Physics undergraduate students' perceptions of online learning during the transition period to the new normal era

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**Abstract**. The Covid-19 pandemic forced the Indonesian government release learning from home policy. This policy also applies to the Physics Education of Siliwangi University. Undergraduate students need to adapt immediately. This study aims to know undergraduate students' perceptions of online learning during the transition period from face-to-face learning to online learning. Undergraduate students' perceptions of online learning are seen from aspects of the access of technology, the use of technology for learning, online learning readiness, and attitude towards digital technology literacy. The data is collected by online survey method. This research shows that majority of undergraduate students have sufficient facilities for online learning and have positive attitude towards digital technology literacy. Another finding from the study is that the majority of undergraduate students have difficulty accessing the fast internet (83.87%), they like combination of online media learning and offline media learning (90.32%) but they do not like full online learning (98.06 %), and about a half of them feel convenient in finding information and scientific literature by online (52.90%). This research indicate that teacher should support student for learning online such as provide proper learning material and media. This research is expected to be suggestions for better online learning and literacy technology teaching and learning in the new normal era.

1. Introduction

The Covid-19 pandemic poses significant challenges to human life globally. The prevention of the spread of the Covid-19 Pandemic is trying to be overcome by implementing the PSBB policy and implementing health protocols. PSBB and Lockdown have had a major impact on the education sector[1][2]. The impact on the education sector in Indonesia includes the policy of eliminating the National Examination and the temporary closure of schools and tertiary institutions. The community certainly needs to adapt as soon as possible to face this situation. Community adaptation to face the Covid-19 Pandemic is called a new normal. New normal is as a way of life in the Covid-19 Pandemic situation. New normal is a community effort to keep running life by implementing health protocols. One of the new normal behavior is keeping physical distance. The behavior of keeping physical distancing has an impact on the learning system in the form of learning from home policy. Learning from home policy also applies to higher education in Indonesia, with the majority of learning online[3].

For students, online learning requires students to have a higher level of independence, discipline, responsibility, self-regulated learning, and literacy in technology. In the context of online learning, synchronous or asynchronous interactions occur between lecturers and students. Synchronous interaction allows lecturers and students to interact at the same time even in different places. Asynchronous interaction allows lecturers and students to interact at different times and places[4][5]. Technology and its literacy can support Synchronous or asynchronous interactions.

Technological literacy is needed to face the 21st century and the 4.0 industrial revolution. Fundamental opinions that serve as references for technology studies and technological literacy include the works of Mitcham and Pearson & Young [6][7][8][9]. The technology consists of objects, knowledge, activities, and will [10]. Meanwhile, technological literacy is an understanding of the nature and history of technology, basic hands-on abilities of technology, and the ability to think critically about technological developments [11]. This definition leads to the domain of technological literacy, namely knowledge, thinking, and acting patterns, skills [11]. Technology literacy is important during online learning.

There are several research results related to the response of countries in the world to the COVID-19 pandemic related to the implementation of higher education. Crawford et al. reported that there are universities that are still conducting offline lectures by implementing physical distancing, there are universities that are implementing online learning in full, and some are implementing blended-learning[3]. Bao reports a case study of students who have difficulty studying online due to a lack of good learning attitudes, lack of discipline, lack of appropriate teaching materials, and a good learning environment[2]. Reimers et al. added that education needs to be innovative and flexible with technology mediation in the New Normal era[1].

Online learning is new to the majority of students. Students at this time are still in a transition period to online learning. Then, they need to be well prepared. Thus, it is necessary to study the readiness of students in online learning and attitudes towards technological literacy during the transition to the new normal era. This study aims to determine the response of students of physics education at Siliwangi University to online learning. Besides, this study aims to analyze online learning from a technological literacy perspective.

1. Methods

This research uses a survey method. Respondents are 155 students of Physics Education at Siliwangi University. Respondents consist of 75 first-year students, 60 second-year students, and 20 third-year students. The survey was conducted online using a questionnaire in May 2020. The survey was conducted online using Google Form. The questionnaire items consisted of the categories “access to technology”, “application of technology for learning”, “online learning readiness”, and “attitudes towards digital technology literacy”. The survey results were processed qualitatively descriptively using percentages.

1. Result and Discussion
	1. *Access to Technology*

There are 5 items to reveal aspects of access to technology. The aspect of access to technology shows the availability of smartphones, the availability of notebook or computers, the availability of an operating system that can be used to support online learning, and the smoothness of the internet for accessing information using devices (smartphones/computers, laptops).

