

Adaptation to New Normal Conditions: Students Physics Learning Outcomes Using the Blended Learning Model

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ABSTRACT

Mataram City, West Nusa Tenggara Province, has started a transitional period, including in the world of education. The transition to the new normal requires adjusting the learning process to prepare students to learn normally. This study aims to describe students' physics learning outcomes using a blended learning model. This research is a type of experimental research. The research design was pre-experimental with the type of intact group comparison, where this type of research divided one class into two treatment groups. The population in this study were 11th-grade students of private madrasah majoring in science in Mataram city. The research sample was 50 students who were divided into two groups. The two groups were given a different treatment, where group 1 was taught with a blended learning model, while group 2 was taught using an online learning model. The physics learning outcome data were obtained through the initial and final tests, which were then analyzed descriptively using the N-gain test to determine the achievement of the learning process. Based on the research that has been done, it is found that the group taught with the blended learning model has a mean value of 70.14 with an N-gain of 0.36 (included in the medium category), which indicates that the use of blended models can be used to adjust students during a period of transition to a new normal. The use of the blended learning model in the learning process is to accustom students to return to normal learning, namely face to face in madrasah. It was done to increase student motivation to learn during the COVID-19 pandemic.

INTRODUCTION

Physics is a science that studies inanimate natural phenomena or matter in the living environment of space and time and all the interactions that accompany it (Fatimah et al., 2019). The COVID-19 virus has become one of the global challenges that transcend regional, political, ideological, religious, cultural, and academic boundaries (Nurhayati et al., 2020). Whitaker in Rizaldi et al., 2020 states that physics is a lesson that can help students find facts, concepts, or principles for themselves. Physics is also seen as a process and a product. Physics as a process means understanding how physical scientific information can be obtained by making observations, measurements, investigations, and publications. Physics as a

product means physics as a collection of facts, concepts, principles, laws, formulas, and theories. In learning physics, students are invited to think about finding solutions to problems associated with the theory (Fatimah et al., 2020). Physics learning should provide direct experience to students to increase the ability to construct, understand, and apply the concepts that have been learned (Firdaus et al., 2019).

The academic field of education itself impacts teachers, students, parents, and the environment. Even applied learning must be done by distance learning. Distance learning is a learning process with no direct face-to-face contact between teachers and students (Rizaldi & Fatimah, 2020). However, the government plans to create a policy scenario related to education in the new normal era. The new normal era is the policy of reopening economic, social, and public activities on a limited basis using health standards that previously did not exist during the pandemic (Paramita & Putra, 2020; Sari, 2020). The new normal is an effort to save the lives of citizens and keep the state empowered to carry out its functions.

Towards the adaptation of education in the new normal era, the government will make plans so that education does not always use online or network systems, namely by reopening the learning process in the classroom. It still needs to be considered objectively so that students feel comfortable when the learning process in the classroom is held again. The learning process is indeed the destination of students in pursuing knowledge. Almost all students who have gone through the online learning process prefer learning to be carried out offline. After all, they feel comfortable when the learning process is carried out in one place face to face, especially in science lessons.

This learning process is very influential on students' understanding, so it needs to be considered in evaluating education in the new normal period in determining the methods, strategies, or learning models to be used. One alternative model that can be used is to apply a blended learning model. This learning model does not focus on face-to-face activities in class but also uses technology (Hasmunarti et al., 2018). Blended learning combines online and face-to-face meetings in one integrated learning activity (Wahyuni & Etfita, 2018). Blended learning is a combination of the characteristics of traditional learning and an electronic learning environment or Blended Learning (Vo et al., 2017). Based on the above problems, a study was conducted to determine student learning outcomes using the blended learning model during the new normal transition period for physics subjects, especially elasticity of solid substances materials.

