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 57-71

Need Assessment of Physics Learning Evaluation Course on COVID-19 Pandemic Era in Bloom's Taxonomy Topic

Mukhayyarotin Niswati Rodliyatul Jauhariyah[1*], Wasis[1], Titin Sunarti[1], Woro Setyarsih[1], Abu Zainuddin[1], and Samsul Hidayat[2]
[1]Physics Education Study Program, Universitas Negeri Surabaya, Indonesia
[2]Physics Department of Graduate Program, Sebelas Maret University, Indonesia
mukhayyarotinjauhariyah@unesa.ac.id

DOI:10.20527/bipf.v9i1.9874

Received : 4 January 2021 Accepted : 26 February 2021 Published : 28 February 2021

Abstract

Needs assessment aims to understand the requirements of learning in the COVID-19 pandemic era, the use of online learning platforms, the constraints and solutions offered, the "Merdeka Belajar" curriculum in this course, the challenges and needs in the future. It is an exploratory study for students need on the new learning condition because of the COVID-19 pandemic era. The data gathered from the questionnaire of some lectures and undergraduate programme of physics education students through an online survey also included observation and analysis from various sources. The results show the following facts. It needs online learning with a user-friendly device for students. There are multiple online education platforms based on learning activities, but some students have constraints on internet network stability. Another problem is the need for internet data packages that are not small in the online learning process, especially when using virtual face-to-face platforms. On the other hand, there was a reduction in the semester credit system's weight for the physics learning evaluation course in the "Merdeka Belajar" curriculum. The content of Bloom's taxonomy is quite dense and takes time to understand each level of thinking. So, the future challenge is to develop a learning media that students can use in studying Bloom's taxonomy topic and solve the problem of internet data packages and internet network stability. One alternative solution to learning problems is using learning media in electronic books that students can use offline.

Keywords: Bloom's Taxonomy Topic; COVID-19 Pandemic Era; Learning Media; "Merdeka Belajar" Curriculum; Need Assessment

© 2021 Berkala Ilmiah Pendidikan Fisika

How to cite: Jauhariyah, M. N. R., Wasis, W., Sunarti, T., Setyarsih, W., Zainuddin A., & Hidayat, S. (2021). Need Assessment of Physics Learning Evaluation Course on COVID-19 Pandemic Era in Bloom's Taxonomy Topic. *Berkala Ilmiah Pendidikan Fisika*, *9*(1), 57-71.

INTRODUCTION

The world is facing a pandemic situation due to the coronavirus's rapid spread on an extensive scale. Therefore, this period referred to as the COVID-19 pandemic period (coronavirus disease, which first appeared in Wuhan at the end of 2019) (Remuzzi & Remuzzi, 2020). The existence of the COVID-19 pandemic has an impact on all areas of life, including education. The government made various efforts to prevent coronavirus's rapid spread through social distancing and physical

This is an open access article under the CC-BY-NC-ND license

distancing. It has led governments in multiple countries to adopt policies towards implementing learning at all levels apart from economic systems or other fields. It causes the government and educational institutions to present an alternative learning process and educational administration activities while adhering to health protocols through social and physical distancing. The Minister of Education and Culture of the Republic Indonesia (RI) stipulates the Work From Home (WFH) policy for employees and Study From Home (SFH) for students in the Ministry of Education Republic of Indonesia. It conveyed through the mass media through official letters followed by derivatives circular by all institutions within the MOEC. Its policy is in line with studies in handling the COVID-19 pandemic in which the family is the centre of care during the pandemic era (Hart, Turnbull, Oppenheim, & Courtright, 2020). However, it does not mean that all activities within the MOEC have stopped completely. SFH activities carried out through online learning. WFH also carried out online.

The terms SFH and WFH are not new. These terms have existed for many years, then sticking out again during the COVID-19 pandemic. SFH is an activity for students to study at home with teachers and parents' supervision during the COVID-19 pandemic. Brook, professor of education, has researched" The Value of Home Study under Parental Supervision" in 1916. He found that primary school children who study at home under parental supervision or experience dual instruction from teachers and parents have learning progress better than students who received only a single instruction (Brooks, 1916). Educational institutions applied the SFH pattern by carrying out education during the COVID-19 pandemic. Students carry out learning activities with teachers/lecturers' supervision and their families at home to learn optimally. Communication carried out online considering that during the COVID-19 pandemic and also implemented a physical distancing. Christoper Musello, in 1980 has studied visual communication in the field of photography with a view at home, which shows that home fashion photography is a communicative activity that understood as a communication resource that integrated with ongoing social interactions (Musello, 1980). It strengthens that SFH activities can be carried out properly through visual communication using various platforms that have been available in this era of industrial revolution 4.0.

