



## Effectiveness of Hybrid Learning Assisted in e-Learning Media in Mathematics Learning at Elementary School

Muhammad Mushfi El Iq Bali<sup>1\*</sup>, Zulfatul Aliyah<sup>1</sup>, Didik Humaidi<sup>1</sup>

<sup>1</sup>Department of Islamic Religious Education, Universitas Nurul Jadid, Indonesia

\*Correspondence to: [mushfieliqbali8@gmail.com](mailto:mushfieliqbali8@gmail.com)

**Abstract:** This study describes the effectiveness of hybrid learning using e-learning media during the Covid-19 pandemic, especially in mathematics. This research is descriptive quantitative research using a survey method, focusing on learning evaluation using e-learning media. The research population was all students of Madrasah Ibtidaiyah Miftahul Huda Pedaganga Tiris Probolinggo who were taught mathematics using hybrid learning methods. The research sample is the sixth-grade students of Madrasah Ibtidaiyah Miftahul Huda Pedaganga Tiris Probolinggo who were selected using a simple random sampling technique considering the homogeneity of the population. The data collection instrument used a hybrid learning questionnaire. Data analysis used descriptive statistics. The results of the study describe students assessing mathematics learning using e-learning media as very effective. Although there are also students who consider hybrid learning ineffective, absolutely no one considers it very ineffective. Based on the results of the analysis and research findings regarding the effectiveness of the implementation of hybrid learning using e-learning madrasah in mathematics subjects, it shows that learning using e-learning madrasah is quite effective to implement. This is because many parties support this learning, but several factors can hinder learning, so it must be considered so that learning can run smoothly.

**Keywords:** hybrid learning; e-learning; mathematics learning

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### INTRODUCTION

Information and communication technology in the industrial era 4.0 has experienced rapid development and has a considerable influence on the learning and teaching process. Teachers must be able to take advantage of the ease of accessing technology to improve the quality of education, especially in Indonesia. Technological developments can provide changes to the learning implementation process (Bali, 2019). Indonesia is still trying to improve innovation in the field of education, especially in teaching and learning, because a quality education system cannot be separated from the success of an educator in designing and implementing the learning process. In education 4.0, creating a learning environment is essential for creating a conducive independent learning environment (Bali & Hajriyah, 2020). A learning environment that leads to facilities development provides freedom for students, provides flexible support, and easy access. It is one of the ways to learn through the internet.

The development of information technology has also encouraged the emergence of various innovations in learning models in the field of education. Technology-based learning models arise because there are obstacles to traditional learning methods, especially currently in the Covid-19 pandemic, which can threaten safety so that students cannot meet face-to-face or be actively involved in the learning process (teacher-directed learning) (Oktavia et al., 2019). The government in the world of education has suddenly closed schools, abolished national exams, and has also changed the learning process from school to home. This change in the learning process forces the various parties concerned to be able to follow the path that can be taken so that learning can still take place and become the right solution for learning during the Covid-19 pandemic. The change is the use of technology as a hybrid learning media or e-learning or electronic learning model (Bali et al., 2022). The use of e-learning media or multimedia-based media is one solution to make students able to understand the subject matter well. This is in line with the results research, which shows a positive influence on the use of e-learning on the motivation and learning achievement of students at Tahunan Elementary School of Yogyakarta (Ibrahim & Suardiman, 2014).

Each student has a different way of solving problems; this is due to the different abilities possessed by each individual. The ability of students to organize themselves in the learning process is very important. Students need support from teachers, parents, and the environment to properly manage their learning process. So there must be media as an intermediary between students and teachers that can make it easier for teachers to monitor students' learning progress. E-learning is an internet-based application that can easily connect students and

teachers in an online study room application (Bali & Holilah, 2021). E-learning design aims to be able to overcome all the limitations of teachers and students in the process of implementing learning, especially in terms of time, circumstances, and space (Hendikawati et al., 2019). In summary, e-learning can create a digital space in the learning process, where students can access lessons provided by teachers or educators without being limited by space and time.

Government policies requiring changes in the teaching and learning process during the Covid-19 pandemic were initially carried out face-to-face in the classroom to an online or distance learning system. Using the system sometimes raises various problems faced by students, educators, and even parents or guardians of the student, such as subject matter that the educator has not completed, then the teacher replaces it with other tasks (Bali & Musrifah, 2020). This is a complaint about students and parents of students because, for students, the tasks given by the teacher are more, and for parents and guardians of students, they must provide facilities used for hybrid learning such as providing mobile devices, internet quota, and others-other.

