



## The Influence of Using Edmodo Media with the Discovery Learning Learning Model on Science Learning Outcomes on Pressure in Substances

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### ABSTRACT

**Purpose of the study:** The purpose of this study was to determine the effect of Edmodo media with the discovery learning model on science learning outcomes on the material on pressure in substances.

**Methodology:** This type of research is quasi-experimental quantitative. Sampling in this study was carried out by purposive sampling, namely class VIII D (experimental class) and class VIII E (control class) of junior high school, with 30 students and 28 students respectively. Data collection techniques use questions, questionnaires, observation sheets and documentation. This research instrument includes questions, questionnaires and observation sheets. Hypothesis testing is carried out using correlation coefficients and simple linear regression.

**Main Findings:** There is an influence of 20.5% between two variables on the results of the simple linear regression test with a significance value of 0.015. So it can be concluded that there is an influence of Edmodo media with the Discovery Learning learning model on science learning outcomes regarding pressure in substances.

**Novelty/Originality of this study:** The results of this study can be a basis for the development of Edmodo learning media or the further application of Edmodo media. In addition, it also becomes an added value to the scientific knowledge in the field of education in Indonesia.

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## 1. INTRODUCTION

Science and Technology has developed along with globalization, so that interaction and delivery of information will take place quickly [1]. The influence of globalization can have positive and negative impacts on various aspects of life, starting from government, administration, economics, education, and others [2], [3]. People from various parts of the world can exchange information, science and technology [4], [5]. Global demands in the world of education are very necessary for students to have special skills in the field of Information and Communication Technology (ICT) [6], [7].

The government has carried out improvements to improve the quality of education at various types and levels [8], [9]. However, the facts on the ground do not yet show satisfactory results. One of the problems facing our world of education is the problem of weak learning processes [10], [11]. Children's learning processes are not encouraged to develop thinking abilities and are only directed towards the ability to memorize information,

children's brains are forced to remember and accumulate various information without being required to understand the information they remember to connect it with everyday life. There are several aspects to the learning process, namely methods, approaches, models and learning media as teaching aids [12], [13]. The position of learning media is in learning methods. Therefore, the main function of learning media is as a teaching aid to support the use of learning methods used by teachers [14].

There are not a few learning media nowadays, especially in the world of Information and Communication Technology (ICT), which is often called e-learning, which has the influence of transforming conventional education into digital form, both in content and systems [15], [16]. One form of e-learning based learning media is Edmodo [17]. Edmodo ([www.edmodo.com](http://www.edmodo.com)) is a private microblogging platform developed for teachers and students, with student privacy in mind [18]-[20]. Teachers and students can share notes, links and documents [21]. Through Edmodo, it will bring very good changes in the education system that will be developed [22]. Using Edmodo media will make it easier for students to learn anytime and anywhere because Edmodo media can be downloaded directly using an Android cellphone [23], [24]. Meanwhile, today's children cannot be separated from cellphones. In Edmodo, learning can take place between teachers and students, parents can even control their children while learning takes place [25].

Apart from learning media, a learning model is also needed. There are various kinds of learning models for students, including the Discovery Learning model. Discovery Learning is a model for developing an active way of learning by discovering for yourself, investigating for yourself, so that the results obtained will be loyal and long-lasting in memory [26], [27]. Through discovery learning, students can also learn to think analytically and try to solve the problems they face themselves [28], [29].

Students will gain the abilities that students have after receiving their learning experience, if supported by media or learning methods as well as a learning model that is currently developing [30]. One of the subjects developed using Edmodo media is Natural Sciences. Natural Science or in English is often called Science, which means an exploration of the material world based on observation and looking for regular natural relationships regarding observed phenomena and is capable of testing oneself.