To support breaking the chain of COVID-19, a public university in the city of Surabaya as a higher education institution has implemented online learning since March 16, 2020, using various platforms. Online learning that decided suddenly made lecturers and students carry out online learning according to a mutual agreement using multiple platforms. Such as WhatsApp Group, Google Classroom, Google Meet, Zoom Clouds Meeting, Cisco Webex, or other media can support lectures for the even semester 209/2020. It is undeniable that technology contributes to many solutions in various fields, including the sudden COVID-19 pandemic, which has to carry out physical distancing and social distancing (Keswani, Sethi, Repici, Messman, & Chiu, 2020). Internet with all the easy access to information can be a complete library in the world or even the most pleasant classroom, which is so flexible (Munir, 2009; Saifuddin, 2017). However, it happens if everyone involved in the learning ecosystem is literate and understands how to use technology. The COVID-19 pandemic has served as a significant catalyst to expand educational opportunities specifically related to knowledge

sharing through web-based technology (Stambough et al., 2020).

Implementing the physical distancing policy then becomes the basis for implementing learning from home and closing schools (Gugus Tugas Percepatan Penanganan COVID-19, 2020). Students at primary and secondary education at higher education also complained about the online learning process during the COVID-19 pandemic. Apart from several petitions that emerged from students in the public university in Surabaya, data from the UNNES Students Bulletin (one of the media from a public university in Semarang) showed that most students complained about many assignments given online (Editorial Express, 2020). Its condition became material for evaluation in online learning during the COVID-19 pandemic.

Besides the new learning situation in the COVID-19 pandemic era, the learning evaluation course has new provisions in the new curriculum called "Merdeka Belajar". This course name is "assessment of learning processes and outcomes", with a three-semester credit unit (CU) in the last curriculum. In the new curriculum of "Merdeka Belajar" that implement in the first academic of odd semester 2020/2021, the course name change becomes "learning evaluation" with a two-semester credit unit (CU). It is also the new condition with a new credit unit and the same content course materials.

Learning evaluation course is one of the compulsory course in UPPE. This course studied the measurement, assessment, and evaluation and learning paradigm. It also examines assessment for the domain of knowledge (Bloom's Taxonomy), attitudes (Krathwohl's Taxonomy), and skills. Besides, lectures on this subject provide insight into the development of 21st-century learning assessment. This course is a prerequisite course, such as innovative learning, learning materials development, microteaching, etc. 3rd-semester students at UPPE must take this course before taking advanced courses related to physics learning (UPPE Unesa, 2020).

This course has two fundamental problems: the new learning condition and the new curriculum used with less CU. A learning resource accessible to students during the SFH period is needed to help students hone their thinking processes. Internet access is a significant concern in implementing online learning during the SFH period besides the learning material.

Some researchers and practitioners develop learning media to conduct distance learning that hones their thinking skills. Relevant research has developed e-modules based on multi-representations in Solid-States Physics Introductory subject (Nisa, Ismet, & Andriani, 2020). The implementation of its development can improve students' thinking skills because they can explain their reasoning very well when interpreting visual representation (Jauhariyah & Wasis, 2018). Relevant research also develops an interactive e-module based on H-Guided Inquiry to optimize the ICT skills and learning achievements (Utami, Jufriadi, & Ayu, 2020). It learning model choice can hone and shaping students into lifelong learners. Relevant research also establishes a web-based physics instrument on works and energy materials in the Islamic senior high school to assess distance learning (Rohim, Wahyuni, & Susilo, 2020).

The development described before used the personal computer (PC) in the learning or assessment implementation. It needs enough quota and network stability to access the learning media. On the other hand, students use Android-based phones more in the learning process than PC in this COVID-19 pandemic outbreak. The

thing to consider is none other than the use of internet data quota. When using an Android-based cellphone, the internet data quota required is less than when using the PC. Several studies have shown that learning using an Android-based electronic-book (E-Book) is effectively implemented (Putrawansyah, Zulkardi, & Sardianto, 2016).

In the Learning Evaluation course, several materials need to convey Bloom's Taxonomy and the application in preparing physics test items. Bloom's Taxonomy material has many characteristics and requires more understanding. Blooms' Taxonomy application in the practice of test items is needed before students learn the skills to compile useful test items. Therefore, a learning resource that is easily accessible and representative needs and applying the thinking level based on Bloom's taxonomy makes it easier for students to understand the material.

This research aims to explore the students learning situation in the COVID-19 pandemic era. Based on the exploratory analysis, we can create and develop the learning media appropriate for distance learning.

METHOD

This research is an exploratory study for the new situation of learning during the COVID-19 pandemic era. The undergraduate programme of physics education students (UPPES) needs to be explored by the online survey. The researcher conducted an online survey using a need assessment questionnaire (see Table 1 for the lecturer questionnaire and Table 2 for the students' questionnaire).

Table 1 Lecturer Questionnaire for the Need Assessment

No.	Questions
1.	Based on your experience during online learning during the covid-19 pandemic, even semester 2019/2020, how do students react to the online learning process?
2.	How are the student learning outcomes after online learning that you have implemented?
3.	What online platforms do you often use in online learning? Why did you choose this platform?
4.	How do students perceive you when you use your chosen online learning platform?
5.	According to Mr / Ms, what obstacles occur during the online learning process with students spread across several regions?
6.	Information from the mass media states that online learning's main obstacle is the limitations of the internet network or the limits of internet data packages owned by students (students or university students). In your opinion, what are the alternative solutions to overcome these problems?
7.	To solve network problems and internet data packages, our team took the initiative to develop student learning resources presented in .apk form in the form of an Android e-book for the topic of Bloom's Taxonomy. What do you think?
8.	Please advise and comment on the development of an Android e-book on the topic of Bloom's Taxonomy.

