as online learning such as e-learning, information and communication technologies (ICT), and multimedia. Furthermore, this blended learning model can be used as an alternative during the transition period to make the online learning process a success [14]. Blended learning can be developed according to the needs and learning objectives. In addition, the implementation of blended learning can also support the implementation of learning as it is today during the COVID-19 pandemic which is carried out remotely. With mixed learning, participants in learning activities can take advantage of the accessibility of online components with conventional classroom instruction and can expand the curriculum without increasing program completion time [15]. In addition, the learning process will be more student-centered, so that students better understand the subject matter presented by the teacher. The teacher's role which was originally a learning resource that provides knowledge to students will turn into a facilitator, companion, mentor, and partner for students to develop their skills and knowledge.

Blended learning with the enriched-virtual model is very suitable for learning during this new normal period. With the enriched-virtual model, education carried out online for the last few months can now be integrated with conventional learning [16]. Learning can be done through live events, namely face-to-face learning at the same place and time (classroom) or at different times but in the exact location (virtual classroom). Virtual classroom can be used to maximize online learning and minimize face-to-face learning in class [17]. In this case, it is certainly in line with students' desire to attend face-to-face learning at school. Teachers and students can do face-to-face online learning using the lecture application, which will turn into a facilitator, companion, mentor, and partner for students to develop their skills and knowledge. Blended learning provides students opportunities to carry out learning independently according to their learning style [18]. The combination of face-to-face and online learning will provide more interactive learning experience.

A more significant portion of online lessons can also make it easier for students to get various forms of learning material that can be accessed anytime and anywhere with the internet. The learning process will also be more fun and not monotonous because it uses more varied learning methods and media [19]. Learning can also be done using self-paced learning, which combines traditional knowledge with independent learning that is not limited to time, place, and access to learning materials [20]. Conceptual material or understanding

can be presented in the form of text or multimedia. In contrast, material that is procedural or requires practice in the laboratory can be shown in the form of animation or computer-based simulations. Students can do practical activities like in a natural laboratory with the help of a virtual laboratory. However, this media still has limitations, which can only be used as tutorial material [21]. Students still need direct practice in the laboratory to prove various theories that have been previously studied. Furthermore, teaching materials are first sent online via streaming video, visual audio streaming, and e-books that can be accessed via Moodle, YouTube, or Google Classroom, prepared in advance.

Learning activities between teachers and students can communicate and collaborate to get a vibrant, creative, and dynamic communication atmosphere through email facilities, chatrooms, websites, weblogs, or online discussion forums. This form of communication can add value to teachers and students, and parents to find learning patterns that are truly lively and refreshing in the atmosphere [22]. So that learning is delightful and felt by all parties, namely teachers, students, and parents at home, so that parents can monitor the learning process with a blended learning model that is fun and not dull so that it can improve the quality of learning with various twists and turns with dynamics [23]. Learning outcomes in blended learning can be measured using a combination of assessment tests (tests or quizzes) and non-tests (portfolios, project assignments, product development). The assessment given should be done independently using ICT assistance and can be sent online. That way, students will adapt more quickly to the online learning system.

Blended learning also allows learning to be carried out entirely online. Through the web-enhanced course, teachers and students are expected to take advantage of the internet and technology to improve the classroom's quality of learning [24]. With the internet, students can communicate with the teacher, friends, group members, and other sources. Online learning also requires teaching materials that are interesting and easy to understand. Therefore, teachers and students must be able to work together to find and find varied and innovative learning methods and media. Teachers and students must also be able to use, operate and implement technology in the online learning process [25]. That way, learning with the blended learning model can be carried out well, and it is hoped that all elements of learning can be better prepared for comprehensive online education. Through this blended learning, access to education, efficiency, and quality of learning and teaching can be improved [26]. Students are expected to be able to take advantage of online and digital media to develop critical thinking skills and problem-solving, as well as to have the skills to communicate and collaborate. Students and teachers are also expected to quickly adapt and always have the initiative to be creative and innovate as well as initiatives to access and analyze information to achieve real online learning [27]. Therefore, to maintain the survival of Indonesian people in this era, the educational system's improvement can be improved in quality and quality through active, creative, effective, and enjoyable learning activities for students. One way that can be taken is by implementing blended learning as an alternative to education. Thus, the purpose of this study is to determine the effectiveness of blended learning as an alternative to online education in the new normal era at the high school level.

## **2. LITERATURE REVIEW**

### **2.1. The basic concept of distance learning**

At first, learning was only done face-to-face. Teaching takes place face-to-face because there was no supporting administration to do distance teaching [28]. Face-to-face learning is the occurrence of learning interactions carried out by educators and students at the same time and place. Face-to-face learning is also called traditional learning. Along with the development of information technology, the learning process also changes. The learning process, which was initially only face-to-face, developed with online learning. Online learning is generally referred to as electronic learning or shortened to e-learning [29]. E-learning has become part of learning to help face-to-face learning. E-learning is the assimilation of knowledge and skills continuously by adolescent students [30]. The assimilation is stimulated by synchronous or unsynchronized learning using internet technology. E-learning helps the face-to-face learning process, one of which is in distributing or distributing lesson material, homework, or projects from educators to students. It is also said that e-learning helps the learning process that cannot be done face-to-face. Mixing face-to-face learning and online learning will further maximize the efforts of educators as managers in achieving learning goals [31].

