



The Effect of the Edmodo-Assisted Discovery Learning Model on Students' Scientific Literacy Ability

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ABSTRACT

This study aims to see how the Edmodo-assisted Discovery Learning model affects students' scientific literacy skills. This study is a quasi-experimental design with a pretest-posttest non-equivalent control group. The experimental class is taught using the Edmodo-assisted discovery learning methodology. Data were collected using a pretest and a posttest to measure the increase in students' scientific literacy skills. The experimental class received an N-Gain of 0.51, while the control class received an N-Gain of 0.29. The significance of the Independent Sample t-test on student N-Gain scores is 0.000, which is lower than 0.005, indicating that the Edmodo-assisted discovery learning model has a substantial effect on students' scientific literacy skills. The results of the questionnaire analysis also revealed that students were enthusiastic about Edmodo-assisted discovery learning. As a result, the Edmodo-assisted discovery learning model considerably impacts students' scientific literacy skills.

Pengaruh Model *Discovery Learning* Berbantu Edmodo Terhadap Kemampuan Literasi Sains Peserta Didik

ABSTRAK: Penelitian ini bertujuan untuk mengetahui pengaruh model *Discovery Learning* berbantu Edmodo terhadap kemampuan literasi sains peserta didik. Penelitian ini merupakan kuasi eksperimen dengan desain pretest-posttest non equivalent control group design. Model *discovery learning* berbantu Edmodo diterapkan pada kelas eksperimen. Pengumpulan data dilakukan dengan menggunakan pretest dan posttest untuk mengetahui peningkatan kemampuan literasi sains peserta didik. Hasil penelitian menunjukkan kelas eksperimen mendapatkan N-Gain sebesar 0,51 sedangkan kelas kontrol mendapatkan N-Gain sebesar 0,29. Uji *Independen Sample t-test* terhadap skor N-Gain siswa menunjukkan signifikansi $0.000 < 0,005$ yang berarti model *discovery learning* berbantu Edmodo berpengaruh signifikan terhadap kemampuan literasi sains peserta didik. Hasil analisis angket juga menunjukkan respon yang baik dari siswa terhadap pembelajaran *discovery learning* berbantu edmodo. Dengan demikian dapat disimpulkan bahwa model *discovery learning* berbantu Edmodo berpengaruh signifikan terhadap kemampuan literasi sains peserta didik.

INTRODUCTION

Technological advancements in education benefits students and educators in learning (Haka et al., 2021). As we enter the twenty-first century, fast advances in science and technology have significantly improved the quality of human life (Pratiwi et al., 2019). These changes are frequently accompanied by new ethical, moral, and geopolitical dilemmas that endanger human dignity and existence (Azizah & Budiyanto, 2020). If the community possesses scientific literacy, these problems can be solved (Yaumi et al., 2017). One of the primary goals of science education worldwide is the development of a scientifically literate society (Puspitasari & Nurhayati, 2019). Scientific literacy is described as scientific understanding, identifying new knowledge, interpreting scientific phenomena, and drawing conclusions about science-related concerns, so that it can engage in science-related issues and become responsible citizens with these knowledge concepts (Laila & Firaina, 2020).

Scientific literacy is increasingly required of all individuals in daily life and the workplace (Baihaqi, 2021). Scientific literacy is a crucial educational component in a modern society driven by research and technology. It is required to teach science to all citizens, not only those actively involved or with early career options in science (Fakhri, 2021). Science learning objectives have now been defined, concentrating on knowledge and abilities and students' emotive elements (Gatti et al., 2019). Five key areas of life necessitate the development of scientific skills: economic, democratic, utilitarian, social, and cultural (Syafri et al., 2021). Scientifically literate individuals can apply their scientific knowledge to address difficulties in their daily lives and create helpful scientific products (Aiman et al., 2019).