Table 2 Students Questionnaire for the Need Assessment

Kind	Questions	Answer Choices
Survey	I have programmed the Learning Process and Outcome Assessment Course.	a. Ever b. Has never been
Statement	While doing online lectures, I enjoyed every process and was able to carry it out	c. Strongly Agree d. Agree

Kind	Questions	Answer Choices
	smoothly.	e. Disagree f. Strongly Disagree
Statement	While doing online lectures, I encountered several problems.	a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree
Survey	The obstacles in conducting online lectures that I experienced were:	a. HP/Laptop lack support often hangs. b. Wasteful internet quota. c. Unstable internet network. d. Others
Survey	In implementing lectures for the even semester 2019/2020 during the Covid-19 pandemic, the platform I often use is	e. Vi-learning Unesa f. Google Classroom g. Google Meet h. Zoom Meeting i. WhatsApp Group j. Facebook Group k. Webex l. Microsoft 365 m. Edmodo n. Moodle o. Others
Statement	Although the Android e-book used offline, it needs stimulation before the content presented.	a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree
Statement	The presentation of the bloom taxonomy material in the Android e-book needs to be given examples in the context of physics.	a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree
Statement	It is necessary to study the bloom taxonomy content accompanied by standard physics questions and follow each level of thinking.	a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree
Statement	Although learning resources can use offline after downloading the application (based on Android), student activities need to hone skills in understanding bloom taxonomy and its application in physics problems.	a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree
Statement	It is necessary to provide interactive exercises for Android e-book users to evaluate themselves after learning the content presented in the Android e-book.	a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

During the COVID-19 pandemic, the method used to obtain data was by distributing questionnaire (open questions and consolidated statements) links to all UPPES classes (through WhatsApp Group) of a public university in Surabaya. However, not all students are pleased to fill out the questionnaire.

From the results of a survey conducted on UPPES at one of a public university in Surabaya, it obtained that 68 students were respondents. Meanwhile, from the lecturers, information collected regarding lecturers' opinions in the learning evaluation course at the Faculty of Mathematics and Natural Sciences (FMNS) in a public university in Surabaya and several physics education lecturers from outside Surabaya is pleased to fill in the distributed questionnaire link. Based on the distribution of links, there are eleventh (11) lecturers who are happy to fill in the distribution of 3 lecturers from outside Surabaya and eight lecturers from FMNS of a public university in Surabaya.

The exploration of the information about the new learning condition and the problems used the need assessment questionnaire. The researchers developed the need assessment questionnaire based on the latest learning condition in the COVID-19 pandemic era. All of the questions and statements in the need assessment questionnaire were validated by two expert validators on the content and construct. The expert judgment validation result shows that the questionnaire is very valid (the average score is 3.8 from 4 scales) and feasible for the need assessment. There is a close and open questionnaire in the need assessment. The close questionnaire also analyses the reliability and validity using the correlation of product-moment assisted by SPSS 16.0.

Based on the correlation analysis of product-moment for validity and reliability, we got the data in Table 3 and Table 4. If the Cronbach's Alpha of each item > r_{table}, the questionnaire item is valid (Sugiyono, 2012). If the Cronbach's Alpha > 0.6, the questionnaire is reliable (Arifin, 2017).

Table 3. The Validity Analysis Result

Statement	Cronbach's Alpha	Validity
Online learning fluently	0.782	Valid
There are problems in online learning	0.784	Valid
Course materials	0.746	Valid
Need stimulation	0.678	Valid
Need a content study	0.674	Valid
Need worksheet	0.677	Valid
Need evaluation	0.666	Valid

Table 3 shows the Cronbach's Alpha scores for each item of the need assessment questionnaire's consolidated statement. If N=68, the r_{table} is 0.244 as the baseline to judge the validity of the questionnaire item. Based on Table 1, all of the accounts show the Cronbach's Alpha bigger than 0.244. It means that all of the item stated in the need assessment questionnaire developed by the researchers is valid.