E-learning is an effective learning process produced by combining digital material delivery consisting of support and services in learning. E-learning as a form of education based on technology tools such as laptop computers, smartphones allow a person to study anywhere and anytime [32]. Four factors influence e-learning, namely learners, subject matter, learning atmosphere, and learning technology [33]. The function of e-learning in learning is used as a supplement, complement, or substitution [34]. There are four things in the philosophical factors regarding e-learning: i) E-learning is the delivery of information, communication, education, and online training; ii) E-learning provides a set of tools that can enrich conventional learning values so that responding to the challenges of globalization; iii) E-learning does not

mean replacing conventional learning models but strengthening it with content enrichment and educational technology development; and iv) The capacity of students in mastering the material conveyed through e-learning varies widely, depending on the form, content, and delivery method.

Like other learning models, e-learning also has advantages and disadvantages. The benefits are learner-centered, independent learning, flexible in time and location, cost-effective for students, the potential for students from other countries, unlimited access to knowledge, and the ability to share and reuse knowledge [35]. The drawbacks are the lack of immediate feedback in e-learning that is out of sync. Teachers need more time to prepare, is uncomfortable for some, and can cause frustration, anxiety, and confusion. In learning support services [36], it is stated that the proportion of content delivered in online learning is 30%-79%. Blended learning involves a combination of online and face-to-face learning elements. This describes blended learning as a combination of delivery methods that complement each other and support student learning. Online discussions can be developed to facilitate peer tutorials among students [37]. Blended learning can bring significant changes, namely the existence of learning materials that are deliberately designed, developed, and shared with people who want to access them. Still, they have limitations that affect the learning process. The flexibility of time and place of learning makes mixed learning the broadest possible opportunity for students to learn. There are three concepts in blended learning, namely the concept of pedagogy, technology, and learning theory [38].

## 2.2. The urgency of learning blended learning

Blended learning is the new normal that is currently used in education; whether we realize it or not, new normal has started to occur globally since the COVID-19 pandemic. Teaching and learning activities usually carried out face-to-face, where educators and students are physically present in classrooms and learning places, are now being replaced by learning activities through electronic media (e-learning) either synchronously or non-synchronously. Asynchronous e-learning can be done both online and offline [39]. In online learning, educators and students are simultaneously in the same application or platform and can interact each other as conventional learning. Whereas in offline learning, educators upload material via the web, send via electronic mail or upload it via social media for later download by students [40].

In an offline way, students learn independently without being bound by time and place. On the other hand, e-learning synchronization can only occur online. Even though e-learning teaching and learning activities have been carried out by several universities for a long time, this method of learning is awareness of the industrial revolution 4.0 era, an era that has brought changes to the way humans work, interact, and transact [41]. From an educational perspective, educational theorists' general term as an implication of industrial revolution 4.0 is education 4.0; to describe various ways to integrate technology in the industrial revolution 4.0 era both physically and not into learning. Education 4.0 is an innovation in the world of education in the age of industrial revolution 4.0. Education 4.0 can be seen as a creative response where humans take advantage of digital technology [42], open sources contents, and global classrooms in the application of lifelong learning, flexible education systems, and personalized learning to play a better role in the middle of society. On the other hand, new normal e-learning is not an answer to a question but an adaptation of a condition that everyone is forced to do [43].

## 3. RESEARCH METHOD

This was quantitative research with experimental method employed a one-shot case study design. One-shot case study research designs are useful for demonstrating the measurement power and scientific value of an experimental research design [44]. In other words, a one-shot case study design is used to compare the effectiveness of educational programs before implementing blended learning with the goals of educational programs after implementing blended learning. The results of this study showed how effective the blended learning model is during the COVID-19 pandemic. The effectiveness of the application of the blended learning model during the COVID-19 pandemic in this study was measured using an effectiveness questionnaire. Meanwhile, the one-shot case study design scheme used in this study is shown in Figure 1.

Figure 1 shows that X is the treatment of the independent variable. This means that the treatment used was the application of the blended learning model during the COVID-19 pandemic. Meanwhile, O is a measurement of the implementation of the blended learning model during the COVID-19 pandemic. This research was conducted in several public high schools in Special Region of Yogyakarta. The respondent was 70 teachers who were taken by simple random sampling technique. This technique was used due to the similarity of characteristics of state high school teachers in Yogyakarta. Data collection was carried out by using questionnaires. The questionnaire consisted of 15 statements developed adhere a 5 Likert scale (1=very low to 5=very high) with statements or comments in implementing the blended learning model during the COVID-19 pandemic. Furthermore, questionnaire is distributed to respondents to obtain the data (to see whether or not the level of effectiveness in using the blended learning model) [45].