Previous research conducted by Simanjuntak et al., [31] highlighted the role of Edmodo in supporting a scientific approach to improve learning independence and science learning outcomes in general. However, these studies have not focused on specific aspects of the material, such as pressure in matter, and have not explored in depth the effectiveness of different learning models. The current study fills this gap by examining the application of Edmodo in the context of a discovery learning model that is oriented towards developing conceptual understanding and specific learning outcomes in the material of pressure in matter. This provides a new contribution by combining Edmodo technology and innovative learning models on specific materials.

This study has novelty by integrating Edmodo media into a discovery learning model that focuses on specific material, namely pressure in substances. This approach has not been widely explored in previous studies that generally only use Edmodo in a general context or with different learning models. The urgency of this study lies in the need to improve science learning outcomes through interactive and contextual learning methods, especially in understanding the concept of pressure which is often a challenge for students. By combining technology and a discovery-based approach, this study has the potential to provide practical solutions to improve the effectiveness of science learning in the digital era. Based on the explanation above, the purpose of this study is to determine the effect of Edmodo media with the discovery learning model on science learning outcomes on the material on pressure in substances.

## **2. RESEARCH METHOD**

### **2.1. Research Design**

This type of research is quantitative research, with quasi-experimental quantitative research methods. In this design there are two groups selected randomly, the first group is given treatment (X) and the other group is not [32], [33]. The group that is treated is called the experimental group and the group that is not treated is called the control group. The effect of treatment is (Q1 : Q2). In real research, the effect of treatment is analyzed using different tests, using t-test statistics for example.

### **2.2. Research Subject**

Sampling was carried out using purposive sampling technique. Based on the considerations of the class VIII science subject teacher, the researcher used class VIII-D as the experimental class and class VIII-E as the control class on the grounds that the two classes received equal ratings.

### **2.3. Data collection technique**

The instrument used in this research was a test. The test in question is a test of 50 mastery of the concept of pressure in substances in science subjects whose assignments are delivered via Edmodo with a discovery learning learning model for the experimental class and given directly for the control class. The data collection

techniques used in this research were questionnaires, observation sheets, questions and documentation. The questionnaire used in this research is a questionnaire with a Likert scale, students respond to statements with four alternative answers, namely Strongly Agree (SS), Agree (S), Disagree (TS), and Strongly Disagree (STS). Observations were carried out by researchers by observing and recording the implementation of learning in the classroom. The data collection techniques that the author used in this research were pre-test (initial test) and post-test (final test). Documentation techniques are used to obtain data that is already available in the form of notes.

## 2.4. Data Analysis Techniques

The collected data were analyzed through several stages. First, a normality test was conducted to ensure that the data came from a normally distributed population. Second, a homogeneity test was used to ensure equality of variance between groups. Third, a hypothesis test was conducted using simple linear regression analysis to determine the relationship between the use of Edmodo media in Discovery Learning and student learning outcomes. This analysis technique aims to provide a deep understanding of the effect of treatment on the variables studied.

## 3. RESULTS AND DISCUSSION

### 3.1. Normality test

The normality test is used to determine whether the sample studied comes from a normally distributed population or not. The results of the data normality test in this study can be seen in the following table:

Table 1. Normality Test Results with Kolmogorov Smirnov

Class	$r_{\text{count}}$	$r_{\text{table}}$	information
Experiment	0.2	0.05	Normal
Control	0.2	0.05	Normal

Table 1 shows the results of the data normality test using the Kolmogorov-Smirnov method for the experimental class and the control class. Based on the table, the  $r_{\text{count}}$  value for both classes is 0.2, which is greater than  $r_{\text{table}}$  of 0.05. This indicates that the data in both classes come from a normally distributed population. This information is the basis for determining the feasibility of the data in continuing to the parametric statistical test in the analysis of this study.

### 3.2. Homogeneity Test

The homogeneity test is used to show that two or more groups of sample data come from populations that have the same variation. The results of the data homogeneity test in this study can be seen in the following table:

Table 2. Results of the Test of Homogeneity of Variances

Levene			
Statistic	df1	df2	Sig.
.414	1	56	.522

Table 2 shows the results of the homogeneity of variance test using Levene's statistics. Based on the table, the value of Levene Statistic is 0.414 with degrees of freedom (df1) of 1 and (df2) of 56, and a significance value (Sig.) of 0.522. Because the significance value is greater than 0.05, it can be concluded that the data has homogeneous variance, so that the sample group comes from a population with the same variation. These results meet the assumptions for continuing parametric statistical analysis.