Table 4 The reliability Analysis Result

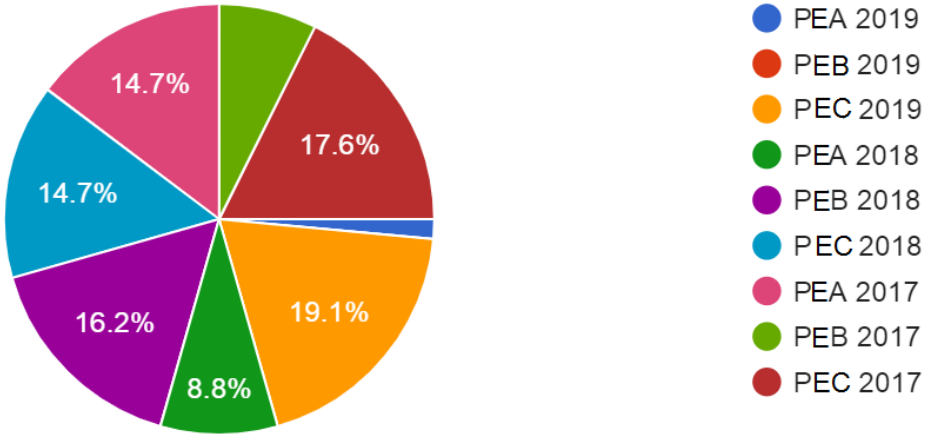
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.749	0.767	7

Table 4 shows the score for the reliability test. The Cronbach's Alpha for all of the questionnaire is more prominent than 0.6. It means that the need assessment questionnaire is reliable.

RESULT AND DISCUSSION

Based on the data obtained through the distribution of questionnaires to all classes in the UPPE through WhatsApp Group, 68 respondents were willing to

fill out a questionnaire with class distribution, as shown in Figure 1. Of all of the respondents, 85.3% had programmed the Assessment Process and Learning Outcomes course, while the rest had not to program them. Besides, some lecturers are open-questionnaire who teach the assessment course; 11 lecturers were willing to fill out a questionnaire.



PEA = Physics Education A, PEB = Physics Education B, PEC = Physics Education C

Figure 1 The Distribution of Participant from The Undergraduate Programme of Physics Education

Online Learning During the COVID-19 pandemic

Online learning during the COVID-19 pandemic is imperative to break the chain of the spread of COVID-19. The whole world faces the same problems in education, and an alternative to continuing implementing the learning process is using distance learning. This quite sudden decision has implemented since mid-March 2020 in Indonesia, including students at public university in Surabaya.

Synchronous online prosthodontic education course in China had a high number of participants but low learning progress and completion rates during the COVID-19 pandemic (Yang, Li, Liu, & Tan, 2020). Hasan and Bao confirmed that college students suffer from psychological distress due to an ineffective e-Learning system and fear of academic year loss (Hasan & Bao, 2020). The linkage between the change management process and online teaching-learning in the education system amid the COVID-19 outbreak to overcome the persisting academic disturbance and, consequently, ensure educational activities and discourses as an ordinary course procedure education system (Mishra, Gupta, & Shree, 2020).

Exploratory research conducted to assess student needs for learning in the odd semester of the 2020/2021 academic year to determine the obstacles to students' online learning. UPPE students gave a questionnaire link to determine their learning conditions during online education in the even semester 2019/2020. Most students enjoy every online learning process and live it smoothly. However, 25% disagreed with this statement because of the limitations they experienced during online learning. Even though nearly 70% of students stated that they enjoyed the online learning they were doing, they also shared many obstacles during the online learning process, mainly if synchronous

learning used a virtual face-to-face platform. Figure 2 shows the data about this. The blue bars indicate that students enjoy every process and can run it smoothly, while the red bars indicate that students encountered several problems.