Madrasah e-learning are hybrid learning media provided by the Ministry of Religion of the Republic of Indonesia as one of the infrastructures in terms of education to divert hybrid learning due to the Covid-19 outbreak. Madrasah e-learning is a free application that was initiated to support the learning process in madrasas so that it continues during the pandemic (Kholil et al., 2021). Madrasah e-learning is used by all levels of education under the Ministry of Religion, starting from *Madrasah Ibtidaiyah* (MI), *Madrasah Tsanawiyah* (MTs), to *Madrasah Aliyah* (MA). With the existence of e-learning madrasas, it is hoped that learning will become more structured, interesting, and interactive. Madrasah e-learning has six access roles, including (1) madrasa operator (administrator), (2) subject teacher, (3) counselling guidance teacher, (4) homeroom teacher, (5) students, and (6) supervisor (headmasters and staff) (Agus et al., 2022).

Educators need a variety of distance learning media that can be used to maximize hybrid learning in order to achieve the expected goals. These facilities are used optimally as learning media in the classroom. So, indirectly the ability to use and access technology will be increasingly controlled by educators and students (Rahman et al., 2019). The change in the teaching and learning system from home (hybrid learning) gives educators, students, and parents a distinct impression. This cannot be separated from the inhibiting and supporting factors to realize a goal of maximum learning. However, the implementation needs to be evaluated to get clear and data-based corrective steps.

Learning carried out by educators during the pandemic must-have new and more interesting innovations so that it can help make it easier for students to undergo hybrid learning. Using online media or e-learning when doing hybrid learning is very effective, but educators must improve several things to maximize learning, for example, in providing material and giving assignments, educators must consider the things that need to be considered can occur (Bali et al., 2021). In addition, hybrid learning is very easy to implement but cannot be said to be effective compared to direct learning because the developments obtained by students when learning online are very dependent on the situation (Tohet et al., 2021).

The effectiveness of learning is the result of using after carrying out the teaching and learning process. The team from IKIP Surabaya stated that the efficiency and effectiveness of teaching in a good learning interaction process is all the efforts of the teacher in helping students to learn well (Bali, 2020). The use of hybrid learning will be very effective if it fulfils the essential components in learning, namely discussion, adaptive, interactive, and reflective with elements that will be very good if integrated with the learning environment so that it can become hybrid learning that is integrated with the environment or fulfils the digital learning ecosystem component. Learning is said to be effective if it meets the following characteristics: a) Can develop students' understanding of the learning material, b) Make students curious, c) Make students challenged, d) Can make students active mentally, physically, and psychic, e) Help students grow creatively, f) Easy to implement by teachers (Bali & Rozhana, 2022). Based on the explanation, the researcher uses the characteristics of learning that are said to be effective according to Wicaksana et al. (2017) as indicators in this study.

Research related to the use of online media in general for the teaching and learning process during the pandemic (Mustakim, 2020). Wicaksana et al. (2017) conducted research related to the effectiveness of learning using e-learning media on the motivation and interest of students' talents during the Covid-19 pandemic (Wicaksana et al., 2017). The research we do is research that focuses on madrasa e-learning media and mathematics subjects. This research hopes that readers can find out how effective madrasa e-learning media are when used for online mathematics learning. Thus, this study aimed to determine the level of effectiveness of hybrid learning by using e-learning media in mathematics subjects. So that the results of this study can also be seen from the views of educators and students with the implementation of a hybrid learning system in mathematics subjects using e-learning madrasas. The formulation of the problem in this study is how the implementation of hybrid learning in mathematics subjects using e-learning madrasas, how effective the implementation of hybrid learning in mathematics subjects using e-learning madrasas is, and what are the supporting and inhibiting factors for the effectiveness of hybrid learning in subjects mathematics lessons using e-learning *madrasah*.

## METHODS

This research includes descriptive quantitative research using a survey method conducted online to find out an overview of the effectiveness of hybrid learning using e-learning madrasahs in mathematics. Surveys are used to collect information from some people regarding a particular topic or issue (Creswell, 2012). This research was conducted on August 16, 2021, with the number of respondents being 12 students of class VI. The subjects of this study were students and teachers. Researchers only conducted research on some students of Madrasah Ibtidaiyah Miftahul Huda Pedaganga Tiris Probolinggo due to limitations in conducting exploration during the current Covid-19 pandemic, thus requiring researchers to conduct research online. Data were obtained through questionnaires (questionnaires) and interviews. The questionnaire was conducted by making questions distributed to all respondents in the form of a google form that aims to find complete information (Akker et al., 2013). At the same time, the interview is addressed to the teacher as data supporting the questionnaire technique in data collection if the questionnaire technique is not in-depth the interview technique will obtain more in-depth information from the informant.

