

# IMPROVEMENT OF STUDENT SCIENCE LITERACY SKILLS THROUGH EDMODO-BASED TEACHING MATERIALS IN LEARNING SCIENCE IN ELEMENTARY SCHOOL

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**Abstract:** — Background of this research is based on the low literacy skills of Indonesian students, one of which is observed at SDN 19 Nan Sabaris. Science literacy is an important skills that need to be mastered by students in IPA learning. Science literacy skills are basic skills related to the curiosity and self-reliance of students in learning. The use of Edmodo-based teaching materials is a solution to improve student science literacy skills in science learning in elementary school. The samples in this research were 21 students of the V-grade SDN 19 Nan Sabaris. Referring to the data analysis results that have been done using the test paired sample T-Test (SIG 2. Tailed = 0.001) It can be concluded that the application of Edmodo-based teaching materials in SCIENCE learning in the V-grade SDN 19 Nan Sabaris proved to improve students' science literacy skills.

**Index Term:**—Edmodo, IPA, Problem-Based Learning, Science Literacy, Elementary School, Learning Technology

## 1 INTRODUCTION

Education is one of the most important things today. The important role of education is to create quality human resources, morality, and widespread and able to provide good change for the surrounding community. The enormous demands of education encourage educators and students to be able to participate in various developments in the education world. The 21st century learning can be interpreted as learning that gives students the proficiency of 4C, which includes: (1) Communication (2) Collaboration, (3) Critical Thinking and Problem solving, and (4) Creative and Innovative. With the characteristics of the 21st century, various main competencies that must be possessed by students include learning and innovating skills, mastering media and information, and life and career abilities. [1] Literacy skills are a very important ability today. Literacy skills is a basic ability that Indonesian people must have especially for students, both at basic education and at higher levels of education. The development of technology in Indonesia is not balanced with the capability of literacy This is shown from the low ability of community literacy in Indonesia that is far behind from neighboring countries such as Malaysia and Singapore. Low literacy skills of Indonesian people due to literacy has not become the daily culture of Indonesian society yet. ICT Literacy is the ability to use digital technology, communication tools and or network in Define, Access, Managing, Integrate, Evaluate, Create and Communicate information well and legally to produce a new concept in order to build a knowledgeable community. Technology, information and communication, or ICT is a combination of information technology and communication technology. [2] ICT is a tool to get added value in producing

information that is fast, complete, accurate, transparent and up to date.[3] The development of computer technology is currently becoming spotlight in various countries of the world as a competency that must be learned by learners to live in society and can participate in the digital world of the future and prepare to their future jobs. Information Literacy is the ability to know when information is needed, identified, found, evaluated, and effectively uses that information for issues or issues encountered. Literacy information is the ability of one to realize that valid and complete information is the foundation for decision making, formulate information needs, identifying the potential information on the information, creating an exploring strategy, accessing information recorded in non-printed media, evaluating information, integrating new information into the science structure knowledge.[4] The importance of this information literacy is also to try the occurrence of hoaxes and the delivery of incomplete information. In learning information literacy has a very important role. Learners should look for the information that they need and summarize it so that the information they get is more memorable.

Science Literacy is the ability to use science knowledge, identify questions, and draw conclusions based on evidence, in order to understand and make decisions regarding nature and the changes done to nature through human activity.[5] The importance of literacy skills is in line with the objectives of the Trends in International Mathematics and Science Study (TIMSS). TIMSS is a series of international assessments of mathematics and science knowledge from students in different parts of the world. The students participated from a diverse collection of educational systems in terms of economic development, geographic location, and many residents. TIMSS is an indicator that shows the quality of education in Indonesia. From the results of TIMSS in 2015 Indonesia ranked 46 from the 51 countries of the TIMSS. The low result gained by Indonesia shows that it is still a lack of the ability of our learners to solve problems that include science literacy. The 5-year-old TIMSS is expected to be the encouragement of learners in Indonesia to get the top ranking of the world. The fact of the low of students' literacy skills can be seen during

