

# Analysis of Digital Literacy Teachers High School in Jakarta through Web-Based Learning Approach Using Web Nearpod

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**Abstract:** *Teachers as the main key to the success of using technology in schools in the future must be able to build digital literacy. Various studies have been carried out as an effort to hone these digital literacy skills, one of which is by knowing the competence of teachers regarding digital literacy. This study aims to determine the competence of chemistry teachers regarding digital literacy as a 21st century skill. The research method used is descriptive quantitative, with an instrument in the form of a questionnaire. Respondents are high school chemistry teachers in Jakarta. The results showed that the chemistry teacher's media and information literacy component had a very good perception with a score of 3.76, as well as on the ICT literacy component, prospective chemistry teachers had very good perception criteria with a score of 3.28. Thus, it can be seen that the overall competence of chemistry teachers regarding digital literacy has very good criteria with an average score of 3. Teachers as the main key to the success of using technology in schools in the future must be able to build digital literacy.*

**Keywords:** digital literacy, chemistry teacher, high school, Jakarta

## 1. Introduction

One of the Indonesian government programs in improving the quality of education in Indonesia is by promoting literacy programs. This movement is carried out by reading non-lesson books for 15 minutes before the lesson begins. Over time, various forms of literacy have emerged, one of which is digital literacy. According to Gilster [1] digital literacy is the ability to understand and use information in various forms and a wide variety of sources accessed via computer devices.

Leu et al [2] describe that the new literacies of the Internet and other ICTs include the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies and contexts that continuously emerge in our world and influence all areas of our personal and professional lives. These new literacies allow us to use the Internet and other ICTs to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others.

Gilster [1] states that a person is said to have digital literacy skills if they have the ability to: (i) internet searching, (ii) hypertextual navigation, (iii) content evaluation and (iv) knowledge assembly. Hobbs (2010) maps 5 competencies in Digital literacy is: (i) Access, (ii) Analyze & evaluate, (iii) Create content, (iv) Reflection, and (v) Act. Meanwhile, Douglas () in his thesis What is 'Digital Literacy'? said that there are eight components of digital literacy, namely: (i) cultural, (ii) cognitive, (iii) constructive, (iv) communicative, (v) evaluation, (vi) creative, (vii) critical and (viii) socially responsible

The rapid development of technology requires teachers to: (i) use digital media in the teaching and learning process in accordance with applicable norms, (ii) follow the

development of innovation in digital-based learning [4] and (iii) have the ability to combine the ability to use technology effectively with learning in schools [5]. If teachers succeed in making digital-based learning innovations in schools, they will succeed in utilizing or optimizing them with technological advances that are currently developing.

Based on a survey from Sumintono et al [6], it shows that technology, information and communication have not yet been prevalent in Indonesia. This is shown by schools in urban areas that use information and communication technology in the learning process, while in schools in rural areas there are still schools that do not use information and communication technology.

Alexandra [7] found students to hold at least three conceptions of how digital literacy may develop. These were conceptions reflecting digital natives, skill-based, and sociocultural approaches to digital literacy development. In this study consisted of preservice teachers, their holding beliefs reflective of a digital natives perspective. Skill-based conceptions of digital literacy development seemed predominant among students' responses. As conceptualized in Ng's [8] framework, students attend to technological aspects of digital literacy development, much more frequently than they do to cognitive or critical aspects of digital literacy. Indeed, a minority of students specifically identified mastering skills like corroborating sources or determining website credibility as key components of digital literacy. Moreover, socio-emotional aspects of digital literacy development, in particular, seemed to be almost entirely missing from students' responses, these included the skills necessary for communication, collaboration, privacy maintenance, and identify formation online.

Erhan and Eralp [9] study constructs a science teaching belief system to examine pre-service science teachers' scientific epistemological beliefs (SEBs) and conceptions of teaching and learning (COTL). Result pre-service teachers'

COTL contribute more positively to their digital literacy skills if they hold constructivist COTL. For this reason, we suggest that future teachers holding constructivist COTL will make use of digital tools in their classes in a more effective manner and will be able to adapt to future developments in ICT. Judit and Jesus [10] assessed 483 pre-service teachers' perceptions of the different competence dimensions of digital literacy and of psychological and educational measures. The result study indicates that pre-service teachers' perceptions of the use of Web 2.0 tools are positive and that they have satisfactory training in digital literacy competencies and psychological and educational measures such as learning strategies, motivation and thinking styles. Ilknur and Ayça [11] found that digital competence trainings improved pre-service teachers' skills of searching for information on the web, gained knowledge and skills about "Digital identity management. This study concluded that pre-service teachers developed their knowledge and skills in getting digital content from various sources, planning the searching process, using specific searching strategies, storing information in digital environments, realizing information may not be reliable, being careful about website extensions and making sure websites are certified.

