**Berkala Ilmiah Pendidikan Fisika**
ISSN : 2337-604X (print)
ISSN : 2549-2764 (online)

Vol 9 No 1 2021
https://ppjp.ulm.ac.id/journal/index.php/bipf
page 16-27

# Digital Literacy Overview: Challenges in Online Physics Learning at New Normal Era

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**DOI:10.20527/bipf.v9i1.9367**

**Received : 19 October 2020 Accepted : 1 February 2021 Published : 28 February 2021**

## Abstract

This study aimed to determine the extent of the digital literacy contribution to physics learning carried out by students at a university in Jayapura city in Physics Education Study Program at new normal era. The descriptive research approach was used in this study. This study's population were all students of the Physics Education Study Program divided into 4 groups totaling 96 people. Based on the sampling process from 4 existing groups, purposive sampling was carried out so that the selected ones were students from academic year 2017 with a sample size of 18 people. This research was conducted at a university in Jayapura city in Physics Education Study Program, in September 2020. In this study, data collection techniques were used in the form of a closed questionnaire (structured questionnaire) and interviews to carry data triangulation. The results showed that every aspect of digital literacy has a variation in scores and different interpretations. The three aspects are Use Skill (medium), Critical Understanding (medium), and Communicative Abilities (basic). Students have not been able to communicate and participate actively in online learning during physics classroom because they were only at the stage of uploading content. It concluded that online learning deserves of particular attention when it lasts for the long term. The efforts to elevate the process is urgently needed.

**Keywords:** Digital literacy; New normal era; Online learning, Physics



**How to cite:** Manalu, A. N., Wanda, Y. A., Worumboy, H. V. N., & Budiarti, I. S. (2021). Digital literacy overview: challenges in online physics learning at new normal era. *Berkala Ilmiah Pendidikan Fisika*, *9*(1), 16-27.

## INTRODUCTION

Early in 2020, Coronavirus Disease (Covid-19) was spread in Indonesia which hampered all forms of activity, one of which was in the field of education (Fitriyani et al., 2020). This resulted in the learning process being required to study at home, namely in the form of online learning. According to Mustofa et al., (2019) online learning is a distance education system that uses a set of teaching methods, namely that there are teaching activities that are held separately from learning activities (Fajrillah et al., 2020). Online learning is carried out through the internet and web 2.0 networks, which means that the implementation of online learning involves elements of technology as a means and internet networks as a system

(Pastor-Satorras & Vespignani, 2007). Thus, online learning is a learning process that can be done using internet networks and digital devices so that without having to meet face to face, learning can be carried out (Fitriyani et al., 2020)

According to Bilfaqih & Qomarudin (2015) dan Kuntarto (2017), the purpose of online learning or distance learning is to provide quality learning services that are massive and open to reaching students or students more widely. Another opinion also states that online learning aims to provide educational services widely so that it can provide certainty for getting good quality education services (Atiqoh, 2020). Therefore, it can be concluded that the core objective of online learning is to facilitate learning services even if done remotely.

As a result of this Covid-19 pandemic, the Ministry of Education and Culture of the Government stated that universities were not allowed to carry out face-to-face (conventional) learning and ordered to carry out online learning (Budiarti & Usman, 2015; Sadikin & Hamidah, 2020). Based on this, Indonesia is implementing a new order to adapt to Covid-19, including a new order in the field of education to adapt the perimeters. The new order in the field of education makes educators and students adaptable in the learning to be applied.

These problems must be resolved immediately, the new order that has been implemented must be implemented properly. One of the important things in the world of education today is that it must be technology literate (Atzori et al., 2018; Budiardi & Anggraeni, 2013; Zhafira et al., 2020). Therefore, educators and students must understand digital literacy because the learning process is carried out using digital media. Gilster & Glister (1997) first introduced the term digital literacy, which means the ability to use technology and process information from digital devices effectively and efficiently in the context of academics, careers, and everyday life. So it can be said that technology can make it easier for humans to obtain and process information. According to Setyaningsih et al., (2019), digital literacy is the interest, attitude and ability of individuals to use digital technology and communication tools to access, manage, integrate, analyze and evaluate information, build new knowledge, create and communicate with others in order to be able to participate effectively in society. This makes digital literacy something that must be included in the competence of students in learning in the pandemic era. Moreover, education still has to meet the demands of the 21st century era (Buckingham, 2010; Eshet, 2004; Setyaningsih, 2017).