Figure 1. One-shot case study design scheme

The data analysis started by analyzing the feasibility of questionnaire to determine the validity and reliability [46]. Analysis of the item validity employed Pearson product moment correlation validity test. Meanwhile, the reliability analysis of the questionnaire in this study was carried out using the Cronbach Alpha equation as shown in (1).

$$r_{11} = \left( \frac{k}{k-1} \right) \left( 1 - \frac{\sum \sigma b^2}{\sigma t^2} \right) \quad (1)$$

Based on (1), it can be seen that  $r_{11}$  is the instrument reliability score,  $k$  is the number of items,  $\sum \sigma b^2$  is the number of item variances, and  $\sigma t^2$  is the number of variances [47]. Meanwhile, the data analysis technique used to answer the purpose of this research is to compare the percentage of the effectiveness of learning activities before implementing blended learning with learning activities after applying blended learning. Learning will be tested and succeeded effectively and efficiently, if the results of the learning effectiveness show a score with an interval of 80-100% then the effectiveness of learning that implements blended learning is included in the high category. If the results of the learning effectiveness show a score with an interval of 70-79%, the effectiveness of learning that implements blended learning is included in the medium category. Meanwhile, if the results of learning effectiveness show a score of less than 70%, then the effectiveness of learning that implements blended learning is included in the low category [48]. Furthermore, the effectiveness of the blended learning model in learning during the COVID-19 pandemic was determined using regression analysis with the help of SPSS software.

## 4. RESULTS AND DISCUSSION

### 4.1. Questionnaire validity and reliability

Questionnaire was employed to collect the data in this research. The validity of this questionnaire was tested by using Pearson product moment correlation test. The results of the validity test in this study are presented in Table 1. The table shows that all the correlation values obtained are above the  $r$  table value. The value of  $r$  table for  $N$  is 15, which is 0.36. That is, the results of the questionnaire validity test as presented in Table 1 show that the questionnaire used to measure the effectiveness of the blended learning model is valid. This is evidenced by the correlation value for each item which is more than 0.8 and the lowest correlation value is 0.884 in the questionnaire item number 7. In addition, to test the feasibility of the questionnaire used to measure the effectiveness of the blended learning model, a reliability test is also carried out. The reliability test of the questionnaire in this study was carried out using the Cronbach Alpha equation with the help of the SPSS program. The results of the questionnaire reliability test in this study are shown in Table 2.

Table 1. Questionnaire validity test results

No.	Correlations	Significance level	Interpretation
1	0.973	0.05	Valid
2	0.955	0.05	Valid
3	0.946	0.05	Valid
4	0.935	0.05	Valid
5	0.973	0.05	Valid
6	0.891	0.05	Valid
7	0.884	0.05	Valid
8	0.973	0.05	Valid
9	0.908	0.05	Valid
10	0.973	0.05	Valid
11	0.958	0.05	Valid
12	0.948	0.05	Valid
13	0.947	0.05	Valid
14	0.948	0.05	Valid
15	0.921	0.05	Valid

Table 2 reveals that the questionnaire reliability score is 0.988. A measurement instrument whose reliability is analyzed uses the Cronbach Alpha equation if the Alpha coefficient value is more than 0.60, then the measurement instrument can be said to be reliable [49]. Since the reliability score of the questionnaire in this study is 0.988 which is greater than 0.60, the questionnaire used to measure the effectiveness of the blended learning model during the COVID-19 pandemic is reliable. Therefore, in general the questionnaire used in this study is feasible to measure the effectiveness of the blended learning model during the COVID-19 pandemic.

Table 2. Questionnaire reliability test results

Reliability statistics	
Cronbach's Alpha	N of items
.988	15

#### 4.2. The effectiveness of blended learning model

After the questionnaire developed in this study obtained decent results, the next step was to use the questionnaire to measure the effectiveness of the blended learning model during the COVID-19 pandemic. The results of the effectiveness of the blended learning model have a positive influence on learning activities during the COVID-19 pandemic. This can be shown from the percentage of the effectiveness percentage of the blended learning model on learning activities during the COVID-19 pandemic as presented in Table 3.

Table 3 describes the results of the effectiveness of the application of the blended learning model in learning during the COVID-19 pandemic. The value in the "value" column is obtained from the total amount for each item. In contrast, the percentage column's value is obtained from the total amount for each item divided by the ideal number then multiplied by the value 100. This study shows that the ability of blended learning to achieve educational goals has better effectiveness than the effectiveness of education before using blended learning (93.14% versus 73.71%). Meanwhile, making students feel satisfied in the educational process, the combined learning method provides a higher percentage value of 94.57%. The percentage of educational effectiveness before using blended learning is 70%. Furthermore, the effectiveness of the ability to make students more creative in the educational process, the blended learning method provides much higher energy (95.14%). In contrast, the effectiveness of making students more creative in the educational approach before using blended learning is 73.14%. This also occurs in terms of the ability to take advantage of technological advances in education.

Table 3. Blended learning model effectiveness percentage

Before applying blended learning		Aspects assessed	After applying blended learning	
Value	Percentage (%)		Value	Percentage (%)
258	73.71	Ability to achieve educational goals	326	93.14
245	70.00	The ability to make students feel satisfied in the educational process	331	94.57
256	73.14	The ability to make students more creative in the educational process	333	95.14
262	74.86	Ability to take advantage of technological advances in education	337	96.29
253	72.29	The ability to make it easier for students to understand the material	332	94.86
256	73.14	The ability to make students learn more flexible	330	94.29
252	72.00	The ability to make students more expressive in education	329	94.00
259	74.00	The ability to make students get good learning outcomes in education	336	96.00
258	73.71	Ability to make education more attractive	335	95.71
259	74.00	The ability to make education more varied	332	94.86
256	73.14	The ability to make students faster in getting information	334	95.43
254	72.57	The ability to make students more severe and concentrate	333	95.14
259	74.00	Making education saves more on learning tools	333	95.14
257	73.43	The ability to make students more active in the educational process	334	95.43
261	74.57	The ability to make education better and following technological	335	95.71