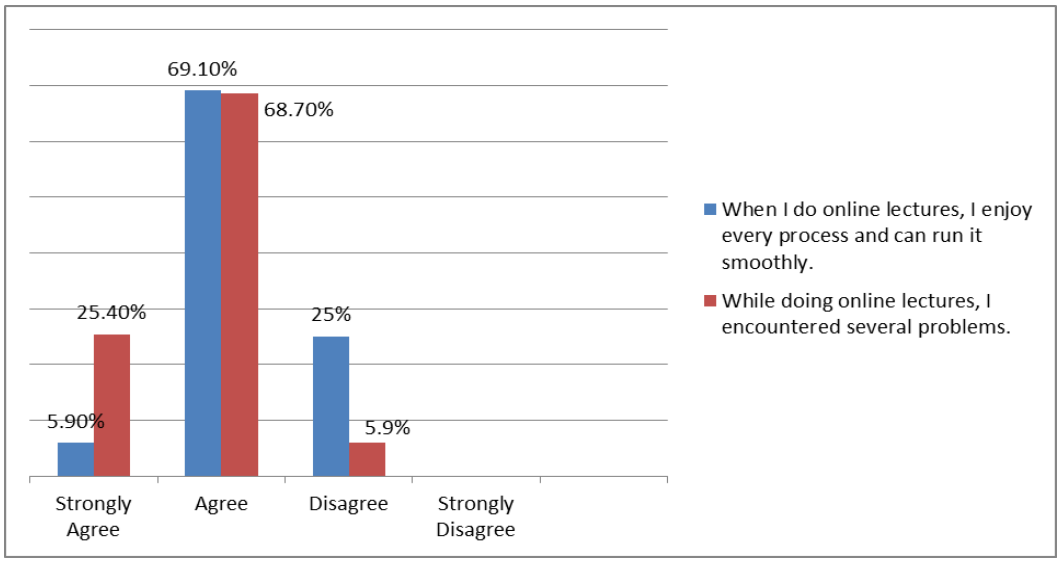


Figure 2 Online Learning and The Obstacles That Students Experience

More than 90% of students experience problems in the online process. Based on the respondents' answers, the biggest obstacle they encountered was the instability of the internet network—besides wasteful internet quotas and lack of support for devices such as cellphones or laptops. The constraints regarding the need for a large internet quota have resolved with an internet quota assistance program from the Indonesian Ministry of Education and Culture for registered and verified teachers and students throughout Indonesia. However, the problem of internet network stability has not appropriately resolved. It becomes a significant concern for this research. Figure 3 shows information data about the constraints experienced by students during the online learning process. Several lecturer respondents also said that the online learning process's biggest obstacle is the stability of the internet network and internet quota availability. The sixth lecturer respondent stated, "*Learning during the COVID-19 period students felt quite tricky in the learning process because they were accustomed to face-to-face learning and were also constrained by the needs of online learning such as cellphones and internet quotas.*" The ninth lecturer respondent also experienced the same problem,

"Sometimes it is cut off because of the internet network." This information is in line with the relevant research results, which states that students face various problems related to depression anxiety, poor internet connectivity, and an unfavourable study environment at home during the COVID-19 Pandemic in West Bengal, India (Kapasia et al., 2020). Other relevant research also found that technical problems, such as poor internet connectivity and limited data plans, also compounded the problem in internet-based e-learning during the COVID-19 pandemic (Azlan et al., 2020).

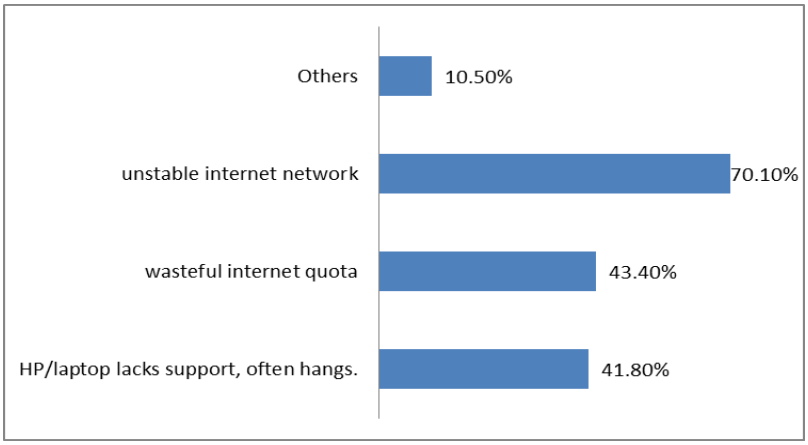


Figure 3 The Problems of The Respondent in Implementing Online Lectures

On the other hand, with limited quota and internet network, students must continue to attend lectures no matter how they use the lecturer's platform. Figure 4 shows several types of media operated by students during online learning activities. The data in Figure 4 shows that the most frequently used platform is Google Meet (g-meet), followed by WhatsApp Group (WAG), Google Classroom, Zoom Meeting Webex Online Meeting other media. WAG is an alternative learning communication because almost all students and lecturers have used it as a communication application in everyday life. WAG also requires less quota that virtual face-to-face platforms like Zoom or Google Meeting (g-meet). G-meet widely used because they used for free during a pandemic. However, synchronous lectures using g-meet are an obstacle for some students with problems with internet network stability. Students will often come in and out of virtual rooms because of the lack of a stable internet network. These constraints make students miss information or knowledge related to what they learned during the virtual face-to-face lecture. To overcome this, students make various efforts to stay in classes, such as a paid WiFi subscription for students from families with the middle and upper economies. However, students also found it challenging to focus on distractions, lack of engagement and mental stress (Azlan et al., 2020).

Students from remote areas and marginalized sections mainly face enormous challenges for the study during this pandemic (Kapasia et al., 2020). The wasteful quotas and stability of the internet network are the main problems. Students make efforts to keep attending lectures by leaving the house and looking for a place with a free WiFi area or even looking for a home with a strong internet signal, for example, in a cafe or locations that allow crowds to occur. If students are in remote areas that do not get internet signal, they will go to places with more robust internet networks. It becomes a problem if students do not meet health protocols when they are not at home while taking online lectures for a certain period. So, we need online learning with a user-friendly device for students to solve problems.