Based on research conducted by the University of Illinois Urbana Campaign related to digital literacy, the conclusion of centralized research is the ability (expected skills) to be owned by individuals in order to use a variety of digital technologies, to perform communication equipment and computer networks (hardware and software), to understand and use information (which come from various sources) into a file format to then be presented, displayed, or represented via computers and other computer devices, and to create the personal ability to do all work effectively (in a computer-based digital environment and other technologies). It includes the abilities to produce data, process data into information, obtain knowledge from the technology used, and participate actively in the process of developing the latest technology due to the global challenges (Crenshaw et al., 2008; Eshet, 2004; Nagy & Anderson, 1995).

The ability to use digital media, communication tools or internet

networks to find, use, evaluate, create, process information and utilize it wisely is also called digital literacy (Sadikin et al., 2019; Sari et al., 2020). Based on several opinions about digital literacy, it can be concluded that digital literacy, also known as technological literacy, is the ability to find and process information using electronic devices connected to the internet network.

Pilot study has not examined the contribution of digital literacy to distance learning carried out at the university level by students. This study discussed the contribution of digital literacy to students at a university in Jayapura city in Physics Education Study Program. Papua province has mountainous geographical conditions, where internet networks are a major problem in the use of online learning today (Kartikasari et al., 2012). The current pandemic period requires students to have Android Operating System-based cellular phones and even laptops / computers with internet connection. This described course requires a lot of money, even to operate it in online learning requires money to buy a data package, while the average parent is also experiencing economic difficulties during this pandemic (Zhafira et al., 2020).

Based on the background of the problems that have been stated, the researchers conducted a study to analyze the contribution of digital literacy to online physics learning at new normal era. The advantage of this research is that it can be one of the considerations for developing digital literacy mastery in learning physics at new normal era. The research to examine as main core in writing this paper is: "How does digital literacy contribute to physics learning carried out by students of the physics education study program in the new normal era?". Based on the formulation of the problem above, the purpose of this study was to determine the extent of the contribution of digital literacy to online physics learning carried out by students at a university in Jayapura city in Physics Education Study Program. The research results are expected to be a reflection toward online learning in eastern Indonesia during Covid-19.

## METHOD

The type of research used in this research was descriptive research. Descriptive qualitative research was chosen as a way to describe data based on the ongoing research process (Rukajat, 2018). The purpose of research using this method was to systematically describe the facts and characteristics of the research object accurately and without subjective assessment intervention. The approach used was chosen because researcher intended to find the students' obstacles in physics learning during new normal through questionnaires as research instrument (Soendari, 2012).

The students of pre-service teacher program in at a university in Jayapura city in Physics Education Study Program take the educational and physics courses. Students in the university have proper access to the internet resource but the coverage is still low so that they often face difficulty to join online learning. Students are taught with blended learning during the pandemic era and required to have internet access and gadget to support the learning process.

The population in this study were all students at a university in Jayapura city in Physics Education Study Program divided into 4 groups based on four level of pre-service students' achievements totaling 96 people. Based on the sampling process from 4 existing groups, purposive sampling technique was chosen to carry out afterwards so that the selected ones were students from academic year 2017 with a sample size of 18 people. The sampling technique was chosen because students from

academic year 2017 were third year students and have been experiencing both direct learning, online learning, and blended learning through multiple courses at the university.

This research was conducted at a university in Jayapura city in Physics Education Study Program in September 2020. The research location selection was selected based on preliminary research that referred to digital literacy skills at a university in Jayapura city in Physics Education Study Program. Research schedule adjusts the learning schedule.

There were two kinds of data collection techniques used in the study. The first was a questionnaire. In this study, data collection techniques were used in the form of a closed questionnaire (structured questionnaire). The data collected through this questionnaire was used by researchers to find out about the responses or thoughts of students related to physics lectures that they attended through internet facilities during the Covid-19 pandemic. The second technique was the interview. Researchers collected data by interviewing students at a university in Jayapura city in Physics Education Study Program. Through this interview, researchers can find out the experiences and constraints of students regarding the lecture process carried out during the Covid-19 pandemic. The indicators of digital literacy obtained in this study were: Use Skill, Critical Understanding, and Communicative Abilities.