The combined learning method has much higher effectiveness at 96.29%. Meanwhile, the point occurs in terms of taking advantage of technological advances in education before using blended learning, amounting to 74.86%. Furthermore, this study's concern is the effectiveness in terms of the ability to make it easier for students to understand the material in education. Before using blended learning, the percentage of energy was 72.29%, but after using blended learning, the effectiveness was 94.86%. These results indicate that using the mixed learning method has a positive effect in making it easier for students to understand the material. It is no less interesting to explore is related to its ability to make students learn more flexibly in the educational process. In this case, blended learning showed better results indicated by the percentage value

obtained 94.29%. Meanwhile, the effectiveness before using blended learning was only 73.14%. The ability to maximize students' expression in education is also a concern in this study.

In this regard, blended learning looks more effective, with its effectiveness value reaching 94%. Meanwhile, the ability to make students express themselves more optimally in education before using blended learning is only 72%. Next is the ability to make students get good learning outcomes in their education; it is clear that using blended learning has a higher value (96%), while using blended learning only 74%. This also happened in terms of its ability to make education more attractive; it turned out that after using blended learning, the effectiveness was better at 95.71%, and before using blended learning, the effectiveness value was 73.71%. The ability to make education more varied is also a concern in this study. In this regard, using blended learning was higher than the effectiveness before using blended learning (94.86% versus 74%). Meanwhile, the comparison of significance in terms of its ability to make students faster in obtaining information related to student learning outcomes is 95.43% versus 73.14%.

Another aspect that was also explored for its effectiveness in this study was making students more severe and concentrating on the educational process. In this regard, the point after using blended learning was 95.14%, meanwhile, the effectiveness before using blended learning was 72.57%. The ability to make education save more on learning equipment such as blackboards, markers, erasers, and paper is also a concern in this study related to these aspects. The effectiveness after using blended learning is 95.14% and before using blended learning is 74%.

Hypothesis testing from this research can be drawn from a common thread that the respondents before applying the blended learning model aimed at 70.00-74.00 showed intermediate results, in this case, because there had not been any changes. However, after implementing blended learning, the scores were relatively high, namely 93.14-96.00. Thus, the level of success in the blended learning model of education can be said to be effective and successful very satisfactorily. The blended learning pattern is quite significant in accompanying children in the learning process so that it is more effective and efficient, and the results of learning. Furthermore, this study found the results of the effectiveness of the application of the blended learning model in learning during the COVID-19 pandemic as presented in Table 4.

Table 4 shows the effectiveness of using the blended learning during the COVID-19 pandemic based on the results of the regression test has been confirmed with  $R=.923$  and  $R^2=.852$ . In other words, the results of the regression coefficients show that the use of the blended model is effective in learning during the COVID-19 pandemic by 85.20% and the remaining 14.80% is influenced by other factors. The results indicated  $H_a$  to be accepted because the significance level is smaller than 0.05 (0.006). It means that the use of the blended model effectively influences learning during the COVID-19 pandemic.

Table 4. The effectiveness of blended learning model

R	R Square	Adjusted R Square	Std. error of the estimate	Statistics		
				R Square Dif.	F Dif.	Sig. F Dif.
.923	.852	.8101	7.764	.611	3.291	.006

## 5. DISCUSSION

This experimental research carried out with a one-shot case study research design. The effectiveness of the application of the blended learning model is measured. The effectiveness of the blended learning model was measured using a questionnaire developed in this study. The questionnaire is valid and reliable. It can be adopted by other researchers who will measure the effectiveness of a learning model whose characteristics resemble the blended learning model during the COVID-19 pandemic [50]. With the questionnaire developed in this study feasible to be used in measuring the effectiveness of the learning model, this research indirectly also contributes to the field of education in providing valid and reliable measurement instruments.

In this study, there is a significant difference from what the authors found, where the learning and discussion results show a fairly high score, which is 93.14-95.00. On the other hand, before applying the blended learning method, they were only able to catch up to a score of 70.00-74.00. These results indicated that in general learning needs to be done with a variety of variations. Students need a varied treatment so that the subject matter delivered by the teacher can be easily understood by them. It is not surprising that the term appears when interacting with something monotonous will cause boredom, especially for students whose curiosity is at their peak [51]. Therefore, it is not surprising that the results of implementing the blended learning model have a high percentage of learning. In addition, during the COVID-19 pandemic, learning variations are also needed that are able to suppress the spread of COVID-19, one of which is through blended learning. Learning during the COVID-19 pandemic which was carried out by applying the blended learning

model was carried out with the majority of delivering material remotely [52]. Students and teachers carry out learning using the help of various existing technologies. Although there are positive and negative sides to distance learning, for health reasons, distance learning using the blended learning model must still be done.