### 3.3. Simple Linear Regression Test

The results of the simple linear regression test data in this study can be seen in the following table:

Table 3. Simple Linear Regression Test Results

		Unstandardized		Standardized		
		Coefficients		Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	38.387	12.417		3.091	.005
	Posttest					
	Experiment	.417	.161	.453	2.593	.015

From Table 3. Simple Linear Regression Test Results, it can be seen that the significance value (Sig.) of 0.015 is smaller than the probability of 0.05, so it can be concluded that  $H_0$  is rejected and  $H_a$  is accepted, which means that there is an influence between Edmodo media and the Discovery Learning learning model. on science learning outcomes. Table 3. Simple Linear Regression Test Results also show that the a value is 38.387 and the b value is 0.417, which means that for every 1% addition of Edmodo media, science learning outcomes will increase by 0.417. Then the regression equation is:  $Y = 38.387 + 0.417$

The results of the study showed that the use of Edmodo media with the Discovery Learning learning model had a positive effect on student learning outcomes in the material on substance pressure. This can be seen from the results of a simple linear regression test which showed a significant relationship between the use of Edmodo and increased learning outcomes. The use of Edmodo media allows students to learn flexibly anytime and anywhere, thereby increasing the accessibility of learning materials. In addition, Discovery Learning encourages students to actively search, find, and understand concepts independently, thereby strengthening their mastery of concepts.

Edmodo media also contributes to creating a more interactive and interesting learning environment. Features such as online discussions, automatic assessments, and uploading materials allow students to interact more easily with teachers and peers. This is in line with previous studies showing that e-learning-based platforms such as Edmodo are able to increase student learning motivation because of their user-friendly and interactive nature.

The Discovery Learning learning model used in this study plays a role in developing students' critical thinking skills. By encouraging students to find concepts independently, they learn to analyze information, solve problems, and draw relevant conclusions. These results are relevant to the finding that Discovery Learning is effective in improving higher-order thinking skills, especially when combined with technology that supports students' independent exploration.

However, it should be noted that the effectiveness of using Edmodo is highly dependent on students' digital skills and the availability of supporting infrastructure, such as devices and internet access. In the experimental class, students who had better digital literacy tended to show higher learning outcomes compared to students who were less skilled in using technology. Therefore, training in the use of digital media for students and teachers is an important aspect in optimizing the implementation of this technology-based learning media.

In addition, the scope of the material in this study is still limited to the pressure of substances, so the results cannot be generalized to other science materials. Further research is recommended to test the use of Edmodo and Discovery Learning on other more complex materials, such as thermodynamics or electromagnetism. Thus, the implementation of this innovative technology and learning model is expected to have a broader impact on improving the quality of science learning.

The impact of this research can provide a significant contribution to the development of more effective science learning methods, especially in understanding physics concepts such as pressure in substances. By combining Edmodo media and the discovery learning learning model, this research is expected to increase student interactivity, motivate active exploration, and deepen their understanding of the material being taught. In addition, the findings of this study can be a reference for the development of technology-based curriculum and learning strategies, which have the potential to improve overall science learning outcomes. More broadly, this research can also encourage the application of innovative learning methods in various schools, improve the quality of science education, and prepare students to face challenges in the digital era.

This study has several limitations that need to be considered. First, the implementation of Edmodo and the discovery learning model may be influenced by the level of digital literacy of students and teachers, so the results may vary depending on their ability to use technology. Second, the focus on the material on pressure in matter limits the generalizability of the results of this study to other science materials. Third, this study only measured learning outcomes in the short term, so it cannot yet ascertain the impact of the sustainability of this method on long-term learning. In addition, technical conditions such as the availability of devices and internet access can also be limiting factors in the implementation of this method in various schools, especially in areas with limited infrastructure.