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learning process. Learning activities are likely to use lecture and discussion methods. Both methods have a weakness that learners only get limited information. Besides the availability of learning resources also greatly affects the ability of students literacy. The learning resources used can be books and the internet. Low literacy skills that are owned by the students will affect their reading skills. Literacy activities are not just reading but also a powerful source of motivation for learners to analyze and recall and evaluate from their reading materials. If the ability of literacy is low, it can result in a lack of curiosity that is owned by learners, so that self-learning cannot be carried out properly. One way to improve learners' literacy skills is by using problem-based learning methods. The PBL (problem-based learning) strategy is learning with constructivism approaches so that the learners form their own knowledge, developing higher skills and increasing self-confidence.[6] According to the constructivist theory of thinking and problem solving skills can be developed if the students do by themselves, find and move the complexity of existing knowledge.[7] By using this method, the PBL is expected to increase the motivation to learn learners. One of the uses of technology that can be used in learning aimed at improving literacy skills and learning motivation for learners is the use of Edmodo application. Edmodo is one of those applications that can be used in learning both at school and at home. Edmodo is a social media platform that is often described as Facebook for schools and can function even more as needed. [8] This application can be downloaded for free and can be used on smartphones or computers so that the use of Edmodo is more practical and efficient. One of the excess booster app Edmodo compared to other similar applications is Edmodo compatible on all smartphones. Edmodo is a free service that allows lecturers/educators who can create and maintain their own community of classes securely.[9] Edmodo is developed on the basis of class management principles as well as social media. The main feature of Edmodo is the active support of the communication model of social media online, which is added with online learning materials and online evaluation features. Edmodo was first developed by Nicolas Borg and Jeff O'Hara, in which Edmodo was considered as a safe learning platform for teachers, students and social media-based schools. Edmodo provides the classroom with a safe and easy way to connect and collaborate between students and teachers to share educational content, manage projects and tasks and handle notifications of every activity.[10] The use of smartphones is suitable for the current conditions where rapid and continuous development of information and communication (ICT) technology.[11] Mobile phones are not just a tool for communicating to others using sound, but it quickly transforms into a multi-purpose tool in wireless technologies such as personal computers.[12] Edmodo is one part of Social Network Sites (SNS) that can be utilized in a learning environment. The characteristics of SNS are as follows:

1. Build a public or semi-public profile in a restricted system,
2. Articulate the list of other users with whom they share the connection,
3. View and traverse the list of their connections and those made by others in the system.[13]

In Edmodo application allows one to create and recruit members in order to join a community that has been created. In the created virtual community, it is possible for each member to be connected and able to interact in a public space with privacy restricted to the entire member.

## 2 METHODOLOGY OF RESEARCH

The type of research conducted is the quasi experiment aimed at seeing the improvement of the students' science literacy skills between before and after the use of Edmodo-based teaching materials in SCIENCE studies in elementary school. Sampling techniques used is purposive random sampling, with total samples selected as many as 21 grade V students at SDN 19 Nan Sabaris. The data analysis techniques in this study used the test paired sample T-Test in which before the test was carried out the prerequisite test carried out the normality and homogeneity tests. Data collection instruments In this study use an observation-shaped assessment sheet to observe student activity during the learning activities. Student Science literacy Skills Assessment sheet consists of 10 indicators, such as assessment of: Hypotheses, selection of tools and materials for the activities of proving/experimental, activity design, execution/implementation, data collection, observation, utilization of time, making conclusions, reflections, communication findings. The data analysis technique used is to use the T-Test paired sample test. Before testing the paired sample T-Test is done, first the data that has been collected in the test and homogenization. Conclusions in research can be taken by comparing the value of 2-tailed sig with an alpha value (0.05).  $H_0$  will be rejected if the value is sig 2. Small tailed of alpha value (0.05). Data analysis is done using SPSS app version 20.

## 3 RESULT AND DISCUSSION

This research aims to see the contribution of Edmodo-based teaching materials in improving students' science literacy skills to science elementary school. To see the improvement of science literacy skills, data analysis strengthened by the technique Using a T-Test paired sample test. Before the test is performed, prerequisite tests are required, including:

### 1. Test normality

Test normality aims to see if the data group will be used as a normal distributed sample. The normality test used is the Smirnov KOLMOGOROV with the results of analysis using the application SPSS version 20 as follows:

Table 1. Test Results Normality Data Before and After Treatment

No	Variabel	Result	
		Before	After
1	N	21	21
2	Mean	58.3333	66.9048
3	Standard Deviation	9.61769	1.18940E1
4	Kolmogorov-Smirnov Z	0.667	0.800
5	Sig. (2-tailed)	0.766	0.544

Based on the results of data analysis, it can be concluded

that the data before and after the treatment has been distributed normally, it is evidenced by the value of Sig 2 tailed greater than the alpha value (0.05). The conclusion that can be withdrawn from this test is that both groups of data have been distributed normally and can be continued to the next test of the structure of homogeneity.