Distance learning that applies the blended learning model can be conducted with the assistance of technology. Therefore, learning that utilizes electronic, digital, or internet technology is often referred to as e-learning [53]. E-learning is an effective learning process produced by combining the delivery of digital materials consisting of support and services in learning [54]. In line with this statement, Pustika [55] stated that e-learning is a computer-based educational tool or system that allows a person to learn anywhere and anytime. Four factors affect e-learning, namely students, subject matter, learning atmosphere, and learning technology [56]. The function of e-learning in learning is used as a complement, complement, or substitute. There is a correlation between the research findings and the theoretical basis that the researchers used previously. The results showed that the application of the blended learning model at public high schools in Yogyakarta during the COVID-19 pandemic was mostly carried out by blended learning by teachers or education practitioners.

The application of the blended learning model in this study focuses more on improving the quality and effectiveness of learning and more on the level of enjoying the beauty of blended learning. In addition, the implementation of the blended learning model also makes it easier for parents to monitor the learning process carried out by each student. In this case indirectly the parents of students also learn to understand the cognitive, affective, and psychomotor development of students [57]. Based on the research results, this blended learning model is more effective, efficient, and simple. Therefore, it is hoped that other schools will participate in carrying out this learning because there has been a significant increase in the learning process that applies the blended learning model during the COVID-19 pandemic and even parents also participate in monitoring children who are in the learning process. Meanwhile, this research provides alternatives in applying blended learning models during the COVID-19 pandemic.

## 6. CONCLUSION

This study concluded that the effectiveness of educational programs after using blended learning is higher than before. This finding proved that the implementation of the blended learning model positively affects learning activities during the COVID-19 pandemic. These results indicated that the blended learning model is feasible to use as an alternative learning model during the COVID-19 pandemic.

Moreover, teachers need variations in the implementation of learning activities. The existence of variations in learning can make it easier for students to understand the material presented by the teacher. The class also become more interesting in the learning process that uses a variety of learning models. Teachers are expected to have sufficient competence to carry out the blended learning model. Students need to be given sufficient initial knowledge to participate in blended learning.

Meanwhile, researchers who will explore similar research themes can develop and complement other research approaches and models. There are several limitations experienced in this study. This research only involved respondent in high schools. Data analysis is still in the form of descriptive statistics. Researchers who will research with the same theme should develop more profound into the broader research subject and other research designs.

## REFERENCES

- [1] J. Crawford *et al.*, "COVID-19: 20 countries' higher education intra-period digital pedagogy responses," *Journal of Applied Learning & Teaching*, vol. 3, no. 1, pp. 1–20, 2020.
- [2] R. M. Anderson, H. Heesterbeek, D. Klinkenberg, and T. D. Hollingsworth, "How will country-based mitigation measures influence the course of the COVID-19 epidemic?" *The Lancet*, vol. 395, no. 10228, pp. 931–934, Mar. 2020, doi: 10.1016/s0140-6736(20)30567-5.
- [3] O. Zawacki-Richter, "The current state and impact of Covid-19 on digital higher education in Germany," *Human Behavior and Emerging Technologies*, vol. 3, no. 1, pp. 218–226, Dec. 2020, doi: 10.1002/hbe2.238.
- [4] F. Chen, A. M. Lui, and S. M. Martinelli, "A systematic review of the effectiveness of flipped classrooms in medical education," *Medical Education*, vol. 51, no. 6, pp. 585–597, May 2017, doi: 10.1111/medu.13272.
- [5] L. M. Foote, "Honing Crisis Communication Skills," *Journal of Management Education*, vol. 37, no. 1, pp. 79–114, Aug. 2012, doi: 10.1177/1052562912455419.
- [6] S. Papadakis, M. Kalogiannakis, E. Sifaki, and N. Vidakis, "Access Moodle Using Smart Mobile Phones. A Case Study in a Greek University," in *Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering*, Springer International Publishing, 2018, pp. 376–385.
- [7] S. Papadakis, M. Kalogiannakis, E. Sifaki, and N. Vidakis, "Evaluating Moodle use via Smart Mobile Phones. A case study in a Greek University," *EAI Endorsed Transactions on Creative Technologies*, vol. 5, no. 16, p. 156382, Oct. 2018, doi: 10.4108/eai.10-4-2018.156382.
- [8] J. E. López, J. J. R. D. de la Guardia, M. del C. O. Gómez, R. C. Cuberos, and E. M. O. Moreno, "Enhancing skills for employment in the workplace of the future 2020 using the theory of connectivity: shared and adaptive personal learning environments in a Spanish context," *Sustainability*, vol. 11, no. 15, pp. 4219–4225, 2019.