METHODS

This research was conducted in several private madrasahs in the city of Mataram, West Nusa Tenggara Province. This research belongs to the type of experimental research with a descriptive analysis approach. The research design was pre-experimental with the type of intact group comparison. According to Sugiyono in Rizaldi et al., 2019, this type of research is a research design to determine cause-and-effect using only the experimental group. The population in this study was students of 11th-grade science majoring in madrasah, with a total sample of 50 students divided into two groups. The two groups were given a different treatment, where group 1 was taught using a blended learning model, while group 2 was taught using an online learning model. Student learning outcomes data were obtained by giving initial and final tests to each group. The learning outcome data were then analyzed descriptively using the N-gain test. This test compares the two groups' learning outcomes after treatment using blended and online learning models. The N-gain formula, according to Hake in Rizaldi et al., 2019 used is normalized gain (gain normalization) as follows.

$$N - gain < g > = \frac{\%S_{final} - \%S_{initial}}{100\% - \%S_{initial}} \quad (1)$$

Information:

S_{final} = mean value of the final test

$S_{initial}$ = mean value of the initial test

The categories of N-gain gain are as follows.

Table 1. Criteria for N-gain

No.	Interval	Criteria
1	$g > 0,70$	High
2	$0,30 \leq g \leq 0,70$	Medium
3	$g < 0,30$	Low

(Source: Hake In Rizaldi et al., 2019)

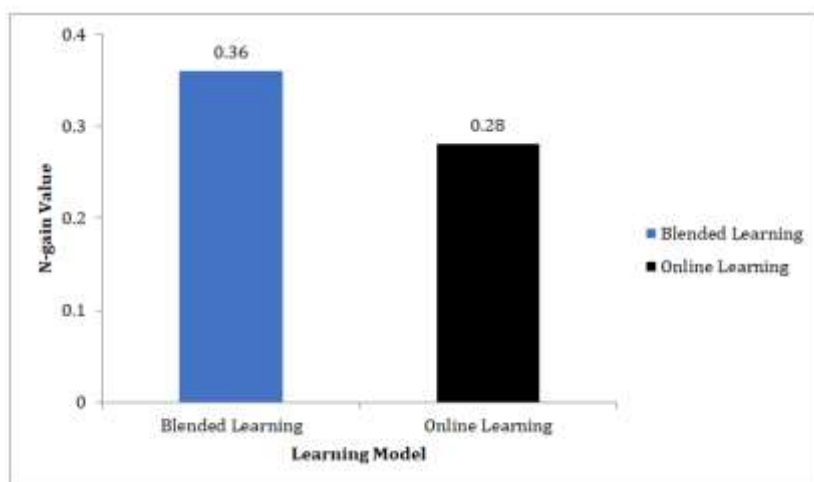
RESULTS AND DISCUSSION

The research data were obtained based on students' answers on the initial and final tests related to the elasticity of solid substances. This material consists of several sub-chapters, namely 1). Stress, 2). Strain, 3). Young's Modulus, 4). Hooke's Law, and 5). Spring Constant. The value obtained by each group after being given treatment and testing can be seen in Table 2.

Table 2. Data on Learning Outcomes on the Elasticity of Solid Substances

Group	Initial Test	Final Test	N-gain	Criteria
Group 1: Blended Learning	53.20	70.14	0.36	Medium
Group 2: Online Learning	51.84	65.40	0.28	Low

Data on the improvement of student learning outcomes in both groups through the N-gain test graphically can be seen in Figure 1.


Figure 1. Improved Learning Outcomes in Elasticity of Solid Substances

Meanwhile, in terms of the learning sub-chapter, the scores obtained in the two groups can be seen in Table 3.

Table 3. Student Learning Outcomes Data in terms of Sub Learning Materials

No	Sub-chapter	Group 1 (Blended Learning)			Group 2 (Online Learning)		
		Initial Test	Final Test	N-gain	Initial Test	Final Test	N-gain
1	Stress	57.40	72.90	0.36	56.90	69.00	0.28
2	Strain	54.40	70.00	0.34	55.00	63.30	0.32
3	Young's Modulus	56.30	64.80	0.19	50.90	61.90	0.22

No	Sub-chapter	Group 1 (Blended Learning)			Group 2 (Online Learning)		
		Initial Test	Final Test	N-gain	Initial Test	Final Test	N-gain
4	Hooke's Law	52.40	71.20	0.39	52.40	62.70	0.22
5	Spring Constant	45.50	71.80	0.48	44.40	64.10	0.36

Data on improving student learning outcomes in both groups in terms of the learning sub-chapter graphically can be seen in Figure 2.