#### 4. CONCLUSION

There is an influence of the use of Discovery Learning on the science learning outcomes of Pressure on Substances for Class VIII Students at State Junior High School 1 Salatiga. It can be seen in the hypothesis test using simple linear regression with a significance value of 0.015 and an R Square of 0.205, indicating that  $H_0$  is rejected and  $H_a$  is accepted, which means that there is an influence between Edmodo media in the Discovery Learning model and science learning outcomes. Recommendations for further research Further research can explore the application of Edmodo media with other learning approaches, such as STEM or problem-based learning, to see its impact on 21st-century skills, such as critical thinking and collaboration. In addition, research can also be conducted at different levels of education or other more complex science materials, such as

thermodynamics, to determine the generalizability of the results. Analysis of non-cognitive factors, such as motivation and learning independence, as well as comparison with other learning platforms, can also be a focus to provide a more comprehensive picture of Edmodo's effectiveness in supporting technology-based learning.

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## REFERENCES

- [1] O. Dakhi, J. Jama, D. Irfan, Ambiyar, and Ishak, "Blended Learning: a 21st Century Learning Model At College," *Internatinal J. Multiscience*, vol. 1, no. 7, pp. 50–65, 2020.
- [2] L. Zhang, M. Xu, H. Chen, Y. Li, and S. Chen, "Globalization, Green Economy and Environmental Challenges: State of the Art Review for Practical Implications," *Front. Environ. Sci.*, vol. 10, no. March, pp. 1–9, 2022, doi: 10.3389/fenvs.2022.870271.
- [3] A. Mason and R. Lee, "Six Ways Population Change Will Affect the Global Economy," *Popul. Dev. Rev.*, vol. 48, no. 1, pp. 51–73, 2022, doi: 10.1111/padr.12469.
- [4] L. Li, "Reskilling and Upskilling the Future-ready Workforce for Industry 4.0 and Beyond," *Inf. Syst. Front.*, vol. 26, no. 5, pp. 1697–1712, 2022, doi: 10.1007/s10796-022-10308-y.
- [5] D. Vargo, L. Zhu, B. Benwell, and Z. Yan, "Digital technology use during COVID-19 pandemic: A rapid review," *Hum. Behav. Emerg. Technol.*, vol. 3, no. 1, pp. 13–24, 2021, doi: 10.1002/hbe2.242.
- [6] W. M. Al-Rahmi, A. I. Alzahrani, N. Yahaya, N. Alalwan, and Y. Bin Kamin, "Digital communication: Information and communication technology (ICT) usage for education sustainability," *Sustain.*, vol. 12, no. 12, pp. 1–18, 2020, doi: 10.3390/su12125052.
- [7] M. Liesa-Orús, C. Latorre-Coscolluela, S. Vázquez-Toledo, and V. Sierra-Sánchez, "The technological challenge facing higher education professors: Perceptions of ICT tools for developing 21st Century skills [El Desafío Tecnológico que Enfrentan los Profesores de Educación Superior: Percepciones sobre las Herramientas de TIC para Desarrollo]," *Sustainability*, vol. 12, no. 5339, pp. 1–14, 2020, [Online]. Available: <https://doi.org/10.3390/su12135339>
- [8] L. Yurui, Z. Xuanchang, C. Zhi, L. Zhengjia, L. Zhi, and L. Yansui, "Towards the progress of ecological restoration and economic development in China's Loess Plateau and strategy for more sustainable development," *Sci. Total Environ.*, vol. 756, p. 143676, 2021, doi: 10.1016/j.scitotenv.2020.143676.
