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Digital Literacy Analysis through Flipped Classroom Learning using Web-Edmodo on Buffer Solution Material

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Abstract *- This study aims to determine students' digital literacy through Flipped Classroom learning on buffer solution material using web-Edmodo. The research was conducted at SMA N 1 Padangan, East Java. This research method is a qualitative method. The learning model used is the flipped classroom, while the Edmodo web is a platform that can be used in the teaching and learning process anywhere and anytime. Data collection techniques include distributing digital literacy questionnaires, observation, interviews, reflective journals, and documentation. The digital literacy dimensions analyzed in this study consist of information, communication, content-creation, safety, and problem-solving. The results showed that the students had a very good category in the dimensions of information, communication, content creation, and safety, while in problem-solving they had a good category. Thus it can be concluded that the use of the Edmodo web in buffer solution learning through the flipped classroom can foster students' digital literacy.*

Keywords - *Digital literacy, Web-Edmodo, Flipped Classroom, Buffer Solutions*

I. INTRODUCTION

Education is a very important human activity. Through education, humans can be educated to become human beings with noble behavior [1]. The development of education in the world cannot be separated from the development of the industrial revolution that has occurred in the world, because indirect changes in the economic order have also changed the order of education in a country. In the Era of the Industrial Revolution 4.0, a new education system was needed. One of the movements launched by the government is the new literacy movement as a reinforcement and even replacing the old literacy movement. The new literacy movement is intended to focus on three main literacy, namely 1) digital literacy, 2) technological literacy, and 3) human literacy [2]. The implementation of 3 new literacy is inseparable from the use of technology. Indonesia is a very large country consisting of various islands, resulting in uneven infrastructure development. This causes an educational gap in Indonesian society, especially for people who are in remote and rural areas. Infrastructure development in the region is still relatively low, for example, the internet network in the area is unstable, and the technology used is outdated.

The low level of infrastructure development in the region is one of the challenges of education in Indonesia. The government needs to balance education with current technological developments. Flipped Classroom is the best solution to this problem. This is because learning with the FC model does not fully use technology. In addition, learning with the FC model can adjust the technological conditions of each school. Flipped Classroom is a model that learns new material by reading or watching learning videos independently (at home) and time in class is spent by students conducting discussion activities regarding the material that has been provided through videos that have been given by the teacher [3].

Flipped Classroom learning requires a Platform as a medium for carrying out teaching and learning activities. The use of this technology can spur students to have digital literacy competencies with the use of increasingly sophisticated technological tools. Web-Edmodo is a teaching and learning media that can be used to train students to have digital literacy competencies. Web-Edmodo is a learning management system that can connect

teachers and students with various platforms that are simple and easy to use. Web-Edmodo can facilitate and simplify the teaching and learning process to provide a learning experience anywhere and anytime [4].
The use of student learning media technology needs to be balanced with digital literacy. Digital literacy can contribute to more efficient task completion through the help of software and computer programs. Digital literacy also plays a role in improving the quality of chemistry teaching in technical, cognitive, and social aspects. Digital literacy has become a necessity for students to be able to help students learn better [5]. Based on several studies on digital literacy and the Flipped Classroom learning model with the Web-Edmodo Platform, it is necessary to carry out further research to find out the digital literacy of students using the Web-Edmodo Platform on the Material Solution with the Flipped Classroom learning model with the title "Digital Literacy Analysis through Flipped Classroom Learning using Web-Edmodo on Buffer Solution Material.

II. LITERATURE REVIEW

A. Digital Literacy

Digital literacy consists of two words literacy and digital. Literacy comes from the word literacy which is a scientific framework consisting of skills, knowledge, ethics, and output creativity in digital networks [6]. While the word digital comes from the word digitus, in Greek which means fingers. If someone's fingers are counted, there will be ten (10). Therefore, digital is a description of a number condition consisting of the numbers 0 and 1 or off and on (binary number system), also known as bits (Binary Digits). Digital literacy is the ability of technology and information with digital media that aims to be used in everyday life. [7] in his book argues that digital media consists of various forms such as sound, writing, and images. Therefore, digital literacy is not just the effective use of digital media but a certain way of thinking.

According to reference [8], there are five components of digital literacy, including:

1. Information, namely identifying, searching, retrieving, storing, managing, analyzing, and assessing the relevance and purpose of information through digital media.
2. Communication, namely interacting through digital media by sharing information, collaborating, and participating with groups.
3. Content-creation, namely creating and editing new content, producing creative content, programming, understanding copyright and licensing in creating content, and integrating previous knowledge into content.
4. Safety, namely the ability to protect digital devices, and privacy data, as well as the ability to protect health against the effects of digital use.
5. Problem-solving, namely analyzing the renewal needed by digital media, being innovative in using digital technology, renewing one's own and other people's competencies, and solving conceptual problems through digital media.