Data from questionnaires and interviews were analyzed based on syntaxis and triangulation method. The answers on questionnaires sheet were confirmed during interviews to find the constraints or obstacles experienced by students in physics learning during new normal.

## RESULTS AND DISCUSSION

In this study the researcher gave a set of questionnaire related to digital literacy and online learning to 11 students (females and males students) at a university in Jayapura city in Physics Education Study Program. This questionnaire contained questions about students' experiences during distance learning during the Covid-19 pandemic. Table 1 is the questionnaires results obtained in this study.

**Table 1 Questionnaires Results Based on Indicators of Online Learning Effectiveness**

| Indicator | Item | Frequency | | | |
|---|---|---|---|---|---|
| | | SA | A | QA | D |
| The appliance and implementation of digital literacy in online learning | 1. During Covid-19 pandemic, I am distracted to do online learning. | 50% | 25% | 13% | 13% |
| | 2. During Covid-19 pandemic spread, I can join the class from online learning. | 19% | 6% | 25% | 50% |
| The amount and varieties of online reading resources and learning props | 3. During online learning, the subject lecturer has provided digital learning props. | 6% | 44% | 31% | 19% |
| | 4. During online learning, the subject lecturer has not provided digital learning props. | 19% | 19% | 19% | 44% |

| Indicator | Item | Frequency | | | |
|---|---|---|---|---|---|
| | | SA | A | QA | D |
| The availability of digital or online resources | 5. I have had trouble in looking for online information. | 13% | 25% | 25% | 38% |
| | 6. I have searched for valid and reliable online resources. | 31% | 63% | 6% | 0% |
| | 7. I have filtered the information from online resources. | 44% | 50% | 6% | 0% |
| | 8. I have no difficulty in using the application of online learning. | 6% | 19% | 38% | 38% |
| | 9. The subject lecturer has provided the guidance during online learning. | 19% | 25% | 38% | 19% |
| The interface and information preserving related to online leaning in the use of digital platforms and websites | 10. My college has not been preserving information related to online learning. | 6% | 6% | 6% | 81% |

SA=Strongly Agree; A=Agree; QA=Quite Agree; D=Disagree

From the data in Table 1, we can see that 75% (50% of students answered strongly agree and 25% of students answered agree) of the 16 students felt that their lectures were disrupted due to the Covid-19 pandemic but in the implementation of distance learning only 25% of students were able to participate in distance learning well, the rest stated that they could not keep up with distance learning. The pattern of data will be reflected on the learning achievement.

In order to support lectures to run well, lecturers have actually provided digital teaching materials and props which are usually distributed via e-mail or group Whatsapp. However, as many as 50% of students did not agree that lecturers had provided teaching materials and props digitally (6% of students answered strongly agree and 44% of students answered agree). This was because they could not access what the lecturer has shared via e-mail or group WhatsApp.

Through interviews, researchers found out why students cannot participate in distance learning, among others, they did not have electronic devices that support online learning, be it a laptop nor smartphone, some said that they could not participate in online learning.

> "I could not attend the online learning because I did not own the Android-based phone as supporting device to access the internet during the distance learning." – Student A

The first problem was that student did not have supporting devices to access the online learning i.e., smart phone with Android operating system. Meanwhile, other student stated that he had Android phone without internet access to attend online learning.

> "I own Android phone, but I cannot access internet because I don't have data package." – Student B

To sum up, students could not participate in distance learning because they did not have phone supported by the internet coverage or internet data quota and there were limited costs to buy internet data quota. In addition, even though they had electronic devices that support and data quota to take part in online learning, sometimes the quality of the internet network, which could suddenly become unstable in Jayapura, became another obstacle for students when taking online learning in the physics learning.

In digital literacy, there are classifications of individual student skills and / or abilities related to digital literacy. The indicators of digital literacy obtained in this study were: Use Skill, Critical Understanding, and Communicative Abilities. The findings from this study related to the digital literacy indicators were taken from interview as a follow up of the learning constraints found during new normal. The indicators of digital literacy are explained as follows.