Gonca et al [12] study to investigate multimodal literacy levels of 383 pre-service English language teachers at Gazi University, Turkey. The multimodal literacy of prospective teachers are assessed through the Multimodal Literacy Scale and the scores are evaluated in terms of gender, grade, and other background features such as internet use and parents' education level. It was identified that pre-service teachers are planning to put the knowledge they obtained into practice in "Creating and modifying digital resources", "Selecting digital resources" and "Managing, protecting and sharing digital resources" sub-competences categorized under "Digital resources" competence area. It was determined that digital competence training for pre-service teachers should be given in a way to include developing digital content that is appropriate to the goals, evaluating the effectiveness, validity and reliability of digital resources, developing content that is appropriate to intellectual property rights. In this study to measure the digital literacy level of chemistry teachers and English teachers in Indonesian high schools, researchers adopted the DIGCOMP framework adopted from Abdulteef and Khateeb [13].

### 1.1 Digital Competence

In the 21st century, online information is widely available, human life is becoming more connected to the internet and highly dependent on digital technology. Therefore, it is important for teachers to acquire knowledge and skills to utilize digital technology in developing learning media, communicating, collaborating and creating knowledge [14]. Digital literacy is defined as a set of knowledge, skills, attitudes, strategies needed when using digital media to perform tasks, solve problems, communicate, manage information, collaborate, create and share content, and build knowledge in an effective and efficient way, for learning, work, entertainment, socialization, or empowerment [15].

Digital literacy is the newest concept that describes technology-related skills.

Digital literacy is supported by basic skills in ICT, namely the use of computers to retrieve, assess, store, produce, present and exchange information, as well as to communicate and participate in collaborative networks via the internet. Here it is indicated that digital competence is supported by digital literacy [16]. The figure below shows various disciplinary backgrounds and concepts related to digital competence [17]. The DigComp 2.0: The Digital Competence Framework for Citizens classifies five dimensions of digital competence that can be applied in learning [15a], among others:

- 1) Information : Identify, locate, retrieve, store, organize and analyze digital information, assessing its relevance and purpose.
- 2) Communication :Communicating in a digital environment, sharing resources through online, collaborating and interacting which makes it possible to participate in cross-cultural networking and patience communities.
- 3) *Content-creation* : Create and edit new content (from word processing to images and videos), integrate prior knowledge into content, generate creative expression, output, and media and programming, handle and apply intellectual property rights and licenses.
- 4) Safety: Personal protection, data protection, digital identity protection, security measures, safe, and sustainable use.
- 5) Problem-solving: Identifying digital needs and resources, making the right decisions on digital tools that are in accordance with the goals and needs of solving conceptual problems through digital means, creatively using technology, controlling technical problems when using digital technology.

### 1.2 Learning through Web Nearpod

Currently, people use the internet or the "web" (World Wide Web) as a source of information. In the world of education, the web is increasingly being used both as a learning tool to support formal programs and as a means of delivering online learning programs. Web-based learning is often also called online learning or e-learning because it contains online course content. E-Learning is defined as an internet-based learning process or web-based learning that utilizes web-based communication, collaboration, multimedia, knowledge transfer, and training to support active learning of students without time and space constraints [18] (Wang & Wang, 2009). In this definition, active learning is a learning method that involves students in the learning process by requiring students to carry out meaningful learning activities [19] (Motaghian et al., 2013).

The advantages and disadvantages of web-based learning according to McKimm et al [20]. (2003), the advantages include: (1) the Web can link material sources in various formats; (2) Can be an efficient way of delivering subject matter; (3) The source material can be accessed from any location and at any time; (4) Can encourage students to learn more independently and actively; and (5) Can provide

additional sources of useful material for conventional programs, while the disadvantages of web-based learning include: (i) Participants feel frustrated if they cannot access graphics, pictures, and video clips due to poor equipment; (ii) The necessary infrastructure must be available and affordable; and (iii) the delivery of information may vary in quality and accuracy required guidance by instructors/teachers.

One of the web-based interactive learning media products is Nearpod. Nearpod is a web-based learning application that facilitates and controls interactivity during setting up learning experiences [21]. The results of research by Mattar [22], show that one of the main advantages of using Nearpod is that it supports active learning in the classroom because Nearpod offers various types of ways to engage students in the classroom. Thus, Nearpod is seen as one of the learning webs that will increase interactivity and collaboration in the classroom [23]. Through the Nearpod web, students will have the ability to participate in learning through virtual learning, 3D objects, PhET simulations, and others. The interactive features of the Nearpod web include quizzes, collaborative boards, open-ended questions, and more. To be able to use the Nearpod web, you must register first, namely if you are a teacher using a Gmail account, then you can log in by entering your username and password. Furthermore, on the library tab, a learning design is made with available features; later Nearpod can be accessed by students using a laptop or smartphone via a code or link provided by the teacher.