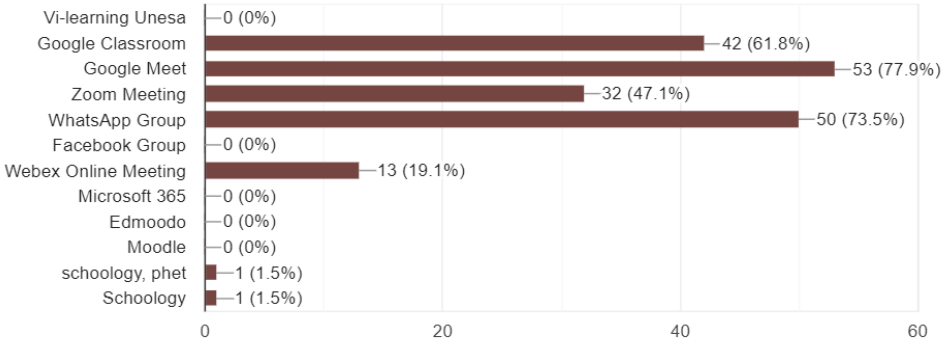


Figure 4 Platforms That The Respondent Frequently Uses

Android-based E-Book

Most of the learners used android mobile for attending e-learning (Kapasia et al., 2020). Mobile Android is more efficient in internet quota and can capture internet networks better than using a PC or laptop. This fact has become the focus of this research to develop an Android-based learning media that students can access quickly, saves internet quota, and can overcome internet network stability. It is thought arises because students need allocations for other learning activities, such as searching for the information to complete lecture assignments. More than 70% of respondents stated that they use the internet to search for library materials for lectures. Thus, the idea of developing an android-based electronic book by considering a solution to internet data and network stability problems.

Strategies are urgently needed to build a resilient education system in this pandemic era (Kapasia et al., 2020). More than 60 % of the students agreed that pre-recorded lectures and viewing videos of practical sessions, plus answering short questions, was beneficial (Azlan et al., 2020). These strategies can implement in e-learning through the Learning Management System (LMS) like moodle, google classroom, etc. However, LMS needs internet data and network stability. Meanwhile, based on previous research studies and questionnaire results, online learning's main problems during a pandemic are these two things.

Learning media developed in the form of an android-based electronic book (e-book) with an interactive presentation by training students' thinking skills in analyzing physics problems based on Bloom's taxonomy to solve this problem. The android-based e-book developed by the researcher in the form of the application installed on the Android system, after which they used offline. The researcher carried out needs analysis research. All of the lecturer respondents give a positive response to this idea. All of them stated that the concept was excellent to implement. Figure 5 shows the results of filling out the student respondent questionnaire on the presentation of an android-based e-book which is expected to help the student learning process.

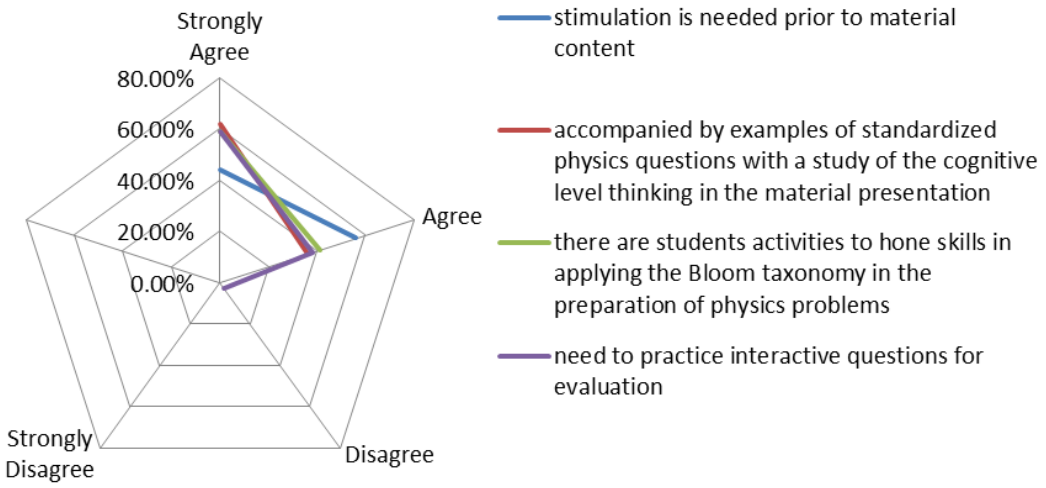


Figure 5 The Needs of Learning Media Content

Based on Figure 5, a total of 44.1% strongly agree, and 55.9% agree that students need stimulation before material content. 61.8% strongly agree, and 38.2% agree that the need to study the bloom taxonomy accompanied by examples of standardized physics questions with a study of the cognitive level thinking in the material presented. Almost all respondents strongly agree and agree if there are students activities to hone skills in applying Bloom taxonomy to prepare physics questions. Also need to practice interactive questions for evaluation; only 3% of respondent disagree with it.

Meanwhile, summarize of suggestions in an open questionnaire given to lecturers are:

"Each cognitive level is given a concrete example of its use."

"E-Book must be available to download and study offline."

"Presentation is more interactive, unique and more focused on training higher-order thinking."

Based on the need assessment, the Android-based E-book for Bloom's taxonomy topic developed by presents features of apperception, material studies accompanied by examples of curriculum analysis to the arrangement of questions based on Bloom's taxonomy. Also, student worksheets and evaluations provided hone student skills in applying Bloom's taxonomy to prepare physics questions.

Learner Conditions

The explanation in Figure 3 shows students' condition according to the respondents regarding online learning obstacles. According to a lecturer, respondents who given open-ended questions, students' shape when learning online stated as follows.