1) *Use Skill.* Medium level. At this level students are declared capable of using digital media, and are still in the process of adapting to the use of e-learning.
2) *Critical Understanding.* Medium level. At this level, students are able to understand the content, functions, and regulations of digital media usage and beyond, but the awareness to seek valid information is still relatively low.
3) *Communicative Abilities.* Basic level. Students have not been able to communicate and participate actively in online classroom activities during online learning because they are only at the content upload stage.

The findings in this study are supported by several previous studies related to digital literacy and online learning in the pandemic era. Sadikin & Hamidah, (2020) found that: (1) students already have the basic facilities needed to take part in online learning; (2) online learning has flexibility in its implementation and is able to encourage independent learning and motivation to be more active in learning. Meanwhile, Zhafira et al., (2020) found that 53% of the students of the Faculty of Economics, Teuku Umar University were familiar with various online learning media before online lectures began. In addition, the communication pattern that is most interested in students is the semi-bidirectional pattern. This is in accordance with the three digital literacy indicators which are also the reference point for this study based on a questionnaire distributed to respondents.

The term “online learning model” was first and originally used to describe a learning system that utilizes computer-based internet technology (Computer Based Learning or CBL) (Kuntarto, 2017). In addition, according to Fitriyani et al., (2020), (2020), online learning is an educational innovation that uses elements of information technology in learning. At this time technology is very influential in the learning process, so students are required to have digital devices to meet educational needs, so it can be said that online learning is a learning process that can be done using the internet (online) and digital devices so that without having to face-to-face, learning can be implemented (Atiqoh, 2020; Atzori et al., 2018; Budiarti & Usman, 2015). It is also often called as distance learning.

The existence of technology in the world of education is a mean that is used as a medium for learning programs both in one direction and two directions (Husaini, 2017). In addition, the opinion of Almeida & Simões (2019) stated that the use of technology has enabled the emergence of distance learning and develops innovations more broadly in

creating learning methods inside and outside the classroom. Thus, it is not only students who are required to know and understand technology, but lecturers / teachers must understand technology more deeply in order to create innovative models or learning methods that are good in distance learning. In addition, students can interact with lecturers through application tools, such as e-classrooms, video conferencing, telephone, live chat, zoom and WhatsApp groups (Muhaimin et al., 2019; Sakshi & Dhull, 2017).

Online learning has characteristics, namely: (1) utilizing electronic technology services; (2) taking advantage of computers (digital media and computer networks); (3) using self-learning materials, so that they can be accessed anytime and anywhere; (4) utilizing the learning schedule, curriculum, learning progress results, and matters related to educational administration can be viewed at any time on the computer (Mansur dkk., 2016; Rumengan et al., 2019). The advantages of online learning / digital learning make students learn independently and creatively and their motivation increases. However, there are weaknesses in online learning, namely students are not well supervised during the learning process, sometimes the internet signal is weak, and expensive quota fees become a challenge for online learning (Bilfaqih & Qomarudin, 2015; Sadikin & Hamidah, 2020; Zhafira et al., 2020).

Digital literacy, also known as computer literacy, is a skill in using computers, the internet, and other digital tools and / or digital props to enhance their insight. Digital literacy is an effort to know, to search, to understand, to analyze, and to use digital technology (Setyaningsih et al., 2019). Another opinion from Amelia & Ulumu (2019), digital literacy is part of an effort to understand how digital media has an impact on various activities related to literacy. Therefore, digital literacy is also called technological literacy, which is the ability to find and process information using electronic devices connected to the internet network (Fajrillah et al., 2020; Gilster & Glister, 1997; Oktaviani et al., 2019).

One of the digital media, which is internet, has facilitated all human work, especially in the world of education. Lecturers and students are very facilitated in the learning process by the internet, so they can find, evaluate, and analyze information for learning purposes. The level of students' digital literacy skills can be measured using the Individual Competence Framework. Individual Competence is students' ability to utilize and use media, which is divided into 2 categories, namely: students' ability to use media and analyze media content (Personal Competence); and students' ability to communicate, build social relationships, and produce media content (Social Competence) (Lutviah, 2011).