There are advantages and disadvantages of learning with the Nearpod web according to Kholishoh [24], the advantages are (i) Nearpod is a learning web that attracts attention and curiosity about the presentation of material features, so that it can increase students' interest in learning; (ii) In direct learning, being able to minimize the use of LCD projectors because students can view the material content using their laptops or smartphones; (iii) Learning with Nearpod is a form of application of teaching technology, with the use of technology it is hoped that there will be an increase in the quality of teaching and learning, increase in productivity, and the effectiveness of teaching and learning activities; (iv) Through the Nearpod web, it can be seen which students are taking or not attending classes; and (v) The results of student activities can be downloaded through a report per session on the Nearpod web. The shortcomings of learning with the Nearpod web: (i) It really requires an internet connection for online activities so that learning runs optimally; (ii) Paid application to add features. After standard use, other development features are not obtained for free; (iii) The storage space is limited so it must pay attention to the size of the file created; and (iv) the number of users is limited.

## 2. Method

This study was aimed at describing the level of digital literacy of teachers by using the diagnostic test instrument. In this study, using a qualitative approach with descriptive research type, through interviews, observation and survey methods, using structured or systematic questions.

### 2.1 Participant

The population in this study were chemistry teacher in High School, Jakarta with the total number were 87 teachers. Whereas, the samples chosen using multistage random sampling technique were chemistry teacher public high school in Jakarta. All participants had advanced computer skills; they all used computers in everyday life for word processing, E-mail communication, and Internet surfing. All had some experience in working with databases and preparing computer presentations using PowerPoint.

### 2.2 Data collection instrument

Chemistry teacher digital literacy is measured using instruments from DIGCOMP which was later adopted from Abdulteef and Khateeb [13] which includes several dimensions, namely: (i) Information dimensions (ii) Communication dimensions, (iii) Content creation dimensions (iv) Security dimensions (v) Problem solving dimensions Calculation The digital literacy score data in this study uses a Likert scale, where each statement has a choice of strongly agree, agree, disagree and strongly disagree.

So that the ideal score that is determined to determine the digital literacy is included in the very good, good category. In addition, data is also obtained by conducting field observations, interviews with teachers and students, studying documents and archives in the research location. Related to the implementation of learning chemistry. Data validity testing was carried out by extending observations, increasing persistence and triangulation.

### 2.3 Procedure

Participant data that are willing to take part in this activity are equipped with a cellphone number and email address and arranged in a table form. Questionnaires that are valid and reliable are sent via email or via Google form to each participant. Participants are asked to fill out the questionnaire and send it back to the researcher.

### 2.4 Data analysis

The data obtained were analyzed through several stages, namely: editing, coding, cleaning data and processing data with the SPSS 23.00 program. Data from the questionnaire results are presented in the form of tables and graphs. The answer to each question has a score and each score has a category as shown in Table 1

**Table 1: Score Scale Likert**

No	Score	Category
1	3.24-4.00	excellent
2	2.43-3.23	good
3	1.62-2.42	Not good
4	0-1.61	Very low

## 3. Result

The digital literacy skills of teachers are shown in Table 2 below

**Table 2:** Dimension digital literacy

No	Dimension	Score	Category
1	Information	3.76	excellent
2	Communication	3.28	excellent
3	Content	3.20	good
4	Safety	2.96	good
5	Problem solving	3.15	good

### 3.1 Digital Literasi Information

The competencies observed in the information dimension are accessing and searching for relevant information online; collect, filter, understand, and store information and content for easy retrieval [15a]. There are two indicators used in the information dimension, namely exploring acid-base material from various online sources.

For the information dimension the score obtained is 3.76, indicating the ability of teachers to search for information using Google, Bing, Yahoo, collect information from the internet as needed, compare information obtained from various sources, store information in various formats, open links connected to another application via web Schoology and know that not all information on the internet can be trusted. The results of this questionnaire are reinforced by the results of interviews. The following are the statements of the teachers at the time of the interview:

*"I can easily find information on teaching materials on google"*

*"I know that information from the internet does not guarantee it is 100% correct. Because of I am also looking for references from books",*

*"I usually search for material on google first, then just select the material you want to download in what format (usually word or ppt), if you want to search for videos via youtube"*

*"I can store and retrieve various information using a screenshot system, screen recorder or automatic data storage, but because I use web schoology for me, I rarely use this system because web schoology does not eliminate previous learning materials, so I can access it anytime"*

*"I can retrieve and save information about chemistry on the schoology web, because the method is not too complicated, so our task is to save it or download the video in the form of a video."*