- [9] J. Portillo, U. Garay, E. Tejada, and N. Bilbao, "Self-perception of the digital competence of educators during the covid-19 pandemic: A cross-analysis of different educational stages," *Sustain.*, vol. 12, no. 23, pp. 1–13, 2020, doi: 10.3390/su122310128.
- [10] A. M. Maatuk, E. K. Elberkawi, S. Aljawarneh, H. Rashaideh, and H. Alharbi, "The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors," *J. Comput. High. Educ.*, vol. 34, no. 1, pp. 21–38, 2022, doi: 10.1007/s12528-021-09274-2.
- [11] C. Coman, L. G. Țiru, L. Meseșan-Schmitz, C. Stanciu, and M. C. Bularca, "Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective," *Sustain.*, vol. 12, no. 24, pp. 1–22, 2020, doi: 10.3390/su122410367.
- [12] M. D. Abdulrahman *et al.*, "Multimedia tools in the teaching and learning processes: A systematic review," *Heliyon*, vol. 6, no. 11, p. e05312, 2020, doi: 10.1016/j.heliyon.2020.e05312.
- [13] C. W. Hoerudin, S. Syafruddin, A. Mayasari, O. Arifudin, and S. Lestari, "E-Learning as A Learning Media Innovation Islamic Education," *QALAMUNA J. Pendidikan, Sos. dan Agama*, vol. 15, no. 1, pp. 723–734, 2023, doi: 10.37680/qalamuna.v15i1.4466.
- [14] A. Prabawati, S. A. AM, and S. A. AM, "the Students' Perception of the Online Media Used By," *English Lang. Teach. Methodol.*, vol. 1, no. 3, pp. 169–181, 2021.
- [15] R. Roro *et al.*, "E-Learning as Education Media Innovation in the Industrial Revolution and Education 4.0 Era.," *J. Contemp. Issues Bus. Gov.*, vol. 27, no. 1, pp. 2868–2880, 2021, [Online]. Available: [https://cibgp.com/article\\_9498.html](https://cibgp.com/article_9498.html)
- [16] J. Gómez-Galán, "Media education in the ICT Era: Theoretical structure for innovative teaching styles," *Inf.*, vol. 11, no. 5, pp. 1–17, 2020, doi: 10.3390/INFO11050276.
- [17] W. Wibowo and N. Astriawati, "The effectiveness of using Edmodo based e-learning in the applied mechanics course," *J. Phys. Conf. Ser.*, vol. 1511, no. 1, pp. 0–7, 2020, doi: 10.1088/1742-6596/1511/1/012121.
- [18] F. Nami, "Edmodo in semi-technical English courses: towards a more practical strategy for language learning/practice," *Comput. Assist. Lang. Learn.*, vol. 35, no. 7, pp. 1533–1556, 2022, doi: 10.1080/09588221.2020.1819340.
- [19] C. W. M. Malinao and M. M. Sotto, "Home quarantined: Privacy at risk in technologically-oriented learning amidst COVID-19 pandemic," *Int. J. Eval. Res. Educ.*, vol. 11, no. 1, pp. 224–238, 2022, doi: 10.11591/ijere.v11i1.22059.
- [20] C. Greenhow and S. Galvin, "Teaching with social media: evidence-based strategies for making remote higher education less remote," *Inf. Learn. Sci.*, vol. 121, no. 7–8, pp. 513–524, 2020, doi: 10.1108/ILS-04-2020-0138.
- [21] A. Kumi-Yeboah, Y. Kim, A. M. Sallar, and L. K. Kiramba, "Exploring the use of digital technologies from the perspective of diverse learners in online learning environments," *Online Learn. J.*, vol. 24, no. 4, pp. 42–63, 2020, doi: 10.24059/olj.v24i4.2323.
- [22] F. Altinay, Ö. Beyatli, G. Dagli, and Z. Altinay, "The role of Edmodo model for professional development: The uses of blockchain in school management," *Int. J. Emerg. Technol. Learn.*, vol. 15, no. 12, pp. 256–270, 2020, doi: 10.3991/ijet.v15i12.13571.
- [23] U. Usman, T. Muhammad, and B. E. Yanto, "How to Apply Android Applications (Edmodo) and Google Forms as