B. Flipped Classroom

Bergmann and Sams were the first pioneers to introduce learning with the Flipped Classroom system in 2007. According to reference [9], Flipped Classroom is a learning model or strategy that can be provided by educators by minimizing the amount of direct instruction in their teaching practice while maximizing interaction with each other. The purpose of Flipped Classroom is to maximize time in class so that students participate actively in the learning process and interact with peers who are guided by the teacher [10].

C. Web-Edmodo platform

Edmodo is a popular LMS (Learning Management System) and can be used in education. Edmodo was first introduced by Nic Borg and Jeff Ohara in 2008. Edmodo is different compared to other LMS because Edmodo has a system that has been provided by the developer [11]. According to reference [12], Edmodo is a social network platform for teachers and students to share ideas, files, agendas, and assignment activities.

D. Buffer Solution

Reference [13] showed in the book Chemistry, explain that chemistry is a science that is actively developing and is very important for life in the world, both for nature and the environment and for society. There are three levels of representation in studying chemical phenomena, namely the macroscopic, symbolic, and submicroscopic levels. The three representations are presented in the following **Figure** 1:

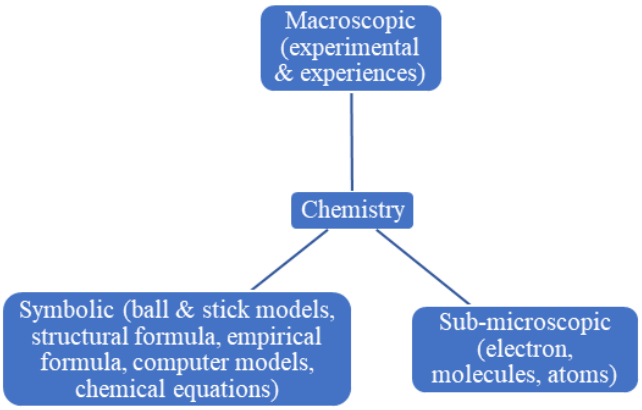

Figure 1. Three Representations of Chemistry

Buffer solutions are all solutions whose pH can be said to be constant, even if a little acid or base is added [14]. Buffer solutions are also known as buffer solutions or buffer solutions. There are two buffer solution systems, namely acidic buffers and basic buffers, with the following explanation:

1. Acid Buffer Solution

An acid buffer solution consisting of a weak acid and a conjugate base maintains the pH in the acidic region. An example is an acid buffer solution made by mixing acetic acid (CH_3COOH) with sodium acetate (CH_3COONa), where CH_3COOH is a weak acid and the CH_3COO^- ion derived from CH_3COONa is the conjugate base. Acid buffer solutions maintain the pH in the acidic region.

2. Alkaline Buffer Solution

A basic buffer solution contains a weak base (B) and a conjugate acid (BH^+), for example, a basic buffer solution is made by mixing ammonia (NH_3) with ammonium chloride (NH_4Cl). NH_3 is a weak base and the NH_4^+ ion is a conjugate acid. An alkaline buffer solution maintains the pH in the alkaline region.

III. METHOD

The purpose of this study is to analyze and find out the digital literacy of class XI students at SMAN 1 Padangan in chemical learning on Buffer Solution material using the Web-Edmodo Platform. This research was conducted at SMAN 1 Padangan. This research was attended by 80 students in class XI IPA 3 and XI IPA 4 for the 2021/2022 academic year, consisting of 32 male students and 48 female students. The data collection techniques used are digital literacy questionnaires, observation, interviews, reflective journals, and documentation. The dimensions of digital literacy refer to the reference [8] including information, communication, content-creation, safety, and problem-solving.

IV. RESULT AND DISCUSSION

The use of Web-Edmodo in this study is equipped with materials (ppt, videos), practice questions, and discussion forms. The digital literacy data of students from the questionnaire results are described according to the dimensions and indicators on these dimensions. The following are the results of scores and categories from the five dimensions in **Table 1.**

Table 1. The Result of Scores and Categories from Five Dimensions

Digital Literacy	Information Dimension	Communication Dimension	Conten creation Dimension	Safety Dimension	Problem-solving Dimension
1.	228	225	221	183	211
2.	223	221	206	227	214
3.	213	206	218	227	196
4.	207	209	206	222	
5.	213	213			
6.	225	192			
7.	219	229			
8.	198				
9.	192				
10.	210				
11.	202				
Average Score	211,81	213,58	212,75	214,75	207
Category	Very Good	Very Good	Very Good	Very Good	Good

Information dimension consists of indicators of finding, storing, understanding, understanding, and using digital content available on the Edmodo web platform. The information dimension has a score of 211.81 in the very good category. In the Information dimension, students do not only search and collect but filter the information they have obtained. Students know that the information on the internet is not always true. So they have to sort and choose information or data that is valid. According to reference [15] finding and storing information is the basis of using the internet, so this should be an easy thing for students, considering that every child must have a smartphone. This is also supported by the interview answers of students, namely as follows:

"I can search and collect some information from Google by writing keywords in the search field. I filtered the data provided by Google again because not all of the data/information provided was correct. So, I read the existing data first and then I reassembled it into new information according to the task instructions given."