- [9] N. Kerimbayev, J. Kultan, S. Abdykarimova, and A. Akramova, "LMS Moodle: Distance international education in cooperation of higher education institutions of different countries," *Education and Information Technologies*, vol. 22, no. 5, pp. 2125–2139, Sep. 2016, doi: 10.1007/s10639-016-9534-5.
- [10] A. E. P. Atmojo and A. Nugroho, "EFL Classes Must Go Online! Teaching Activities and Challenges during COVID-19 Pandemic in Indonesia," *Register Journal*, vol. 13, no. 1, pp. 49–76, May 2020, doi: 10.18326/rgt.v13i1.49-76.
- [11] H. Putranta, H. Setiyatna, S. Supahar, and R. Rukiyati, "The Effect of Smartphones Usability on High School Students' Science Literacy Ability in Physics Learning," *European Journal of Educational Research*, vol. 10, no. 3, pp. 1383–1396, Jul. 2021, doi: 10.12973/eu-jer.10.3.1383.
- [12] Z. Z. A. Thariq, "The Use of Social Media as Learning Resources to Support the New Normal," *Teknodika*, vol. 18, no. 2, p. 80, Sep. 2020, doi: 10.20961/teknodika.v18i2.42181.
- [13] T. Yigit, A. Koyun, A. S. Yuksel, and I. A. Cankaya, "Evaluation of Blended Learning Approach in Computer Engineering Education," *Procedia - Social and Behavioral Sciences*, vol. 141, pp. 807–812, Aug. 2014, doi: 10.1016/j.sbspro.2014.05.140.
- [14] A. Ozadowicz, "Modified Blended Learning in Engineering Higher Education during the COVID-19 Lockdown-Building Automation Courses Case Study," *Education Sciences*, vol. 10, no. 10, p. 292, Oct. 2020, doi: 10.3390/educsci10100292.
- [15] M. Kalogiannakis and S. Papadakis, "The dual form of further education of educators in ICT: Technological and pedagogical training," *Proceedings of the 8th International Conference on Computer Based Learning in Science, (CBLIS 2007)*, Heraklion, 2007, pp. 265–276.
- [16] K. Kiltens, R. Groten, and M. Slater, "The Sense of Embodiment in Virtual Reality," *Presence: Teleoperators and Virtual Environments*, vol. 21, no. 4, pp. 373–387, Nov. 2012, doi: 10.1162/pres\_a\_00124.
- [17] M. Manegre and K. A. Sabiri, "Online language learning using virtual classrooms: an analysis of teacher perceptions," *Computer Assisted Language Learning*, pp. 1–16, May 2020, doi: 10.1080/09588221.2020.1770290.
- [18] L. K. Ilyashenko, M. N. Gladkova, M. M. Kutepov, O. I. Vaganova, and Z. V. Smirnova, "Development of communicative competencies of students in the context of blended learning," *Amazonia Investiga*, vol. 8, no. 18, pp. 313–322, 2019.
- [19] R. R. V. K. Dewi, "E-learning as education media innovation in the industrial revolution and education 4.0 era," *Journal of Contemporary Issues in Business and Government*, vol. 27, no. 1, pp. 2868–2880, 2021.
- [20] Y. Peng and J. G. Tullis, "Theories of intelligence influence self-regulated study choices and learning," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, vol. 46, no. 3, pp. 487–496, Mar. 2020, doi: 10.1037/xlm0000740.
- [21] K. W. McElhane, H.-Y. Chang, J. L. Chiu, and M. C. Linn, "Evidence for effective uses of dynamic visualisations in science curriculum materials," *Studies in Science Education*, vol. 51, no. 1, pp. 49–85, Dec. 2014, doi: 10.1080/03057267.2014.984506.
- [22] M. B. Bosra, H. C. Adi, and G. A. Syawaliani, "Teacher's Communication Model in Learning Islamic Education for Autism Children," *Al-Ta'lim Journal*, vol. 27, no. 3, pp. 306–317, Dec. 2020, doi: 10.15548/jt.v27i3.636.
- [23] E. Jääskä, K. Aaltonen, and J. Kujala, "Game-Based Learning in Project Sustainability Management Education," *Sustainability*, vol. 13, no. 15, p. 8204, Jul. 2021, doi: 10.3390/su13158204.
- [24] A. Elboshi, "Web-Enhanced Peer Feedback in ESL Writing Classrooms A Literature Review," *English Language Teaching*, vol. 14, no. 4, p. 66, Mar. 2021, doi: 10.5539/elt.v14n4p66.
- [25] R. Rasmitadila *et al.*, "The Perceptions of Primary School Teachers of Online Learning during the COVID-19 Pandemic Period: A Case Study in Indonesia," *Journal of Ethnic and Cultural Studies*, vol. 7, no. 2, p. 90, Jul. 2020, doi: 10.29333/ejecs/388.
- [26] R. H. Rafiola, P. Setyosari, C. L. Radjah, and M. Ramli, "The Effect of Learning Motivation, Self-Efficacy, and Blended Learning on Students' Achievement in The Industrial Revolution 4.0," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 15, no. 08, p. 71, Apr. 2020, doi: 10.3991/ijet.v15i08.12525.
- [27] C. Dziuban, C. R. Graham, P. D. Moskal, A. Norberg, and N. Sicilia, "Blended learning: the new normal and emerging technologies," *International Journal of Educational Technology in Higher Education*, vol. 15, no. 1, Feb. 2018, doi: 10.1186/s41239-017-0087-5.
- [28] C. B. Mpungose, "Emergent transition from face-to-face to online learning in a South African University in the context of the Coronavirus pandemic," *Humanities and Social Sciences Communications*, vol. 7, no. 1, Oct. 2020, doi: 10.1057/s41599-020-00603-x.
- [29] Fitria, Ruslan, and M. Y. Mapeasse, "Application of e-learning based on enriched virtual model in the subject database," *International Journal of Environment, Engineering & Education*, vol. 3, no. 1, pp. 32–40, 2021.
- [30] A. Habibi *et al.*, "Building an Online Community: Student Teachers' Perceptions on the Advantages of Using Social Networking Services in A Teacher Education Program," *Turkish Online Journal of Distance Education*, vol. 19, no. 1, pp. 46–61, Jan. 2018, doi: 10.17718/tojde.382663.
- [31] D. Spencer and T. Temple, "Examining Students' Online Course Perceptions and Comparing Student Performance Outcomes in Online and Face-to-Face Classrooms," *Online Learning*, vol. 25, no. 2, Jun. 2021, doi: 10.24059/olj.v25i2.2227.
- [32] S. Ray and S. Srivastava, "Virtualization of science education: a lesson from the COVID-19 pandemic," *Journal of Proteins and Proteomics*, vol. 11, no. 2, pp. 77–80, May 2020, doi: 10.1007/s42485-020-00038-7.
- [33] I. Kadek *et al.*, "Development of E-Learning Oriented Inquiry Learning Based on Character Education in Multimedia Course," *European Journal of Educational Research*, vol. 9, no. 4, pp. 1591–1603, Oct. 2020, doi: 10.12973/eu-jer.9.4.1591.
- [34] E. Suparman and K. Sangadji, "Mobile learning to learnings: Function and benefits," *International Journal of Education, Information Technology, and Others*, vol. 2, no. 2, pp. 96–102, 2019.
- [35] S. B. Cross and A. H. Dunn, "I didn't know of a better way to prepare to teach: A case study of paired student teaching abroad," *Teacher Education Quarterly*, vol. 43, no. 1, pp. 71–90, 2016.
- [36] A.-M. M. Gasaymeh and O. M. Aldalalah, "The Impact of Using SMS as Learning Support Tool on Students' Learning," *International Education Studies*, vol. 6, no. 10, Sep. 2013, doi: 10.5539/ies.v6n10p112.
- [37] L. Ding, "Applying gamifications to asynchronous online discussions: A mixed methods study," *Computers in Human Behavior*, vol. 91, pp. 1–11, Feb. 2019, doi: 10.1016/j.chb.2018.09.022.
- [38] A. Alammery, J. Sheard, and A. Carbone, "Blended learning in higher education: Three different design approaches," *Australasian Journal of Educational Technology*, vol. 30, no. 4, Sep. 2014, doi: 10.14742/ajet.693.
- [39] A. T. Jagzape, K. Shigli, and K. Patel, "Group-based Asynchronous E-learning Incorporating Revised Bloom's Taxonomy: An Innovative Approach," *Journal of Clinical & Diagnostic Research*, 2018, doi: 10.7860/jcdr/2018/29295.11115.
- [40] R. M. Simamora, "The Challenges of Online Learning during the COVID-19 Pandemic: An Essay Analysis of Performing Arts Education Students," *Studies in Learning and Teaching*, vol. 1, no. 2, pp. 86–103, 2020, doi: 10.46627/silet.v1i2.38.
- [41] M. Fadilurrahman, R. Ramadhani, T. Kurniawan, M. Misnasanti, and S. Shaddiq, "Systematic Literature Review of Disruption Era in Indonesia: The Resistance of Industrial Revolution 4.0," *Journal of Robotics and Control (JRC)*, vol. 2, no. 1, 2021, doi: 10.18196/jrc.2152.