Most lecturers have similar opinions on students' condition during distance learning since Indonesia's Covid-19 pandemic. There is the various reaction of the student in the learning process using some platforms in distance learning. *"Student reactions varied, namely enthusiastic, casual, and less enthusiastic."* The fifth lecturer stated in the open questionnaire, representing all the lecturers' opinions who filled out the questionnaire.

The various learner condition in the distance learning on the COVID-19 pandemic era because of the different learner location and network condition.

"Learning during the COVID-19 period, students find it quite difficult in the learning process because they are accustomed to face-to-face learning and are also constrained by the needs of online learning such as cellphones and internet quotas." The tenth lecturer stated on the open questionnaire. The seventh lecturer also gives similar information about the learner condition in the COVID-19 pandemic era, *"Keep responding well and enthusiastically, but there are still obstacles in delivery which sometimes disconnects because of the internet network."* The eleventh lecture gives additional information about the student home location and its relation to the internet network, *"There were various reactions from students, some liked it, and there were some who disliked it because of the inadequate internet access in the village."*

Based on information about students' condition, both from lecturers and the students themselves, most of them are in an unstable internet network condition if lectures conducted synchronously using a virtual face-to-face platform. Thus, the development of an android-based e-book carried out by considering these limitations. The researcher will design the developed Android-based e-book to be interactive and unique. It used offline to understand Bloom's taxonomy and its application in curriculum analysis to prepare physics problems.

Tasks Analysis

Bloom's taxonomy is one of the lecturing topics in the learning evaluation course. Bloom's taxonomy is a taxonomy of thought for the cognitive domain. The discussion of Bloom's taxonomy material is quite dense, coupled with its use in the preparation of physics problems. It took quite a long time to study this material synchronously or face-to-face because it was quite dense. If this lecture carried out synchronously, students would experience obstacles as previously described. It will also not be effective because the student's concentration span for listening synchronous is also limited (Azlan et al., 2020; Kapasia et al., 2020).

On the other hand, there was a reduction in the semester credit system's weight for the physics-learning-evaluation course in the "Merdeka belajar" curriculum. The content of Bloom's taxonomy is quite dense and takes time to understand each level of thinking. The challenge is to develop a learning media that students can use students in studying Bloom's taxonomy topic and solve the problem of internet data packages and internet network stability.

For the material in the android-based e-book, which was developed and based on the needs analysis carried out through this preliminary research, a task analysis carried out on Bloom's taxonomy material. After learning to use an android-based e-book on Bloom's taxonomy topic, UPPE expected to be able:

- Understand Bloom's taxonomy.
- Distinguish between the old Bloom's taxonomy and Bloom's revised taxonomy.
- Analyze common physics questions based on the cognitive dimensions and the knowledge dimension in Bloom's revised taxonomy.
- Analyze the curriculum to compile indicators of competency achievement based on necessary competencies of physics subject based on Bloom's taxonomy
- Make question indicators based on necessary competencies in senior high school physics subject.
- Make questions based on question indicators arranged based on essential competencies by paying attention to Bloom's taxonomy.

The android-based e-book will develop several features such as apperception, material review, student worksheet, and evaluation in one application based on the needs and the task analysis. The hope is that this learning resource's development can benefit students during the COVID-19 pandemic and become a solution to problems with internet data availability and internet network stability.

Challenge and Possible Solutions

Based on the studies and findings presented, researchers have challenges developing a learning media by considering the constraints of quota consumption and the internet network's stability to carry out distance learning. Another challenge is that the media developed should use students' devices and strive for an interactive presentation of content. Even though student study and work offline, they can feel they are still communicating with the lecturers.

Researchers' solution is to develop a learning media in Android-based application, considering that almost all students use Android devices in their daily communication. The developed Android-based electronic book application can be accessed online for the application's download and install process; then, it can be used offline by students. Thus, students can study without being constrained by an unstable internet network and do not require a large internet quota. The solution offered is to overcome the main obstacles to online learning that occurred during the COVID-19 pandemic.

For students to feel that they are learning distance online with lecturers, the book's communication is made more interactive with a question-and-answer feature that students can fill in by students in an offline way. After students fill in the answers according to their understanding, students can click the answer button. The correct answer will appear in the communicative language as if the lecturer explains the answer to the question. This innovation expected to help students learn Bloom's taxonomy topic and its application in the preparation of physics problems that usually take a long time if done face-to-face or if it is done synchronously during a pandemic.

How about another topic in the learning evaluation course? The lecturers can use the variational platform and various strategies to conduct distance learning based on their needs and the content materials' characteristics. We know that the change in unit credit from 3 CU to 2 CU is a significant matter that needs to consider the same material content as before. It could even be denser because there are many new things about learning evaluation during the COVID-19 pandemic discussed in learning in this course.