## 2. Test homogeneity

Summary of the results of homogeneity test as follows:

Table 2. Test Result Summary of Data Group Homogenities

No	Variabel	Result
1	Levene Statistic	0.492
2	df1	1
3	df2	40
4	Sig.2 tailed	0.487

The main focus in homogeneity testing is the value of SIG 2. Tailed, based on table 2 it appears that a Sig 2 tailed value is greater than the alpha value (0.05), so it can be concluded that both groups are homogeneous data.

Once the two prerequisite tests are met, testing the data using the T-Test paired sample test can be resumed. Test result paired sample T-Test is presented as follows:

Table 3. SPSS Result Recapitulation Test Paired Sample T-Test

No	Variabel	Result
1	Mean	61.119
2	Standard deviation	11.350
3	t	34.9
4	df	41
5	Sig 2 tailed	0.0000

Science literacy skills have 10 indicators, including: hypothesis submission, selection of tools and materials for proving/experimental activities, activity plan, execution/implementation, data collection, observation, time utilization, conclusion making, reflection, communication findings. Essentially, in measuring students' science literacy skills, teachers can use assessment instruments in the form of a student activity observation sheet. Assessment indicators of student science literacy skills begin to be observed when students are faced with a problem so as to require students to find an alternative solution. This opportunity confirms that science literacy skills can be enhanced by a problem-based learning plan that is implemented for each learning activity. Problem-based learning for elementary school levels has a concept difference with a problem-based learning approach for adults. Elementary school students are not yet accustomed to conducting a high level of analysis. This is in accordance with the level of development of students expressed by Piaget, where elementary school students are in the concrete operational phase. The stage of child development in this concrete operational phase, students have a high enthusiasm for something, have a sense of curiosity that is much higher than the previous stage of development and independence in doing things. A significant increase in the learning of the

students is thrust by the design of a study that engages students actively on each session.

Problem-based learning can be implemented by utilizing the technology that is available free of charge and practical to use. One of the popular and frequently used examples of technology applications is Edmodo. Edmodo is a social network that focuses on the field of education where study, Edmodo is a combination of Facebook, Instagram, email, Macromedia Flash, chat applications such as WhatsApp and Twitter. The use of Edmodo can enable students to observe, to try, to test, to and communicate. These five basic concepts have been integrated in the assessment of science literacy skills.

In general the implementation of learning using Edmodo has several advantages, including:

1. Students become motivated and have a high sense of curiosity.
2. Edmodo may allow for independent learning.
3. Edmodo has created the concept of digital learning "accessible anywhere and anytime".
4. Edmodo allows students to observe, minister, try, reason and communicate.
5. Edmodo can minimize the boredom of students in following problem-based learning.

The implementation of Edmodo-based learning has been prkatists according to teachers and students. This is reinforced by the evidence of a field interview stating that Edmodo is so easy to use and implemented in learning activities. A total of 78.12% of students agree on the use of Edmodo in learning activities can stimulate students' curiosity to increase and provide significant effect in the independence of learning.

Edmodo can enable students to unlock extensive insight by visiting the online libraries that have been designed by the teacher before the implementation of the learning progresses. The online library becomes so practical because it is accessible to students before learning. This means that the student's initial knowledge increased after the implementation of this Edmodo-based learning. The library menus available in the Edmodo app contribute to increasing read interest and self-reliance students in learning. High reading interest affects how hypothesized and problem solving are in learning activities. Students who already have high initial knowledge will become broader insight and knowledge in exploring the material when compared to other students. Edmodo presents a feature that supports students to be self-reliant and active in learning. The use of Edmodo can also train students' independence in learning. Self-reliance becomes important when in the implementation of the Division focuses on the concept of active learning. Assessment on the scale of science literacy skills One of them can be seen in improving students' self-reliance. The materials are designed to support the realization of the concept of self-reliance learning in students.