- [42] A. A. Hussin, "Education 4.0 Made Simple: Ideas For Teaching," *International Journal of Education and Literacy Studies*, vol. 6, no. 3, p. 92, Jul. 2018, doi: 10.7575/aiac.ijels.v.6n.3p.92.
- [43] S. Siswati, A. K. Astiena, and Y. Savitri, "Evaluation of online-based student learning: Models during new normal pandemic Covid-19 in Indonesia," *Journal of Nonformal Education*, vol. 6, no. 2, pp. 148–155, 2020.
- [44] D. Kariman, Y. Harisman, A. Sovia, and R. C. I. Prahmana, "Effectiveness of guided discovery-based module: A case study in Padang City, Indonesia," *Journal on Mathematics Education*, vol. 10, no. 2, pp. 239–250, May 2019, doi: 10.22342/jme.10.2.6610.239-250.
- [45] A. Youde, "Tutor Emotional Competences Valued by Learners in a Blended Learning Context," *European Journal of Open, Distance and E-Learning*, vol. 19, no. 2, pp. 63–79, Dec. 2016, doi: 10.1515/eurodl-2016-0008.
- [46] O. Bolarinwa, "Principles and methods of validity and reliability testing of questionnaires used in social and health science researches," vol. 22, no. 4, p. 195, 2015, doi: 10.4103/1117-1936.173959.
- [47] B. Sharma, "A focus on reliability in developmental research through Cronbach's Alpha among medical, dental and paramedical professionals," *Asian Pacific Journal of Health Sciences*, vol. 3, no. 4, pp. 271–278, Nov. 2016, doi: 10.21276/apjhs.2016.3.4.43.
- [48] N. Deschacht and K. Goeman, "The effect of blended learning on course persistence and performance of adult learners: A difference-in-differences analysis," *Computers & Education*, vol. 87, pp. 83–89, Sep. 2015, doi: 10.1016/j.compedu.2015.03.020.
- [49] K. S. Taber, "The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education," *Research in Science Education*, vol. 48, no. 6, pp. 1273–1296, Jun. 2017, doi: 10.1007/s11165-016-9602-2.
- [50] B. Philipson, J. Tondeur, N. P. Roblin, S. Vanslambrouck, and C. Zhu, "Improving teacher professional development for online and blended learning: a systematic meta-aggregative review," *Educational Technology Research and Development*, vol. 67, no. 5, pp. 1145–1174, Jan. 2019, doi: 10.1007/s11423-019-09645-8.
- [51] C. C. Burn, "Bestial boredom: a biological perspective on animal boredom and suggestions for its scientific investigation," *Animal Behaviour*, vol. 130, pp. 141–151, Aug. 2017, doi: 10.1016/j.anbehav.2017.06.006.
- [52] A. Y. Alqahtani and A. A. Rajkhan, "E-Learning Critical Success Factors during the COVID-19 Pandemic: A Comprehensive Analysis of E-Learning Managerial Perspectives," *Education Sciences*, vol. 10, no. 9, p. 216, Aug. 2020, doi: 10.3390/educsci10090216.
- [53] V. Arkorful and N. Abaidoo, "The role of e-learning, advantages and disadvantages of its adoption in higher education," *International Journal of Instructional Technology and Distance Learning*, vol. 12, no. 1, pp. 29–42, 2015.
- [54] N. Cavus, "Distance Learning and Learning Management Systems," *Procedia - Social and Behavioral Sciences*, vol. 191, pp. 872–877, Jun. 2015, doi: 10.1016/j.sbspro.2015.04.611.
- [55] R. Pustika, "Future English Teachers' Perspective towards the Implementation of E-Learning in Covid-19 Pandemic Era," *Journal of English Language Teaching and Linguistics*, vol. 5, no. 3, p. 383, Dec. 2020, doi: 10.21462/jeltl.v5i3.448.
- [56] I. Ilyas and A. N. A. M. Liu, "The Effect of Based E-learning Contextual Approach on Student Learning Motivation," *Jurnal Penelitian Pendidikan IPA*, vol. 6, no. 2, pp. 184–189, Jun. 2020, doi: 10.29303/jppipa.v6i2.425.
- [57] P. Cai, "Thinking skills development in mobile learning: The case of elementary school students studying environmental studies," *Thinking Skills and Creativity*, vol. 42, p. 100922, Dec. 2021, doi: 10.1016/j.tsc.2021.100922.