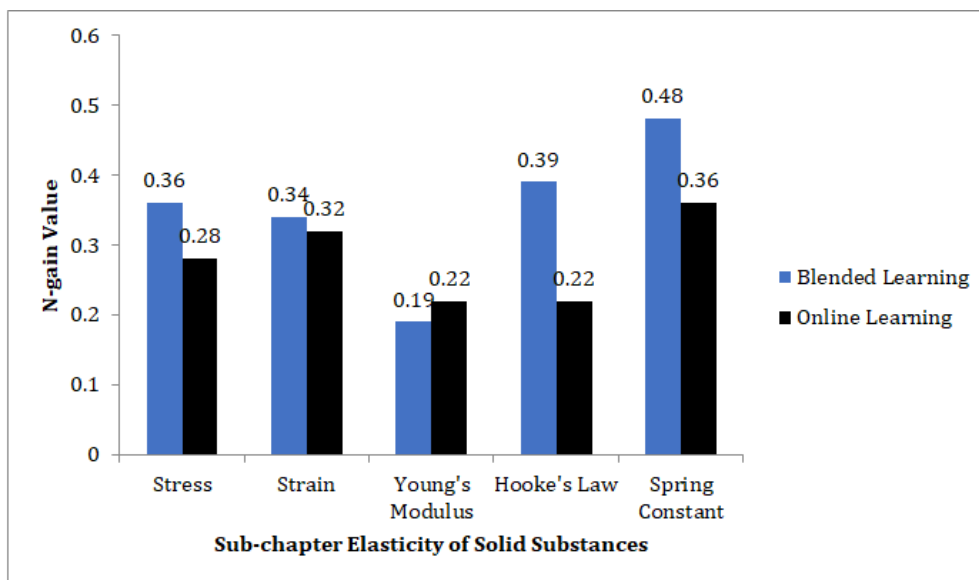


Figure 2. Increasing the Value in Each Learning Sub-chapter

Based on Figure 2, it can be seen that the increase in test results in the group taught by the blended learning model is better in the sub-chapter on stress, strain, Hooke's law, and spring constants.

DISCUSSION

Implementation of the Blended Learning Model

Blended learning is the most appropriate solution for the learning process that suits the learning needs and the student's style (Nurhayati et al., 2021). According to Rusman et al. (2012), the characteristics of Blended Learning are:

1. Providing supplementary resources for learning programs over traditional lines is largely through institutional support for virtual learning environments.
2. Deep learning designs support the transformative level of learning practice.
3. A holistic view of technology to support learning.

The Blended Learning model used refers to Alwan (2017), which divides learning activities into three main activities, namely 1). Face-to-face learning activities are conventional activities carried out face-to-face in schools, such as facilitating students to carry out an experiment and various activities that cannot be applied using online applications, 2). Online activities are learning activities that apply the E-learning Madrasah application related to distributing teaching materials, online discussion activities, doing assignments, and conducting an online assessment process, 3). Offline activities include reading material at home and various other activities.

The teaching and learning process is implemented with blended learning while still implementing health protocols to ensure that unwanted things do not occur related to the spread of COVID-19 in the madrasah environment. Since the government began implementing the new social distancing normal, most private madrasahs have implemented the blended learning model. It needs to be done because there are several factors, including 1). Learning cannot be done online or in full online by looking at the condition of students in meeting the needs for facilities and infrastructure, 2). Online learning does not

make students easy to understand, especially in learning physics, where students are required to learn concepts and equations that require a more detailed explanation in the learning process, and 3). Although the 2013 curriculum has emphasized that students are more active than teachers, an explanation of the concept must also be obtained from the teacher to convince students more in capturing the lesson.

Physics lesson schedule for two meetings with a duration of 1 hour/meeting, so that each sub-chapter to be delivered is carried out in two meetings to provide opportunities for students to understand the concepts being learned. The first meeting was conducted online using the E-learning Madrasah application and WhatsApp Group to deliver material and things that are the basis of the sub-chapters, while in the second meeting, face-to-face learning was conducted. In contrast to the groups taught by the online learning model, groups with the blended learning model will continue to carry out simple face-to-face experimental activities. The use of practicum in learning physics is one of the things that can increase students' level of understanding in studying a learning material, and it is hoped that it will have an impact on learning outcomes during the COVID-19 pandemic. According to [Yanti et al. \(2016\)](#), physics is one of the fields of science that requires systematic research and verification. With this proof, students will be more confident in the material they have studied previously. There are four main reasons for the importance of implementing experimental activities, among others: 1). Experiments increase student motivation; 2). Experiments develop basic skills in conducting experiments; 3). Experiments become a means of scientific learning, and 4). Experiments to support understanding of the subject matter ([Subiantoro in Syamsu, 2017](#)).