- Learning Media in Historical Learning in High School,” *AL-ISHLAH J. Pendidik.*, vol. 14, no. 4, pp. 5477–5482, 2022, doi: 10.35445/alishlah.v14i4.1882.
- [24] L. R. Choirunnisya’ and P. Sudira, “Developing an e-module of making Edmodo-based Hosanna Moda system bustier to improve learning independence and learning achievement,” *J. Pendidik. Vokasi*, vol. 11, no. 3, pp. 275–293, 2021, doi: 10.21831/jpv.v11i3.44094.
- [25] M. Thoiyibi and M. Nuzli, “Using Edmodo as a Media of E-Learning Learning in Educational Technology Courses,” *Sink. J. dan Penelit. Tek. Inform.*, vol. 6, no. 2, pp. 478–484, 2022, doi: 10.33395/sinkron.v7i2.11349.
- [26] P. O. Lestari, “Learning Development Model Discovery Learning Motivation To Improve Education Student Writing Indonesian FKIP UMSU,” ... *Int. Conf. ...*, vol. 9, no. January, pp. 235–244, 2022, [Online]. Available: [https://books.google.com/books?hl=en&lr=&id=MmNiEAAAQBAJ&oi=fnd&pg=PA235&dq=student+motivation&ots=WphpFWF\\_nE&sig=wByrBIHK4Kp6Kp-Q8udg66K8Cbw](https://books.google.com/books?hl=en&lr=&id=MmNiEAAAQBAJ&oi=fnd&pg=PA235&dq=student+motivation&ots=WphpFWF_nE&sig=wByrBIHK4Kp6Kp-Q8udg66K8Cbw)
- [27] K. H. Inde, M. B. U. Kaleka, and I. Ilyas, “the Effect of Discovery Learning Model on Learning Outcome of Grade-Vii Students of Smpn 5 Nangapanda,” *J. Sci. Educ. Res.*, vol. 4, no. 1, pp. 11–14, 2020, doi: 10.21831/jser.v4i1.34233.
- [28] T. Nasution, D. Afrianti, T. Tukiyo, S. Sulistyani, and H. Herman, “Critical Discourse Analysis in the Classroom: A Critical Language Awareness on Early Children’s Critical Thinking,” *J. Obs. J. Pendidik. Anak Usia Dini*, vol. 6, no. 5, pp. 4992–5002, 2022, doi: 10.31004/obsesi.v6i5.2951.
- [29] H. Zulnaidi, S. Heleni, and M. Syafri, “Effects of SSCS Teaching Model on Students’ Mathematical Problem-Solving Ability and Self-Efficacy.,” *Int. J. Instr.*, vol. 14, no. 1, pp. 475–488, 2021.
- [30] R. Purnamasari *et al.*, “Student center based class management assistance through the implementation of digital learning models and media,” *J. Community Engagem.*, vol. 02, no. 02, pp. 41–44, 2020, [Online]. Available: <https://journal.unpak.ac.id/index.php/jce>
- [31] M. P. Simanjuntak, E. I. Sihite, and R. D. Suyanti, “The Effect of Blended Learning with Edmodo-Assisted Scientific Approach on Independence and Science Learning Outcomes,” *Int. J. Instr.*, vol. 16, no. 4, pp. 135–154, 2023, doi: 10.2991/978-94-6463-158-6\_25.
- [32] G. Kotronoulas and C. Papadopoulou, “A Primer to Experimental and Nonexperimental Quantitative Research: The Example Case of Tobacco-Related Mouth Cancer,” *Semin. Oncol. Nurs.*, vol. 39, no. 2, pp. 0–6, 2023, doi: 10.1016/j.soncn.2023.151396.
- [33] P. Castelnovo, S. Clò, and M. Florio, “A quasi-experimental design to assess the innovative impact of public procurement: An application to the Italian space industry,” *Technovation*, vol. 121, no. December 2022, 2023, doi: 10.1016/j.technovation.2022.102683.