## BIOGRAPHIES OF AUTHORS






**Sukirman**    is a lecturer at the Department of educational management, Faculty of Teacher Training and Education, Universitas Ahmad Dahlan, Yogyakarta, Indonesia.; education total quality management information system; education curriculum management and learning; using technologies in teaching. Relating to her research area, he has written and published book, several articles in prestigious journals and international conferences. He can be contacted at email: sukirman@mp.uad.ac.id.






**Yusron Masduki**    is lecturer at Department of Islamic Education, Universitas Ahmad Dahlan, Indonesia. He received his bachelor degree at Universitas Sriwijaya, Indonesia, master in Islamic Education at universitas Islam Raden Fatah Palembang, Indonesia, and doctoral in Islamic Educational Psychology at Universitas Muhammadiyah Yogyakarta, Indonesia. He can be contacted at email: yusron.masduki@pai.uad.ac.id.






**Suyono**    is a lecturer at the Department of Education Management, Faculty of Teacher Training and Education, Sarjanawiyata University Tamansiswa Yogyakarta, Indonesia. His main research directions are education management; teaching methods; information system of education management; education policy; the use of technology in teaching. Relating to his research area. He is also a consultant at educational institution Salsabila Baiturrahman Prambanan and the head of education at the Baiturrahman Prambanan Foundation. He can be contacted at email: [yonoyati18888@gmail.com](mailto:yonoyati18888@gmail.com).






**Dian Hidayati**    is a lecturer at the Department of educational management, Faculty of Teacher Training and Education, Universitas Ahmad Dahlan, Yogyakarta, Indonesia. Her main research directions are pre-service and in-service teacher training; teaching methods; education management information system; education policy; using technologies in teaching. Relating to her research area, she has written and published two books, over 34 articles in prestigious journals and proceedings of international conferences, and two articles published in international journals. She can be contacted at email: [dian.hidayati@mp.uad.ac.id](mailto:dian.hidayati@mp.uad.ac.id).



**Hanif Cahyo Adi Kistoro**    is a Ph.D. Candidate, Department of Educational Research and Evaluation, Graduate School, Universitas Negeri Yogyakarta, Colombo Street No.1 Yogyakarta, Yogyakarta 55281, Indonesia & Lecturer, Department of Islamic Education, Universitas Ahmad Dahlan, Indonesia. His research focuses on physics education, Scaffolding in education, Scientific literacy, project-based learning, Supersymmetry in Quantum, STEM education and literacy. He can be contacted at email: [hanifcahyo.2018@student.uny.ac.id](mailto:hanifcahyo.2018@student.uny.ac.id); [hanif.kistoro@pai.uad.ac.id](mailto:hanif.kistoro@pai.uad.ac.id).



**Sutipyo Ru'iyah**    is a Ph.D. Candidate, Department of Islamic Education, Universitas Islam Negeri Sunan Kalijaga, Yogyakarta, Marsda Adi Sucipto Street, Yogyakarta Indonesia. He is a Lecturer at Department of Islamic Education, Universitas Ahmad Dahlan, Indonesia. He can be contacted at e-mail: [sutipyo@pai.uad.ac.id](mailto:sutipyo@pai.uad.ac.id).