The final process to determine the level of student absorption related to learning materials taught using the blended learning and online learning models is evaluated online using CBT (Computer Based Test) in the E-learning Madrasah application. The evaluation process is carried out at the final meeting and at the same time to avoid fraud and other things. The evaluation consists of 20 multiple choice questions and five essay questions which are done for 120 minutes.

Learning Outcomes with the Blended Learning Model

From the results of the data obtained, it can be seen in Table 2, which is the comparison between Blended Learning and Online Learning with the mean value of the final test obtained for the Blended Learning model, namely 70.14 (medium level category) and Online Learning with a value of 65.40 (low-level category). The learning model used is the most important factor that influences the learning process in the classroom besides the characteristics of the teachers, students, and the material being taught. According to [Sahidu \(2016\)](#), the learning model can be interpreted as a pattern used to compile curriculum, organize material, and give instructions to teachers in class. The use of appropriate learning models in certain conditions greatly affects the ability of students to receive and respond to learning material. The teacher can use the appropriate learning model to help students get information, ideas, skills, ways of thinking, and expressing ideas. Soekanto et al. suggest that the learning model's purpose is a conceptual framework that describes a systematic procedure for organizing learning experiences to achieve certain learning goals. It serves as a guide for learning designers and teachers in planning teaching and learning activities ([Trianto, 2012](#)).

In terms of increasing learning outcomes, it can be seen that the two groups experienced a process of increasing results that were not much different, where the blender learning group scored 0.36 (included in the medium category) and the online learning group scored 0.28 (included in the low category). This difference can occur because the different treatment between the two groups allows for differences in the level of absorption of students in understanding the material being taught. Meanwhile, in terms of the learning sub-chapter, the result data obtained shows that the blended learning group is higher than the online learning group in several sub-chapters as a whole. The two groups' N-gain values increase the section on stress, strain, Hooke's law, and the spring constant. From the two data obtained, it can be concluded that using the blended learning model can improve student learning outcomes. Learning outcomes themselves are abilities that are owned after receiving a learning experience, namely by applying a blended learning model that can change the behavior experienced during learning ([Mandang & Tulandi, 2020](#); [Tsaniyah et al., 2019](#)). It is in line with the opinion of [Heinze \(2008\)](#), which states that blended learning can increase learning outcomes equal to or higher than conventional or

fully online learning, although the success rate varies between disciplines. The advantages of the blended learning model (Wardani et al., 2018) are as follows:

1. Students can access and study subject matter available in online learning freely,
2. Students have the opportunity to discuss with their teacher or with other students outside face-to-face hours,
3. Learning activities carried out by students outside the classroom face to face can be controlled by the teacher,
4. Teachers can enrich learning materials through internet facilities,
5. The teacher can ask students to read or work on assignments before the learning process,
6. Teachers can handle quizzes, provide feedback more effectively, and
7. Students can share files with other students.

Constraints to the Application of the Blended Learning Model in the City of Mataram

The pandemic period requires academics to pay attention to every policy related to the learning process. It causes the teacher to carry out the learning process with the blended learning model requiring more manpower. It ensures all students continue to pay attention to the COVID-19 health protocol during the face-to-face learning process at the madrasah. This treatment is necessary because children's awareness in the city of Mataram about the dangers of COVID-19 is still very low. The following are some of the obstacles faced in implementing the blended learning model in supporting the physics learning process.

1. Need more meetings due to time restrictions during face-to-face meetings at the madrasah.
2. Teachers are required to be able to manage the learning process well.
3. The decline in student learning motivation is due to being accustomed to learning done online, so that teachers need to increase student learning motivation first so that they can participate in the learning process to the fullest.
4. Requires good preparation in integrating face-to-face meetings with online meetings with a blended learning model.