Interviews were conducted both online and offline. Furthermore, the collected data is analyzed for description. The respondent's sampling technique was carried out using the Simple Random Sampling technique. The simple Random Sampling technique takes sample members from the population, which is done randomly without regard to the strata that exist in the population. Sampling is used because this study involves many elements in the population, so it does not allow researchers to collect and test each element of the population because it takes much time, cost, and effort.

The data analysis technique in this study used descriptive statistical analysis techniques. The data is processed based on the answers given by the respondents to the statements of each questionnaire item. After collecting data from all respondents, the researchers conducted grouping, sorting, categorizing, and calculating to answer the problem formulation. The existence of grouping activities makes a sequence and shortens the data to be easier to read. The validity test in this study uses item analysis which is to test the validity of each item, then the scores on the items in question are correlated with the total score. At the same time, the reliability test used in this study is single test reliability (Internal Consistency Reliability) using the Spearman-Brown formula. Testing is done through Microsoft Excel.

## RESULT AND DISCUSSION

At this stage, the description is divided into two parts; the first part explains the research findings based on the analysis of variable items, while the second part focuses on discussing the results of this study with related theories or research.

### Implementation of Hybrid Learning Assisted by e-Learning Media in Mathematics Learning at Elementary School

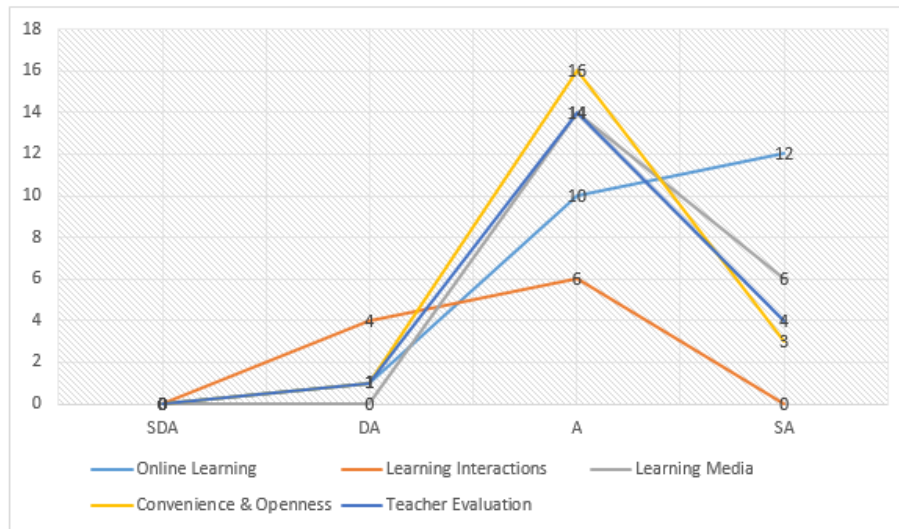
Analysis of the calculation of variable items regarding the implementation of hybrid learning using e-learning madrasahs in mathematics subjects based on the questionnaire data that we have distributed, the distribution of answers is obtained as follows.

**Table 1.** Implementation of e-Learning Assisted Hybrid Learning in Mathematics Learning at Elementary School

Indicator	Score					%
	SA	A	DA	SDA	Total	
Hybrid learning using e-learning <i>madrasah</i>	12	10	1	0	23	76,7
Learning interactions between teachers and students	0	6	4	0	10	33,3
Learning Media	6	14	0	0	20	66,7
Convenience and openness of hybrid learning	3	16	1	0	20	66,7
Teacher evaluation in hybrid learning	4	14	1	0	19	63,3

When implementing hybrid learning, it is indispensable to have suitable learning media to support the success of the learning process. Based on the results of the questionnaires that have been distributed, it shows that when hybrid learning is needed e-learning madrasahs as learning media, this result is shown by 76.7% of student responses stating that they strongly agree with this, the teacher who is the interviewee also stated the same thing. The interaction between teachers and students dramatically affects the learning process. Considering that the hybrid learning process is carried out in their respective residences using e-learning madrasahs, the interaction between teachers and students becomes more effortless; this is in line with the results of the questionnaire at that point showing that 33.3% of respondents disagreed that the interaction between

students with teachers when learning mathematics using e-learning madrasas is less than optimal.