The advantages of Edmodo according to students' views are as follows:

1. The assessment conducted by the teacher is directly
2. Assessment does not take time long enough, different from the assessment of tasks that are paper and pencil test
3. The task has a time limit that is clear enough to make it possible to cultivate the student discipline attitude in work
4. Students can perform tasks wherever and whenever,

without limited space and time

5. Students can submit assignments from the place where the students are without having to face the teacher directly
6. Foster a student's self-attitude in work

Some disadvantages of Edmodo, including:

1. For students who are not yet proficient in IT, it is necessary to help the task process to run in accordance with the expectations of teachers
2. The quality of the task input is very determined by the network/provider (will be less maximum on the quality of Edge/3G network)
3. Edmodo app requires a considerable phone on smartphones

In the future, it is hoped that Edmodo is no longer an application feared by teachers and students who have not been tech literate. Edmodo has been designed to be as practical as possible to facilitate users in their use in learning activities. The use of Edmodo can be adjusted to the learning approach chosen and where the learning objectives will be directed. If teachers want to improve skills such as science literacy skills, problem solving skills, critical thinking, colabrative and communication, teachers can design a learning concept with a problem-based Edmodo application (Edmodo-Problem Based learning). Problem-based learning accommodates the ability to propose hypotheses, find solutions, implement proof and draw conclusions. In the near term, it is expected that Edmodo has been recognized by every teacher and can be implemented in learning

#### 4 CONCLUSION

Edmodo-based teaching materials are a teaching material that is designed with problem-based learning concepts to improve students' science literacy skills for SCIENCE learning in elementary school. Edmodo is designed to improve learning quality and maximize the ease of use for each learning execution. The use of Edmodo-based materials proved theoretically and strengthened statistic can improve students' science literacy skills in SCIENCE learning. Edmodo can increase interest in reading, curiosity, independence and student cooperation in learning activities that also contribute to the improvement of student knowledge. Edmodo is a flexible application that can be used on all subjects. The features of Edmodo are always updated annually so that it can be deduced Edmodo always keep up with the times. Edmodo is an application that allows digital-based learning and enables teachers and students to conduct learning. Fore expected every teacher can make Edmodo as one of the main options to improve the quality of learning.

#### REFERENCES

- [1] Abidin, Y. (2014). *Desain Sistem Pembelajaran Dalam Konteks Kurikulum 2013*. Bandung: PT Refika Aditama.
- [2] Daniel J. 2012. *ICT dan Pembelajaran (Kurikulum untuk Sekolah dan Program Pengembangan Guru)*, terjemahan dari *Information and Communication Technology in Education (A Curriculum for Schoolsand Programme of Teacher Development)*. Jakarta : Referensi.
- [3] Munir. 2009. *Kontribusi Teknologi Informasi Dan Komunikasi (TIK) dalam Pendidikan di Era Globalisasi Pendidikan Indonesia*. Jurnal Pendidikan Teknologi Informasi dan Komunikasi 2.
- [4] Doyle, C. (1996). Information literacy: status report from the United States. In D. Booker (Ed.), *Learning for life: information literacy and the autonomous learner* (p. 39-48)
- [5] OECD, 2016. *PISA 2015 Results in Focus*. OECD Publishing.
- [6] Putri, Sri Diana., & Djamas, Djusmaini. (2017). Pengembangan Perangkat Pembelajaran Fisika Berbasis Keterampilan Berpikir Kritis dalam Problem-Based Learning, *Jurnal Ilmiah Pendidikan Fisika Al-BiRuNi*. 06 (1) (2017) 125-135
- [7] González, R., & Batanero, F. (2016). A review of Problem-Based Learning applied to Engineering. *EduRe Journal International Journal on Advancesin Education Research EduRe Journal No*, 3(1), 2340–2504.
- [8] Suriadhi, Gede. 2014. Pengembangan E-learning Berbasis Edmodo pada Mata Pelajaran IPA Kelas VIII di SMPN 2 Singaraja. *Journal Edutech*. Vol. II No. 1.
- [9] Dharmawati. (2017). Penggunaan Media e-Learning Berbasis Edmodo Dalam Pembelajaran English for Business. *QUERY: Jurnal Sistem Informasi*, 1(1), 43-50.
- [10] Putrinta, Nurita. (2013). Cara Membuat Media Pembelajaran Online Menggunakan Edmodo. *Pontianak: Jurnal Pendidikan Informatika dan Sains*, 2(2), 139-147.
- [11] Zakirman, Z., Lufri, L., & Khairani, K. (2019, January). Factors Influencing the Use of Lecture Methods in Learning Activities: Teacher Perspective. In *International Conference on Islamic Education (ICoIE 2018)*. Atlantis Press.
- [12] Khaleel, M. (2015). Students' Perceptions of Edmodo and Mobile Learning and their Real Barriers towards them. *Turkish: The Turkish Online Journal of Educational Technology*, 14 (2), 167-180.
- [13] Elizabeth. (2013). *Student Interactions in Edmodo Versus Facebook*. Arizona: Arizona State University, 12-13.