### 3.2 Dimensions of Communication

In this communication dimension, there are two competencies that must be achieved including interacting through technology and Netiquette (having knowledge of norms and behavior in interacting online). There are indicators used in this communication dimension, namely discussing and sharing information on acid-base material using web nearpod; and have knowledge about norms and behavior when interacting through web nearpod. The score of the teacher's digital competence is 3.28 which shows that

by discussing through the web nearpod, teachers can discuss, share information, can write and send messages to friends, as well as teachers in discussion forums, using language that is easy to understand and polite, both in writing and in writing. The intonation of voice if via telephone or video call with friends is very good. Here are the results of interviews with teachers regarding the dimensions of communication

*"On web schoology there is a feature for discussion, which is to be able to see the opinions of other friends and we ourselves can share their opinions"*

*"Easy to discuss, and because it is anonymous"*

*"It's hard for me to discuss on web schoology because I don't know what I want to say".*

*"Sharing messages between teachers and other teachers can be done in the format of writing, pictures and voice messages"*

*]*

*"I can post articles, pictures and opinions in discussion forums".*

*"Interact online using polite language, pay attention to the time when you want to interact, don't be too late or too early"*

*"The etiquette of interacting with teachers online, for example, saying hello first 'assalamualaikum, good morning/afternoon/evening', then apologizing for disturbing the time, then going to the topic you want to ask/talk about, lastly saying 'thank you'"*

### 3.3 Dimensions of content creation

The dimensions of content creation contained in the instrument have two competencies, namely regarding the results of digital content and concern for copyright and licensing in creating digital content. The results of the study show that teachers are able to create digital content for acid-base materials, and respect copyrights and licenses of other people's work. Able to create content in video format uploaded via web nearpod as an assignment, able to upload assignments in various formats into web nearpod and create content in the form of an assignment by including the reference source. The results of interviews with teachers show that

*"Usually I edit a lot of videos, only I use what's on my cellphone, which is from the default on the cellphone, it can be edited like that."*

*"For video editing, I use the Kinemaster and Inshoot applications."*

*"With the assignment to make the video, we can experiment on our own and can learn and immediately get the proof so that we can easily understand which natural indicators can produce."*

*"With the assignment to make the video, we can experiment on our own and can learn and immediately get the proof so that we can easily understand which natural indicators can produce."*

*"Students are able to upload image content via the Nearpod web, but video content created by students is uploaded via Google Classroom."*

*"In the process of making the video I used a cellphone camera which I videoed myself using a tripod, then I also edited it in the CapCut application which I downloaded from the Playstore."*

### 3.4 Dimensions of Security (Safety)

The security dimension used in this instrument has the competence to secure the school page and protect personal data. The results showed that the teacher knew that web schoology did not contain elements of ERRIP (Ethnicity, Religion, Race, Intergroup, Pornography, and Politics), web schoology was free from advertisements. Teacher know that usernames and passwords can be misused so that the teachers, do not give them to others. The following are the results of interviews with teachers regarding the dimensions of security

*"I know the importance of the passcode to access the schoology web"*

*"How to protect personal data, of course I will change my password often, so I will change my password from time to time with a more difficult and safer password so that I can reduce the threat of misuse of your account"*

*"Without the passcode the user cannot enter and access the Nearpod web."*

### 3.4 Dimensions of Problem-solving

The problem-solving dimension in this instrument has three competencies and three indicators. The three competencies include the ability to overcome possible technical problems, innovate and be creative using technology, as well as identify gaps in digital schoology competencies, and identify the ability to use digital. The result of the teacher's digital competence score in the problem-solving dimension is 3.20. The following are the results of interviews with teachers regarding the dimensions of problem solving

*"At the very least, the loading takes a bit longer if for example to another website or a link from a PDF, so the solution must be refreshed."*

*"Sometimes when writing answers on the collaborated board feature, it is accidentally submitted, and I also don't know how to delete it if for example we send the wrong answer or delete the answer if it's double."*

*"Sometimes when writing answers in the collaborate feature board"*

*"I accidentally submitted it, and I also don't know how to delete it if for example we send the wrong answer or delete the answer if it's double."*

*"Teachers are able to overcome technical problems that occur when accessing the schoology web, such as not being able to open the next slide for learning on the schoology web"*

*"Teachers know the features contained in web schoology to solve problems"*

*"Teachers are able to adapt to new technologies"*

*"Teachers are aware that they need to update their digital skills to help with learning activities"*

## 4. Conclusion

Based on the research data, it shows that the competence and digital literacy of high school teachers at Jakarta Senior High Schools are at a good level. To improve competence and digital literacy, there is a need for high school teachers to hold training. The existence of strategic plans and school policies to encourage creativity, teacher innovation. There should also be serious efforts made to bridge what is known as the digital divide for teachers, so that the competence and digital literacy of teachers are at the same level.

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