**Figure 1.** Implementation of e-Learning Assisted Hybrid Learning in Mathematics Learning at Elementary School

The maximum interaction between teachers and students positively affects the openness and freedom of students to express questions and opinions about the material. The existence of learning through e-learning madrasas makes students more open in expressing questions and opinions about problems that exist in the learning material; this is based on 66.7% of respondents agreeing regarding this matter. The use of madrasa e-learning is also beneficial in the process of implementing online mathematics learning; this is indicated by 66.7% of respondents' answers agreeing to the statement. Good learning ends with an evaluation conducted by the teacher on the students. 63.3% of the answers stated that the teacher continued to re-evaluate the tasks given through e-learning *madrasah*.

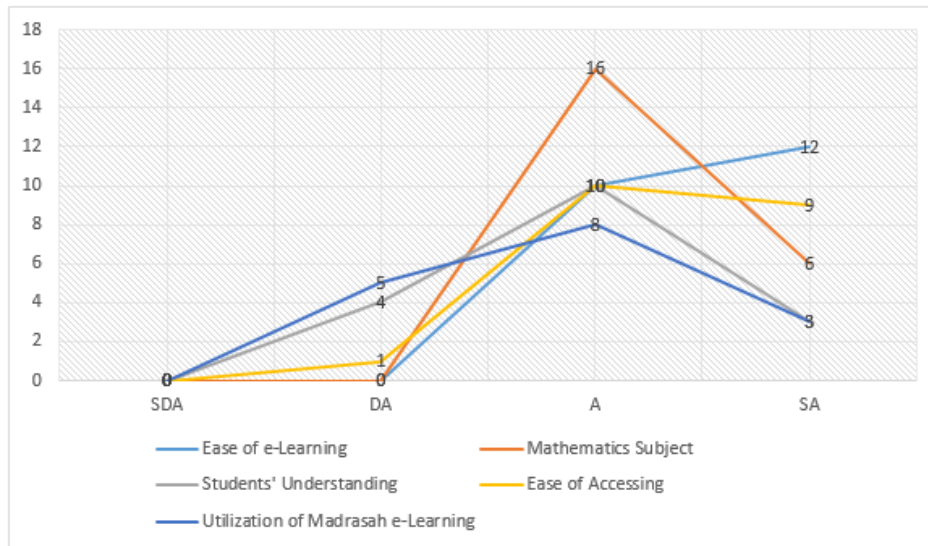
**The Effectiveness of Hybrid Learning Assisted by e-Learning Media in Mathematics Learning at Elementary School**

Based on the questionnaire data that we have distributed regarding the effectiveness of the implementation of hybrid learning using e-learning madrasas in mathematics, the distribution of answers is obtained as follows.

**Table 2.** Effectiveness of e-Learning-Assisted Hybrid Learning in Mathematics Learning at Elementary School

Indicator	Score					%
	SA	A	DA	SDA	Total	
Ease of hybrid learning using e-learning <i>madrasah</i>	12	10	0	0	22	73,3
Mathematics subject development	6	16	0	0	22	73,3
Ease of learning through <i>madrasah</i> e-learning for students' understanding of mathematics subjects	3	10	4	0	17	66,7
Ease of accessing learning materials	9	10	1	0	20	66,7
Utilization of <i>madrasah</i> e-learning	3	8	5	0	16	53

The questionnaire results stated that 73.3% of respondents agreed with the statement of the ease of hybrid learning using e-learning madrasas. E-learning madrasas also help students develop mathematics subject matter independently considering that hybrid learning is carried out at their respective homes, students are required to be able to develop the material provided by the teacher independently, based on the results of the questionnaire at this point, there are 73.3% respondents agreed with this matter. With e-learning madrasas, students also find it easier to understand mathematics subject matter when the learning process is carried out online; it is proven that 56.7% of respondents agree with this.