(Student Interview 06, 30 May 2022)

The Communication dimension has discussion indicators, explaining and explaining information to both group mates and other groups. The Communication dimension has an average score of 213.58 in the very good category. On the Communication dimension, students have no difficulty communicating with friends, because they can discuss via WhatsApp. This is different from commenting via web-Edmodo, they seem to have difficulty because they haven't known web-Edmodo for a long time, so they still feel unfamiliar with the platform. This following statement.

"Edmodo is a new learning medium so I don't understand this learning website. So, I don't know how to comment on the Edmodo page yet."

(Interview of Student 36, 31 May 2022)

Whereas on the Content-creation dimension which has indicators of creating and developing digital projects according to the material, it has an average score of 212.75 in the very good category. Students have no difficulty because they see the video tutorial first before uploading the video assignment on Edmodo. Meanwhile, to include the reference, they only need to download the reference source, then they write the title and year, and publisher in the assignment video. Internet users must know basic rights and respect other internet users, such as freedom of expression and intellectual property rights, for example, copyright [16]. The following are the results of interviews with students:

"I didn't experience any difficulties when uploading videos to Edmodo, because I saw the method on YouTube first, then I followed it."

(Student Interview 06, 30 May 2022)

The Safety dimension has a very good category with an average score of 214.75. This dimension has indicators namely protecting, coping with, and storing personal data. Students admit that they can be careful with usernames and passwords, and they will not give them to other people and they are also careful in commenting on Edmodo. Everyone has the right to protect their private data [17]. The 1945 Constitution, Article 28 G has regulated the protection of personal data, which reads as follows:

"Everyone has the right to protection of personal data, family, honor, dignity, and property under his control, and has the right to feel safe and protected from threats of fear to do or not do something that is a human right."

The following are student statements:

"I understand that usernames and passwords are not allowed to be given to other people, I always maintain this confidentiality."

(Student Interview 06, 30 May 2022)

The fifth dimension, namely the Problem-solving dimension, this dimension has indicators, namely implementing and utilizing the Edmodo web platform for other subjects. This dimension gets the lowest average score compared to the other four dimensions, namely 207 in the good category. Therefore, students need to improve their digital literacy, especially in the problem-solving dimension. This is intended so that students can have digital literacy very well and can compete globally.

These data were obtained from various sources including questionnaires, reflective journals, interviews, observations, and documentation. From these data, students gave positive responses to the use of web-Edmodo in learning chemistry through the Flipped Classroom learning model. Students feel they can make good use of it, even with limited infrastructure in the area. The following is student data can be presented in **Figure 2**.

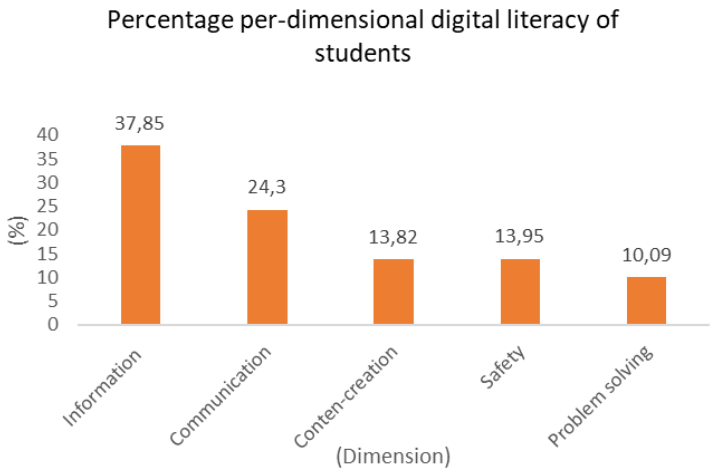

Figure 2. Percentage per Dimension of Students' Digital Literacy

"Learning using the web-Edmodo is very fun because the learning method is usually really boring. Learning using web-Edmodo makes me more enthusiastic about learning chemistry."

(Data reflective journal, students 32, 30 May 2022)

"The way of learning this time is very unique, I can learn materials that have been given by the teacher via web-Edmodo at home, then at school, I can ask questions about the material that was previously given. Not only ~~that, web-Edmodo can also be used for discussions with friends, so it's easier for me to communicate with my~~ friends when discussing material that I don't understand."