Items related to smartphone availability reveal that 94.84% (147) of respondents own and can use smartphones for online learning. Furthermore, 7 students use ordinary cellphones and smartphones. There is 1 student who feels no need to use a smartphone. There were 75.48% (117) students who had their laptop or computer, 19.35% (30) took turns with family or friends, there were even 5.16% (8) respondents who did not have a notebook or computers. Furthermore, as many as 83.87% (130) of respondents stated that they could use a notebook or computer equipped with an operating system for learning. There is 9.67% (15) of respondents who ask for help from family or friends to be able to access a notebook or computers for studying, and the rest still do not use it but feel the need to have access to an operating system to be used in learning.

As many as 78.06% (121) of respondents state that they can use a smartphone to access information and 21.94% (34) of respondents are sometimes able to use a smartphone/computer to access information. One of the constraints in accessing information using a smartphone is the problem with the internet that is not smooth. Only 16.13% (25) of respondents state that they could access the internet smoothly. Even 6.45% (10) state that they could not access the internet when they were in their domicile area and 77.42% (120) of respondents state that they had a fairly slow internet network. Then, there are 83.87% (130) of respondents could not access the internet properly.

Access to technology is an important aspect of online learning. Based on the results related to aspects of access to technology, the important point obtained is that the majority of students have been able to access online learning facilities in the form of laptops/computers or smartphones and can search using these devices to find information and learn. At this time, technology and information have developed rapidly then smartphones or laptops are no longer a luxury for the majority of people. Devices have become very important in the era of online learning. However, there are still respondents who do not have support in the form of laptops/computers for studying. Besides, a smooth internet network can only be accessed by a minority of respondents. The same thing was reported by Kapasia et al and Khalil et al who stated that students who undergo online learning experience serious problems related to the smooth running of the internet network[12][13]. Apart from devices, internet networks are the main infrastructure in online learning. Bao stated that we need to ensure that students are actively and effectively involved in online learning[2]. Then, teachers must reduce obstacles related to access to technology. It can be reduced by giving more time to work on assignments and studying material independently, providing independent assignments that can train students to find information on the website, providing teaching materials earlier than lecture hours, and changing file sizes.

* 1. *Application**of Technology for Learning*

The aspect of applying technology to learning consists of 5 items. Aspects of applying technology to learning are related to the habit of storing paperless files, using email to communicate, and using software to do assignments. Besides, the aspect of applying technology to learning also reveals perceptions of the urgency of using devices in online learning and perceptions of the technology used to complete tasks.

The aspect of applying technology to learning is related to the use of online storage media. This is because the material and the results of the assignments need to be stored in the soft-file form. As many as 61.29% (95) of respondents still use offline storage media, namely print outs, hard disks, and USB drives. Meanwhile, 38.71% (60) of respondents have used online storage media.

Using email and using the software are the most basic ways to communicate in the digital age and online learning era. The majority of respondents used email as a medium of communication, as many as 104 students (67.10%). Furthermore, 30.32% (47) of respondents state that they always use certain software to study and do assignments, 60.65% (94) of respondents state that they often use certain software to do assignments and study, and 9.03% (14) respondents state that they only occasionally use certain software to study and do assignments.

Another thing that was revealed in the aspect of applying technology for learning was the perception of the urgency of using devices in online learning and the perception of the technology used to complete tasks. As many as 94.19% (146) respondents believe that the use of devices is important in online learning and 5.81% (9) think that devices are not always important in online learning. Another aspect of applying technology for learning is related to the perception of technology for task completion. As many as 39.35% (61) of respondents stated that technology was not related and even hindered the collection of assignments. Meanwhile, 60.65% (94) of respondents thought that technology made the task easier.

Students need to take advantage of the rapid development of information technology for studying independently. It can be started by taking advantage of things like saving the results of doing assignments and books in the form of soft files and then storing them online and offline and using certain software to help complete the task. This can provide benefits to students in online learning that demands more studying independently.

* 1. *Online* *Learning Readiness*

Students' online learning readiness needs to be supported by the University. Support from universities in online learning is providing free internet quota and providing a learning application system. Besides, students need to understand the consequences of studying online. As many as 50.97% (79) of respondents stated that they understood the consequences of learning online. There are almost half of the respondents (45.81%) still do not understand the consequences of learning online, and the rest do not understand the consequences of learning online (3.23%). Understand the consequences of studying online is important so that student can make good decision about their online learning habit.