Scientific literacy aids reasoning and understanding when making environmental decisions (Sumanik et al., 2021). Scientific literacy has a direct impact on the

development of life skills (Sutrisna, 2021). According to the PISA research data, the scores and ratings obtained by Indonesian students in 2000, 2003, 2006, 2009, 2012, 2015, and 2018 were 393, 395, 393, 383, 382, 403, and 379, respectively. The average score is 500, and the country ranks 38 out of 41, 38 out of 40, 53 out of 57, 57 out of 65, and 64 out of 65 countries (from 2000 to 2015). Indonesia was ranked 62nd out of 72 countries in 2015. Indonesia was rated 73rd out of 79 countries in 2018 (OECD, 2019). Indonesian students' average science competence remains in recognizing a handful of basic facts. Still, they have not been able to convey and correlate this ability with other scientific themes, much alone applying sophisticated and abstract concepts (Suparmi, 2019).

Given the poor student scientific literacy achievement level, Indonesian students' scientific literacy achievements must be developed (Sujudi et al., 2020). Indonesian students' low scientific literacy is attributed to various variables, including curriculum, learning, and learning evaluations that prioritize material aspects while overlooking context and process dimensions (Setiawani et al., 2021).

In general, high school science instruction in Indonesia focuses on memorization rather than the process by which students create scientific questions for study, apply knowledge to explain natural occurrences and draw conclusions from observable facts (Dinata et al., 2018). This situation suggests that initiatives to promote learning in schools are required. New educational standards are also required for teachers to assist students in gaining the abilities required in the twenty-first century (Fahlevi, 2022). Students' low scientific literacy ability is influenced by a learning process that is uninteresting and irrelevant to them, is not contextual, and does not result in higher cognitive abilities (Sinti, 2022).

Several factors can generate interesting learning, one of which is using

learning media via existing technologies (Elyas, 2018). According to Regulation No. 65 of the Ministry of Education and Culture of 2013, every teacher must use information and communication technology in an integrated, organized, and effective manner in line with the circumstances and conditions. As is happening now, the creation of an educational environment that was previously merely Social Network Sites (SNSs) is now evolving into Social Learning Networks (SLNs), implying that teachers must be proficient in the use of technology (Eyub, 2017). This fact is also consistent with the current new normal period, in which the education system has shifted from face-to-face to virtual, and learning is done from home, causing a variety of issues (Soraya et al., 2022). The new normal era is a condition of a new order of life that commences with the spread of the Covid-19 virus and necessitates humans maintaining physical distance from one another (Novitasari et al., 2022). Technology usage considerably supports the government's long-term implementation plan (Rahayu et al., 2022). As a result, teachers must be able to innovate in the learning process, one of which is through the use of technology. Integration of multiple technologies in learning is required, particularly in the new normal era, to make learning more flexible since it can be accessible at any time and from any location (Sakina et al., 2020). The use of technology in the classroom setting can boost school professionalism (Soraya et al., 2022). E-Learning is a sort of learning with internet media integrated with the Learning Management System (LMS) that can assist flexible learning. It is one of the technology applications that can be utilized in learning, particularly in distance learning (Fahmi et al., 2021). Edmodo is one LMS that can be utilized (Sefriani et al., 2021).

Edmodo is a social network-based learning platform that is secure, free, and simple to use at any time and from any location (Muhajir et al., 2019). Edmodo can create a favorable impression among

students by encouraging them to use technology advancements to facilitate communication among students during discussions (Helsa & Kenedi, 2019). Edmodo allows students to access knowledge successfully while facilitating conversations between teachers and students (Altunkaya & Ayranci, 2020). Putri et al. (2020) claim that Edmodo can improve students' scientific literacy abilities. According to research by Pertiwi (2022), Edmodo significantly aids the learning process, and the results of statistical tests suggest that Edmodo media with the discovery learning model influences students' scientific literacy abilities.