(Observation, May 13, 2022)

Learning buffer solutions at High School with web-Edmodo is going well and has its impression on students. This can provide positive results on student learning outcomes. This statement is following the results of research by reference [18], where this research was conducted during the Covid-19 pandemic and it can be concluded that the use of Edmodo media provides effective results for student learning outcomes. The use of Edmodo learning media has many benefits, one of which is to make it easier for students to access the material anywhere and anytime [19]. During the teaching and learning process, students' digital literacy can be seen when students use technology and the internet well, students can interact online, and students can create digital content.

V. Conclusion

Learning buffer solutions using web-Edmodo through Flipped classrooms has an impact on the development of students' digital literacy. This is demonstrated by the achievement of digital literacy dimensions consisting of Information, Communication, Content-creation, Safety, and Problem-solving. The results of the study show that students have a very good category on the dimensions of Information, Communication, Content-creation, and Safety. Meanwhile, the problem-solving dimension has a good category. In the overall digital literacy dimension, the average of all dimensions is very good. Thus it can be concluded that the use of web-Edmodo in buffer solution learning through Flipped Classroom can foster students' digital literacy.

REFERENCES

[1] R. N. Sasongko and B. Sahono, "Desain Inovasi Manajemen Sekolah," *Jakarta Shany Publ.*, 2016.

[2] J. E. Aoun, *Robot-proof: higher education in the age of artificial intelligence*. MIT press, 2017.

[3] J. Bergmann and A. Sams, *Flip your classroom: Reach every student in every class every day*. International society for technology in education, 2012.

[4] Ç. Hursen, "The impact of Edmodo-assisted project-based learning applications on the inquiry skills and the academic achievement of prospective teachers," *TEM J.*, vol. 7, no. 2, pp. 446–455, 2018.

[5] C. A. Dewi, P. Pahriah, and A. Purmadi, "The Urgency of Digital Literacy for Generation Z Students in Chemistry Learning," *Int. J. Emerg. Technol. Learn.*, vol. 16, no. 11, pp. 88–103, 2021.

[6] A. Calvani, A. Cartelli, A. Fini, and M. Ranieri, "Models and instruments for assessing digital competence at school," *J. E-learning Knowl. Soc.*, vol. 4, no. 3, pp. 183–193, 2008.

[7] P. Gilster, *Digital literacy*. John Wiley & Sons, Inc., 1997.

[8] A. F. Editors, Y. Punie, and B. N. Bre, *DIGCOMP : A Framework for Developing and Understanding Digital Competence in Europe* . 2013.

[9] G. B. Johnson, "Student perceptions of the flipped classroom." University of British Columbia, 2013.

[10] S. C. Chang and G. J. Hwang, "Impacts of an augmented reality-based flipped learning guiding approach on students' scientific project performance and perceptions," *Comput. Educ.*, vol. 125, pp. 226–239, Oct. 2018.

[11] F. A. Mokhtar, "Rethinking Conventional Teaching in Language Learning and Proposing Edmodo as Intervention: A Qualitative Analysis.," *Malaysian Online J. Educ. Technol.*, vol. 4, no. 2, pp. 22–37, 2016.

[12] Y. P. Pitoy, "Mathematic Excited with Edmodo," *Tersedia http//yanipieterpitoy. wordpress. com/2012/10/18/mat hematics-excited-with-edmodo/[6 mei 2013]*, 2012.

[13] R. Chang and K. A. Goldsby, "Reactions in aqueous solutions," *Chem. 10th ed., R. Chang (ed.), McGraw-Hill, New York*, 2010.

[14] D. W. Oxtoby, H. P. Gillis, and N. H. Nachtrieb, "Prinsip-prinsip kimia modern," *Jakarta, Erlangga*, 2001.

[15] R. R and S. A, "Penerapan pendekatan demonstrasi interaktif untuk meningkatkan keterampilan dasar proses sains siswa 1," *Gravity J. Ilm. Penelit. dan Pembelajaran Fis.*, vol. 3, no. 1, pp. 40–50, 2017.

[16] N. D. Rizkia and H. Fardiansyah, *HAK KEKAYAAN INTELEKTUAL SUATU PENGANTAR*. Penerbit Widina, 2022.

[17] H. S. Disemadi, F. Hukum, and U. I. Batam, "460-1344-1-Pb," vol. 5, no. 36, pp. 177–199, 2021.

[18] R. Sefriani, R. Sepriana, I. Wijaya, P. Radyuli, and Menrisal, "Blended learning with edmodo: The effectiveness of statistical learning during the covid-19 pandemic," *Int. J. Eval. Res. Educ.*, vol. 10, no. 1, pp. 293–299, 2021.

[19] R. Fithriani and M. A. Alharbi, "The adoption of edmodo in a hybrid EFL writing class: what do Indonesian students and lecturers say?," *Asian EFL J. Res. Artic.*, vol. 28, no. 2, pp. 38–60, 2021.