**Figure 2.** Effectiveness of e-Learning-Assisted Hybrid Learning in Mathematics Learning at Elementary School

In addition, the ease of accessing media is essential. *Madrasah* e-learning has a broad reach, and people can access madrasa e-learning easily as long as they have a registered account. *Madrasah* e-learning also has several features that greatly support the learning process so that students can easily access the learning materials provided by the teacher; this is in line with the results of the analysis on the questionnaire, there are 66.7% of respondents agreed with the statement that e-learning madrasas can facilitate students in accessing the learning materials provided by the teacher. Based on the ease of access to madrasa e-learning and some features that help the smooth learning process, 53% of respondents agree that *madrasah* e-learning is still used even though learning is not done online.

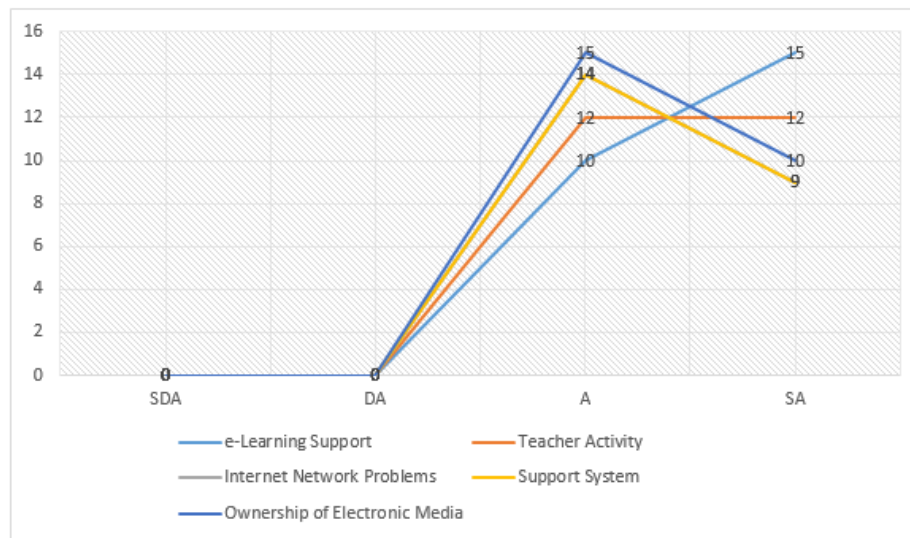
**Supporting and Inhibiting Factors of the Effectiveness of Hybrid Learning Assisted by e-Learning Media in Mathematics Learning at Elementary School**

Based on the questionnaire data that we have distributed regarding the third indicator, namely the supporting and inhibiting factors for the effectiveness of hybrid learning using e-learning madrasas in mathematics, the distribution of answers is obtained as follows.

**Table 3.** Factors Supporting and Inhibiting the Effectiveness of Hybrid Learning Assisted by e-Learning Media in Mathematics Learning at Elementary School

Indicator	Score				Total	%
	SA	A	DA	SDA		
Hybrid learning support facilities	15	10	0	0	25	83,3
Teacher activity in hybrid learning using e-learning madrasas	12	12	0	0	24	80
Internet network problems when learning online	9	14	0	0	23	76,7
Support system for parents when learning online using e-learning	9	14	0	0	23	76
Ownership of electronic media in hybrid learning	15	10	0	0	25	83,3

There are many inhibiting or supporting factors that affect the implementation of online mathematics learning through madrasa e-learning. From the questionnaire results, it is stated that the school has provided facilities to be able to carry out hybrid learning using e-learning madrasas; this can be seen from 83.3% of respondents agreeing to the statement. Even though the teaching and learning process is not carried out directly, teachers still play an active role in learning activities using e-learning madrasas because as many as 80% of the answers agree on this matter. One of the inhibiting factors for hybrid learning using e-learning madrasas is the internet network; as many as 76.7% of respondents stated strongly agree that statements when accessing e-learning madrasas often have problems with unstable internet networks.



**Figure 3.** Factors Supporting and Inhibiting the Effectiveness of Hybrid Learning Assisted by e-Learning Media in Mathematics Learning at Elementary School

Hybrid learning using e-learning madrasahs is when parents provide full support or motivation for hybrid learning using e-learning madrasahs. As many as 76% of respondents stated they strongly agree with the statement. This is in line with the facilities provided by parents to students who are required to be able to carry out hybrid learning processes; as many as 83.3% of respondents stated strongly agree with the statement that students have facilities to carry out hybrid learning such as mobile phones or laptops. The effectiveness of the learning model is a benchmark related to the level of success of a learning process. During the Covid-19 pandemic, the appropriate learning model for implementation is the hybrid learning model. Harley stated that E-Learning (hybrid learning model) is a type of teaching and learning that allows the delivery of teaching materials to students using the internet or other computer network media (Agus et al., 2022).