CONCLUSION

Based on the results of data analysis and the discussion described, it can be concluded that learning using the blended learning model can improve student learning outcomes which can be seen at an average value of 70.14 with an n-gain of 0.36 (included in the category moderate). The N-gain itself is the value of finding out how much improvement the group taught with the blended learning model, and the online learning model will prepare the learning process for the transition period to a new normal. Meanwhile, in terms of the material sub-chapter, it can be seen that four sub-chapters get N-gain scores in the medium category and one sub-chapter material with the low category, which is taught using the blended learning model. During the new normal transition period, most private madrasah has prepared everything that will be used in the learning process, and one of them is preparing a model that is by current conditions.

Funding and Conflicts of Interest

The author declares that there is no funding and conflicts of interest for this research.

REFERENCES

- Alwan, M. (2017). Pengembangan Model Blended Learning Menggunakan Aplikasi Edmodo untuk Mata Pelajaran Geografi SMA. *Jurnal Inovasi Teknologi Pendidikan*, 4(1), 65–76. <https://doi.org/10.21831/jitp.v4i1.10505>
- Fatimah, Z., Hikmawati, H., & Wahyudi, W. (2019). Pengaruh Model Pembelajaran Generatif Dengan Teknik Guided Teaching Terhadap Kemampuan Pemecahan Masalah Fisika Kelas XI. *Konstan - Jurnal Fisika Dan Pendidikan Fisika*, 4(1), 20–31. <https://doi.org/10.20414/konstan.v4i1.25>
- Fatimah, Z., Rizaldi, D. R., Jufri, A. W., & Jamaluddin, J. (2020). Model Inkuiri Terbimbing Berbantuan Laboratorium Virtual Untuk Meningkatkan Keterampilan Proses Sains. *Jurnal Pendidikan, Sains,*

Geologi, Dan Geofisika (GeoScienceEd Journal), 1(2), 28–32.