CONCLUSION

This study found that online learning during the COVID-19 pandemic has several problems, especially internet data availability and internet network stability. There are various online learning platforms based on learning activities and need online education with user-friendly devices. Another problem is about the credit unit changing in the new curriculum with the same dense matter. This exploratory study concludes that students and lecturers need the learning media to consider network stability and the minimum internet quota. Researchers' solution is to develop a learning media in the form of an Android-based application that can be accessed online for its download and install process. Then the user can use offline to learn the material. The dense materials of Bloom's taxonomy topic can display on the Android-based E-book that developed.

This exploratory research implies that creating an Android-based e-book can be continued by paying attention to content needs and paying attention to data problems and internet network stability for students.

REFERENCE

Arifin, J. (2017). *SPSS 24 Untuk Penelitian dan Skripsi*. Jakarta: Elex Media Komputindo.

Azlan, C. A., Wong, J. H. D., Tan, L. K., Huri, M. S. N. A. D., Ung, N. M., Pallath, V., … Ng, K. H. (2020). Teaching and learning of postgraduate medical physics using Internet-based e-learning during the COVID-19 pandemic - A case study from Malaysia. *Physica Medica*, *80*, 10–16.

Brooks, E. C. (1916). The Value of Home Study under Parental Supervision. *The Elementary School Journal*, *17*(3), 187–194.

Editorial Express. (2020). Buletin Mahasiswa UNNESS: EXPRESS. *Badan Penerbitan Dan Pers Mahasiswa (BP2M) UNNES*. Retrieved from http://linikampus.com/2020/04/30/buletin-express-edisi-2-tahun-2020/

Hart, J. L., Turnbull, A. E., Oppenheim, I. M., & Courtright, K. R. (2020). Family-centred care during the covid-19 era. *Journal of Pain and Symptom Management*, *60*(2), e93–e97.

Hasan, N., & Bao, Y. (2020). Impact of "e-learning crack-up" perception on psychological distress among college students during covid-19 pandemic: a mediating role of "fear of academic year loss." *Children and Youth Services Review*, *118*.

Jauhariyah, M. N. R., & Wasis, W. (2018). Students' reasoning on physics related to visual representation case study of college students. In *Atlantis Highlights in Engineering (AHE) for International Conference on Science and Technology (ICST 2018)* (Vol. 1, pp. 904–908).

Kapasia, N., Paul, P., Roy, A., Saha, J., Zaveri, A., Mallick, R., … Chouhan, P. (2020). Impact of lockdown on learning status of undergraduate and postgraduate students during covid - 19 pandemic in West Bengal, India. *Children and Youth Services Review*, *116*.

Keswani, R. N., Sethi, A., Repici, A., Messman, H., & Chiu, P. (2020). How to maximize trainee education during the coronavirus disease-2019 pandemic: perspectives from around the world. *Gastroenterology*, *159*(1), 26–29.

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of covid-19 pandemic. *International Journal of Educational Research Open (Journal Pre-Proof)*.

Munir, M. (2009). *Pembelajaran Jarak Jauh Berbasis Teknologi Informasi dan Komunikasi (Distance Learning Based on Information and Communication Technology)*. Bandung: Alfabeta.

Musello, C. (1980). Studying the home mode: an exploration of family photography and visual communication. *Studies in Visual Communication*, *6*(1), 23–42.

Nisa, L. W., Ismet, I., & Andriani, N. (2020). Development of e-modules based on multi-representations in solid-state physics introductory subject. *Berkala Ilmiah Pendidikan Fisika*, *8*(2), 73–81.

Putrawansyah, F., Zulkardi, & Sardianto, M. S. (2016). Pengembangan digital book berbasis android materi perpindahan kalor di sekolah menengah atas. *Indonesian Journal on Networking and Security*, *5*(4), 39–48.

Remuzzi, A., & Remuzzi, G. (2020).

COVID-19 and Italy: what next? *Lancet*, *395*, 1225–1228.

Rohim, A. M., Wahyuni, S., & Susilo, S. (2020). The development of website-based physics test instrument for senior high school. *Berkala Ilmiah Pendidikan Fisika*, *8*(3), 196–202.

Saifuddin, M. F. (2017). E-learning dalam persepsi mahasiswa. *Jurnal Varidika*, *29*(2), 102–109.

Stambough, J. B., Curtin, B. M., Gililland, J. M., Guild III, G. N., Kain, M. S., Karas, V., … Moskal, J. T. (2020). The past, present, and future of orthopaedic education: lessons learned from the COVID-19 pandemic. *The Journal of Arthroplasty*, *35*, S60–S64.

Sugiyono, S. (2012). *Statistika Untuk Penelitian*. Bandung: Alfabeta.

UPPE Unesa. (2020). *Summary of Curriculum*. Surabaya: UPPE Universitas Negeri Surabaya.

Utami, N. R., Jufriadi, A., & Ayu, H. D. (2020). Interactive e-module based on h-guided inquiry: optimize the ict skills and learning achievements. *Berkala Ilmiah Pendidikan Fisika*, *8*(3), 183–195.

Yang, X., Li, D., Liu, X., & Tan, J. (2020). Learner behaviours in synchronous online prosthodontic education during the 2020 COVID-19 pandemic. *The Journal of Prosthetic Dentistry*, 1–5.