In addition to using media, teachers must be able to develop models and tactics to ensure that the learning process runs smoothly. The discovery learning model is a learning process that is supposed to develop information and skills in recognizing and solving problems to improve individual capacities to think scientifically and critically and apply scientific knowledge to develop decision-making skills (Syamsu, 2020). The advantage of the discovery learning approach is that students discover new knowledge that they were previously unaware of rather than being informed about it (Susana, 2022). Discovery learning allows students to think critically, enhancing their thinking skills and impacting their scientific literacy (Rubini et al., 2018). Huda et al. (2020) discovered that the discovery learning model is very exciting and assists the learning process. It can greatly increase students' academic understanding (Mardesci, 2020). Besides, integrating the discovery learning model and information and communication technology can improve students' language skills and scientific literacy (Winarmi et al., 2018). The discovery learning model allows for the achievement of 21st-century student skills, where learning previously focused on instructors has now switched to student-centered Learning (Winarni et al., 2020).

Based on observations performed at SMAN 1 Baradatu, the online learning process does not meet the demands of the 2013 curriculum because teachers have not used learning models in the learning process, causing learning to be monotonous and dull. Aside from the learning model, the learning material employed can impact the learning process and the achievement of learning objectives. SMAN 1 Baradatu accesses learning media via the WhatsApp Group while online. Teachers stated that during online learning, many students were less active in learning. The responses of teachers and students in discussion forums and the collection of assignments given on the WhatsApp Group were lacking in scientific activity. This process also resulted in poor communication between teachers and students. These issues demonstrate that students' scientific literacy may be increased by integrating proper learning processes using appropriate learning models and media to promote dynamic and not boring learning. Thus, students' scientific literacy can be improved.

Based on the background of discussion, the purpose of this research is to ascertain the impact of the Edmodo-assisted discovery learning model on the scientific literacy of the tenth-grade students at SMAN 1 Baradatu in the New Normal Era.

METHOD

The participants in this research were SMAN 1 Baradatu 10th-grade students. The study used a quasi-experimental approach with a pretest-posttest non-equivalent control group. Purposive

sampling was used to choose the research sample. The research sample was divided into two classes: X MIPA 1 as the experimental class and X MIPA 3 as the control class. In this research, the experimental and control classes were taught using the same learning paradigm, namely the discovery learning model. Edmodo was used to treat the experimental class. Meanwhile, in the control class, learning took place through the WhatsApp group.

This study used tests to obtain quantitative data, and questionnaires were used to acquire qualitative data. The test instrument consists of 20 reasoned multiple-choice questions organized according to PISA measures of scientific literacy on competency areas. The questionnaire includes questions about students' Edmodo responses. The data collection instruments passed the validity and reliability tests. Student pretest and posttest scores provided quantitative data. The N-Gain value was calculated using data from students' pretest and posttest results to determine the significant effect of Edmodo-assisted discovery learning on students' scientific literacy abilities. The researchers tested the N-Gain for normality, homogeneity, and an independent sample t-test.

RESULTS AND DISCUSSION

The average value of the pretest and posttest was acquired from research done on the experimental and control classes. The experimental class had a higher average value than the control class. This is illustrated in Table 1.

Table 1. The Value of N-Gain Scores on Each Aspect of Scientific Literacy

Indicators	Experimental		Control	
	N-gain	Criteria	N-gain	Criteria
Identify scientific questions	0,66	(Moderate)	0,22	(Low)
Explain scientific phenomena	0,44	(Moderate)	0,29	(Low)
Using scientific evidence	0,42	(Moderate)	0,25	(Low)
Average	0,50	(Moderate)	0,25	(Low)

Based on Table 1, the N-Gain score for each aspect of Scientific Literacy above shows that the average N-gain score for scientific literacy in the experimental class is 0.50 in the "medium" category and the control class average is 0.25 in the "low" category. Based on these results, it shows that the Edmodo-assisted discovery learning model has an effect on the process aspect of scientific literacy skills in the experimental class. Then according to the N-gain statistical test, the average value obtained in the experimental class was 0.51 ± 0.12 (moderate). In the control class, the average value obtained was 0.29 ± 0.15 (low). Based on the results of the Independent Sample t-test, the Sig. (2-tailed) value was 0.00, which was lower than 0.05. Therefore, H_1 was accepted, and H_0 was rejected. This result proved that there was an influence of the Edmodo-assisted discovery learning model on the scientific literacy of the tenth-grade students of SMAN 1 Baradatu on the ecosystems material in the new normal era. A teacher must carry out the learning process in the new normal era by utilizing proper learning media to support the learning process, even though a long distance or without face-to-face interaction (Neli et al., 2022). According to learning in the new normal conditions can be done by utilizing the internet network with accessibility, connectivity and flexibility to bring up various types of learning interactions (Lestari et al., 2021). This discovery learning model can be combined with new normal conditions because students are given the opportunity to search and find for themselves the results of data and conclusions from learning materials (Pratama et al., 2020). This can lead to the learning process through identifying scientific questions, explaining scientific phenomena, using scientific evidence so that it will be easy to remember and understand by students so that science literacy indicators can be met (Handoko et al., 2021).