Furthermore, there are only 1.94% (3) respondents who are interested in online learning as a whole and the rest (98.06%) do not like full online learning. When learning online, as many as 90.32% (140) of respondents liked learning media in a variety of print and digital formats, 3.23% (5) of respondents stated that online learning sources were sufficient, and 6.45% (10) respondents did not like various learning resources in digital and online formats. The perception of the comparison of the convenience of online learning systems and face-to-face learning shows that 11.61% (18) of respondents stated that online learning is easier, 16.77% (26) of respondents stated that learning online and learning face-to-face are the same, as many as 58.06% (90) stated that online learning is more difficult, and even 13.55% (21) stated that online learning systems cannot replace face-to-face learning. Convenience in browsing websites means that a person knows how to find information on a website, can use search engines, and knows which websites need to be visited to find information. The survey results showed that 52.90% (82) of respondents stated that they were comfortable in searching for scientific information through the website, 37.42% (58) of respondents were not comfortable yet, and 9.68% (15) of respondents often felt worried.

The survey results revealed regarding online learning readiness complement Kapasia and Khalil's research which states that online learning causes boredom, anxiety, and frustration[13][12]. The convenience of online learning systems needs to be improved. The discomfort of studying online and preferring to study offline is caused by anxiety, frustration, and boredom while studying online[12]. This can be overcome by using a combination of online-offline media and involving the surrounding environment as a learning media.

* 1. *Attitude* *Towards Digital Technology Literacy*

In this study, a positive attitude towards digital technology literacy is shown by being able to identify related digital ethics, themes that link technology literacy and global problems, and digital security and responsibility. The results of the survey of attitudes towards digital technology literacy are presented in table 1, table 2, and table 3.

**Table 1**. Result about digital ethics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Question** | **1 & 2 is true** | **3 & 4 is true** | **1 & 5 is true** | **It’s all true** |
| Which is included in Technology Literacy?1. Security in online source search
2. Knowing the code of ethics in online publications
3. Understand the principles of someone's privacy
4. Understand the concept and terms of plagiarism (Plagiarism)
5. Understand the terms of citation and plagiarism
 | 9,68%(15) | 6,45%(10) | 8,39%(13) | 75,48(117) |

**Table 2**. Result about themes that link technology literacy and global problems

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Question** | **1, 2, & 3 is true** | **2 & 4 is true** | **3 & 5 is true** | **It’s all true** |
| Which of the following themes are relevant to 21st Century Learning:1. Global Awareness 2. Financial Literacy 3. Civic Literacy 4. Health Literacy 5. Environmental Literacy | 20%(31) | 6,45%(10) | 7,74(12) | 65,81(102) |

**Table 3**.Result about digital security and responsibility

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Statement**  | **Agree** | **Uncertain** | **Disagree** | **Not interested** |
| It is very important to understand the latest technology and it is very necessary to use it for the prosperity of educational outcomes in the future. Technology integration into the lecture process is very important to do well and wisely | 76,77% | 20,65% | 0,65% | 1,94% |
| Technology has opened up possibilities for learning new skills and new cultures so that the millennial generation is responsible for understanding and maximizing the potential of technological developments and warding off bad influences. | 72,90% | 25,81% | 0% | 1,29% |

Based on table 1, table 2, and table 3, majority of students already have initial literacy related to technology, namely a positive attitude towards digital ethics, themes that link technology literacy and global problems, and digital security and responsibility. When viewed from the perspective of Young and Pearson's technologic literacy, students already have knowledge in aspects of the ways technology shapes human history and people shape technology also understands that technology reflects the values ​​and culture of society[11]. Technological developments can be used to support online learning at home[3][14]. Examples of technology that have an impact on education include the internet and Android networks. The internet is used as a learning resource apart from books and educators. The use of Android as a basis for learning media is one of the learning styles in the 21st century[18].

Teachers must help student to reduce depression anxiety, boredom, and frustration. Bao mentions the principles of online learning when new normal[2]. First, the principle of appropriate relevance. The material coverage and the difficulty level of the material are adjusted to the academic readiness and online learning behavior of students. Second, the principle of effective delivery. Online learning is characterized by a low concentration of learners so that educators need to adjust the method and speed when delivering material. Third, the principle of sufficient support. Students need to be guided in reflection, pre-study tutorials, and written guides for online study preparation. Fourth, the principle of quality participation. Educators need to find ways to measure the degree of participation of students when learning online. Fifth, the principle of preparing a backup plan. Educators need to prepare a backup plan in case the original plan doesn't work out so that online learning can continue.

1. Conclusion

This research shows that majority of undergraduate students have sufficient facilities for online learning and have positive attitude towards digital technology literacy. Another finding from the study is that the majority of undergraduate students have difficulty accessing the fast internet, they like combination of online media learning and offline media learning but they do not like full online learning (98.06 %), and about a half of them feel convenient in finding information and scientific literature by online (52.90%). This research indicate that teacher should support student for learning online such as provide proper learning material and media. This research is expected to be suggestions for better online learning in the new normal era.

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