Based on research by Gilster & Glister (1997); Muhaimin et al., (2019); Mustofa et al., (2019); and Zhafira et al., (2020), the achievement of digital literacy can be measured from several aspects, including: (1) the intensity of the application and utilization of digital literacy in learning; (2) the number and variety of digital-based reading materials and props; (3) frequency of borrowing digital themed books; and (4) the number of school information presentations using digital media or web sites. This makes online learning deserving of particular attention when it lasts for the long term or long period.

Research conducted by Chusni & Hasanah (2018) found that the results showed that there was no significant influence between the ability of laboratory management to the readiness of prospective physics teachers; there is no significant influence between

scientific literacy on the readiness of prospective physics teachers; and there is no significant influence between the ability of laboratory management and scientific literacy on the readiness of prospective physics teachers. Other study related to digital literacy has been done by (Rianti et al., 2020). The study revealed that the overall results obtained were almost the same as previous studies which also developed modern physics handouts but were not packaged in digital form and not based on technology literacy.

Students' scientific literacy can be obtained during the online learning and/or the distance learning (Mukhopadhyay, 2014; Prastika et al., 2019; Rosana et al., 2020). The process of teaching and learning during covid-19 and new normal era advocates the elevated attitude toward tech-savvy in the education field (Buheji & Buheji, 2020; Openo & College, 2020). It will lead to the innovation of learning method and model. To this day, there are several research regarding on how physics teacher substitutes the laboratory with interactive simulation or virtual laboratory (Angus, 2020).

In line with the research explained, Fitriah (2019) and Prastika et al. (2019) conducted study related to literacy in science. Both studies also supported the findings in this study. The first mentioned focused on describing the effectiveness and validity and practicality of using the Basic Physics 1 textbook integrating the local wisdom and wisdom of South Kalimantan through a direct teaching model. The literacy here was obtained through the absorption of learning materials. The second study was done through data collection using scientific literacy test and scientific attitude questionnaire to analyze the effectiveness of Problem Based Learning (PBL) in improving students' scientific literacy skills and scientific attitudes.

There are several methods to improve students' digital literacy in learning science. Comic-based module is proven to be one of digital literacy enhancement based. Comic-based module andro-web can be used in teaching material XI science class and will raise the ability problem-solving physics students on the subject of an ideal gas (Annisa et al., 2020). The elaborated learning during pandemic also needs to be reflexed. Other than comic-based module, (Rif 'at et al., 2020) developed the Creative Responsibility Based Learning (CRBL) including innovative learning that maximizes the responsibility and science process skills of students in developing their scientific creativity. The empiric study has been done and it led to the finding that the application of CRBL is effective to develop the responsibilities and scientific creativity of students in learning physics. In each learning, students can participate, respect others, work together, try to lead, and express opinions well. Our findings related on digital literacy overview and how to overcome it have also been supported by (Kholiq, 2020). The study developed BDFAR2 (Physics Digital Book Based Augmented Reality) to support online physics learning. It is quite effective as the development is because the developed BDF-AR2 has features that can train the literacy skills of learners including Augmented Reality (AR) feature so that learning can be more real (Chusni & Hasanah, 2018; Kholiq, 2020).

## CONCLUSION

Based on the results and discussions that have been analyzed in this study, there are important points as conclusions that have an important role as the big picture in online learning. In the Use Skill aspect, respondents are at the medium level. At this level students are declared capable of using digital media,

and are still in the process of adapting to the use of e-learning. In the aspect of Critical Understanding, respondents are at the medium subject level. At this level, students are able to understand the content, functions, and regulations of digital media use, but the awareness to seek valid information is still low. In the aspect of Communicative Abilities, respondents are at a basic level. Students have not been able to communicate and participate actively in online because they are only at the stage of uploading content so that the learning evaluation is needed.

To support lectures so that all related academic levels are expected to collaborate to optimize the procurement and utilization of infrastructure so that online learning in the Covid-19 pandemic era can run properly. It is also necessary so that the competence of learning objectives can be achieved well even though without a face-to-face (conventional) classroom process. Research that focuses on the achievement of competencies that must be achieved from online learning must be carried out to review the effectiveness of learning via the internet.

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