According to the questionnaire results on students' responses to Edmodo,

the students were interested in learning biology via Edmodo, with a proportion of 80% belonging to the high category. 79% of students actively participated in biology learning through Edmodo (high category). In addition, 83% of them used Edmodo to learn biology (high category). Finally, 84% of students used Edmodo to follow biology classes (high category). As a result, the findings of the questionnaire data analysis of students' Edmodo responses yielded an average of 80.6% in the high category. Based on these findings, students like using Edmodo in the learning process. Learning through digital media can also provide motivation and a fresh learning environment for teachers and students (Novitasari & Dian Tiara, 2022). Previous research by Zannah et al. (2021) found that discovery learning assisted by Edmodo can improve cognitive and psychomotor components. Riski (2021) in his research also said that Edmodo obtained positive responses and improved students' learning outcomes.

The learning implementation observation sheet for meeting one during the opening, core, and closing stages was 100%. At meeting 2, 100% was obtained at the opening, core, and closing stages. At meeting 3, a total percentage of 95 was obtained at the opening, core, and closing stages. As a result, researchers used the discovery learning model during the learning process to get an average result of 98% in an excellent category.

Tables 1 and 2 show that the Edmodo-assisted discovery learning model significantly influences students' scientific literacy skills in the new normal era, based on statistical tests on pretest, posttest, and N-gain data. The use of the Edmodo-assisted discovery learning model allows students to actively engage in the construction of the knowledge they will acquire. Students' active participation in learning not only instills cognitive knowledge and complete scientific literacy abilities but also serves as the foundation for instilling lifelong learning

concepts (Carina, 2021). The model's emphasis on shared concept discovery indirectly fosters communication between students during the learning process. As a result of contact, trust in friends is created, which creates circumstances for effective learning (Handoko et al., 2016).

Table 3 shows the rise in the average N-gain of the two classes based on the analysis results in the process aspect. The experimental class students used LKPD (Student Worksheets) based on Edmodo-assisted discovery learning derived from everyday life, which resulted in a high average value of N-gain. This finding is consistent with the main goal of scientific literacy, which expects students to apply scientific concepts to assess and analyze the circumstances around them (Schmidt et al., 2020);(Shaffer, 2019). The highest indicator, recognizing scientific questions, is found in the first indicator. The high indicator of identifying scientific questions is because there is a problem with syntax statements when learning with the discovery learning model. The grouped students were given a chance to identify existing issues with the assistance of Edmodo features, such as a library that can help students find learning resources and small groups that are used to communicate with students with groups. Such a learning method will encourage students to describe difficulties. It will improve conceptual comprehension (Huang, 2017), allowing students to grasp the content, apply it, and discover new things that will improve learning outcomes (Hulukati et al., 2018). Furthermore, students responded well to using Edmodo in learning (Riski, 2021).

CONCLUSIONS AND SUGGESTIONS

Based on the preceding description, it was discovered that the Edmodo-assisted Discovery Learning model substantially affected the scientific literacy abilities of the tenth-grade students of SMAN 1 Baradatu in the new normal Era. The Edmodo-assisted

Discovery Learning model can help students enhance their scientific literacy skills, seen from the rise in the average values of the pretest, posttest, and N-Gain. Students' scientific literacy skills improved using the Edmodo-assisted Discovery Learning model. Based on the findings of this research, the Edmodo-assisted Discovery Learning model may be an alternate option for teachers to adopt in the classroom, particularly in the new normal era.

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