When implementing hybrid learning, it is indispensable to have suitable learning media to support the success of the learning process. In addition, teacher-student interaction and learning evaluation also support the hybrid learning process. The results of interviews with mathematics teachers who conduct hybrid learning using e-learning madrasahs state that hybrid learning using e-learning madrasahs is very helpful for teachers and students in carrying out teaching and learning activities in mathematics subjects. This is because, in madrasah e-learning, there are many features such as video conferencing, KI (*Kompetensi Inti*), KD (*Kompetensi Dasar*), and CBT (Computer Based Test) (Abdullah et al., 2017). Teacher's Journal, teaching materials, and others that support the completeness of teacher administration (Septantiningtyas, 2018). In addition, students are quite enthusiastic about learning when using e-learning madrasahs. The teacher also approves if the madrasah e-learning is still used even though the teaching and learning process is carried out normally. This is because e-learning madrasahs can help students learn learning materials by looking back at the teaching materials delivered by the teacher and can be used for practice through the CBT feature. This is in line with the Curriculum Methodology Didactic Team from the *Institut Keguruan dan Ilmu Pendidikan* (IKIP) Surabaya which has now changed to UNESA, stating that the efficiency and effectiveness of teaching in the process of good learning interactions are all efforts of teachers in helping students to learn well (Bali, 2017).

Based on the analysis conducted by this study, it has met the indicators of effective learning, which have the following characteristics: (a) Can develop students' understanding of the learning material, (b) Make students curious, (c) Make students become challenged, (d) Can make students active mentally, physically, and psychologically, (e) Helping students grow creatively, and (f) Easy to implement by the teacher. The six indicators have been met in this study, and the results and discussion of this study are very relevant to the conclusions of in research (Wahid et al., 2021), which states that using online media or e-learning when doing hybrid learning is very effective, but there are several things that educators must improve to maximize learning. For example, in providing material and giving assignments, educators must consider things that can happen.

The results of the analysis of respondents' statements regarding the supporting and inhibiting factors that affect the implementation of online mathematics learning through e-learning madrasahs are very directly proportional to the results of interviews conducted by teachers. He stated that the school is very concerned about supporting facilities for students by providing data packages and providing cellphones for underprivileged students. Another factor that supports the effectiveness of learning mathematics through e-learning madrasahs is the availability of features that are quite complete in e-learning madrasahs. This is in line with Kuntarto's

research, showing that the hybrid learning model has provided new, more challenging experiences than conventional (face-to-face) learning models (Kurtanto, 2017). Unlimited learning time and place gives students the freedom to choose the right time in learning based on their interests so that the ability to absorb learning materials is higher than learning in the classroom. While the inhibiting factors stated are the internet network that is not good and the cellphone devices used by some students are the property of their parents so students can only participate in *Kegiatan Belajar dan Mengajar* (KBM) and do assignments after their parents do not use their cellphones.

Thus, in a learning process, there are supporting factors that must be met and inhibiting factors that should be avoided as much as possible for the success of the learning process. One of the supporting factors in hybrid learning using madrasa e-learning is that schools provide facilities in the form of internet quotas and parents who fully support the learning process carried out by students. At the same time, the inhibiting factor of implementing hybrid learning using e-learning madrasas is the uneven internet network so that students who are in an environment with a poor network cannot carry out learning optimally. In addition, students also have problems with the devices used for hybrid learning; some students do not have personal cellphones or laptops, so they use their parents' devices to carry out the learning process. Things like this must be considered so that the implementation of online mathematics learning using e-learning madrasas becomes more effective.

## CONCLUSION

Based on the results of the analysis and research findings regarding the effectiveness of the implementation of hybrid learning using e-learning madrasas in mathematics subjects, it shows that learning using e-learning madrasas is quite effective to implement. This is because many parties support this learning, but several factors can hinder learning, so it must be considered so that learning can run smoothly. Suggestions from this research are it is better than the online mathematics learning process using e-learning madrasas designed as creatively as possible by utilizing other e-learning media to support students to learn more optimally and not feel bored. In addition, madrasa e-learning can also be used even though learning has been carried out offline because, in madrasa e-learning, many features support the completeness of teacher administration. With the existence of e-learning madrasas, incubation of learning processes and outcomes becomes more integrated with learning administration, making it easier for teachers to complete their learning tools.

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