<https://doi.org/10.29303/goescienceedu.v1i2.45>

- Firdaus, T., Erwin, E., & Rosmiati, R. (2019). Eksperimen Mandiri Siswa dalam Penentuan Percepatan Gravitasi Bumi pada Materi Gerak Jatuh Bebas. *Titian Ilmu: Jurnal Ilmiah Multi Sciences*, 11(1), 31–36. <https://doi.org/10.30599/jti.v11i1.385>
- Hasmunarti, H., Bahri, A., & Idris, I. S. (2018). Analisis Kebutuhan Pengembangan Blended Learning Terintegrasi Strategi PBLRQA (Problem-Based Learning and Reading, Questioning & Answering) pada Pembelajaran Biologi. *Biology Teaching and Learning*, 1(2), 101–108. <http://103.76.50.195/btl/article/viewFile/8177/4720>
- Heinze, A. (2008). *Blended Learning: An Interpretive Action Reseach Study*. University of Salford.
- Mandang, T., & Tulandi, D. A. (2020). Peningkatkan Hasil Belajar Siswa Melalui Pembelajaran Blended Materi Listrik Dinamis. *Jurnal Pendidikan Fisika UNIMA*, 1(1), 28–33. <http://eurekaunima.com/index.php/jpfunima/article/view/5/5>
- Nurhayati, E., Rizaldi, D. R., & Fatimah, Z. (2020). Pencegahan Penyebaran COVID-19 Melalui Inaktivasi Virus dalam Kajian Kinetika, Termodinamika, dan Kesetimbangan. *Jurnal Ilmiah Profesi Pendidikan*, 5(2), 102–107. <https://doi.org/10.29303/jipp.v5i2.121>
- Nurhayati, E., Rizaldi, D. R., & Fatimah, Z. (2021). THE EFFECTIVENESS OF PROJECT-BASED LEARNING WITH THE BLENDED LEARNING SYSTEM TO IMPROVE 21ST CENTURY SKILLS DURING THE COVID-19. *Journal Scientia*, 9(2), 46–52. <https://doi.org/10.35337/scientia.Vol9.pp46-52>
- Paramita, I. B. G., & Putra, I. G. G. P. A. (2020). NEW NORMAL BAGI PARIWISATA BALI DI MASA PANDEMI COVID 19. *Pariwisata Budaya: Jurnal Ilmiah Pariwisata Agama Dan Budaya*, 5(2), 57–65. <https://doi.org/10.25078/pba.v5i2.1723>
- Rizaldi, D. R., & Fatimah, Z. (2020). How the Distance Learning can be a Solution during the Covid-19 Pandemic. *International Journal of Asian Education*, 1(3), 117–124. <https://doi.org/10.46966/ijae.v1i3.42>
- Rizaldi, D. R., Jufri, A. W., & Jamal, J. (2020). PhET: SIMULASI INTERAKTIF DALAM PROSES PEMBELAJARAN FISIKA. *Jurnal Ilmiah Profesi Pendidikan*, 5(1), 10–14. <https://doi.org/10.29303/jipp.v5i1.103>
- Rizaldi, D. R., Makhrus, M., & Doyan, A. (2019). Analisis Tingkat Kemampuan Berpikir Kritis Dengan Model Perubahan Konseptual Ditinjau Dari Gaya Belajar Siswa. *Jurnal Pendidikan Fisika Dan Teknologi*, 5(1), 74–81.
- Rusman, R., Riyana, C., & Kurniawan, D. (2012). *Pembelajaran Berbasis Teknologi Informasi dan Komunikasi: Mengembangkan Profesionalitas Guru* (1st ed.). Rajawali Pers.
- Sahidu, K. (2016). *Pengembangan Program Pembelajaran Fisika (P3F)* (2nd ed.). FKIP Universitas Mataram.
- Sari, D. P. (2020). Kreativitas Pendidikan Karakter di Keluarga pada Pandemi Covid-19. *Prosiding Seminar Nasional Hardiknas*, 1, 107–114. <http://proceedings.ideaspublishing.co.id/index.php/hardiknas/article/view/16>
- Syamsu, F. D. (2017). Pengembangan Penuntun Praktikum IPA Berbasis Inkuiri Terbimbing Untuk Siswa SMP Siswa Kelas VII Semester Genap. *BIONatural*, 4(2), 13–27. <https://ejournal.stkipbbm.ac.id/index.php/bio/article/view/190/177>
- Trianto, T. (2012). *Mendesain Model Pembelajaran Inovatif-Progresif: Konsep, landasan, dan Implementasinya pada Kurikulum Tingkat Satuan Pendidikan (KTSP)* (1st ed.). Kencana Prenada Media Group.
- Tsaniyah, S. F., Ayu, H. D., & Pratiwi, H. Y. (2019). Pengaruh Model Blended Learning menggunakan Schoology Terhadap Prestasi Belajar ditinjau Dari Kemandirian Belajar Siswa. *Jurnal Terapan*

Sains & Teknologi (RAINSTEK), 1(1), 71–77. <https://doi.org/10.21067/jtst.v1i1.3236>

Vo, H. M., Zhu, C., & Diep, N. A. (2017). The effect of blended learning on student performance at course-level in higher education: A meta-analysis. *Studies in Educational Evaluation*, 53, 17–28. <https://doi.org/10.1016/j.stueduc.2017.01.002>

Wahyuni, S., & Eftita, F. (2018). Pengaruh Blended Learning Model dan Sikap Berbahasa terhadap Kemampuan Menulis Bahasa Inggris Siswa Sekolah Menengah Atas Negeri di Kota Pekanbaru. *Jurnal Pendidikan, Bahasa, Dan Sastra (GERAM)*, 6(2), 1–9. [https://doi.org/10.25299/geram.2018.vol6\(2\).1910](https://doi.org/10.25299/geram.2018.vol6(2).1910)

Wardani, D. N., Toenlio, A. J. E., & Wedi, A. (2018). Daya Tarik Pembelajaran Di Era 21 Dengan Blended Learning. *Jurnal Kajian Teknologi Pendidikan (JKTP)*, 1(1), 13–18. <https://core.ac.uk/download/pdf/287323676.pdf>

Yanti, D. E. B., Subiki, S., & Yushardi, Y. (2016). Analisis Sarana Prasarana Laboratorium Fisika Dan Intensitas Kegiatan Praktikum Fisika Dalam Mendukung Pelaksanaan Pembelajaran Fisika SMA Negeri Di Kabupaten Jember. *Jurnal Pembelajaran Fisika*, 5(1), 41–46. <https://jurnal.unej.ac.id/index.php/JPF/article/view/3561/2766>