The role of ICT as a media in learning activities before the COVID-19 pandemic: undergraduate perspective

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Abstract. The crisis caused by COVID-19 has an impact on education in Indonesia, one of which is that classes are postponed due to the implementation of PSBB regulations. The education system is responding to the pandemic with an "emergency e-learning" protocol, with virtual learning. ICT is the main medium of learning with the help of technological resources which is often termed e-learning. Has great potential in the development of the education system by providing freedom of interaction without time and space boundaries. With the results of the descriptive analysis survey, the respondents were 63 students of the Sarjanawiyata Tamansiswa University and Tidar University. Respondents were dominated by female gender as 55 people (87.3%) and male respondents as 8 people (12.7%). Students considered ICT understanding to be very important 61.9% and believed that ICT could expand access to learning 66.7%, with internet usage by 90%, followed by PPT as an ICT tool that was often used by 87.9%. Also, there are obstacles faced by students such as lack of understanding of system operations (40%) and difficulty operating equipment as 36.7%. Thus, knowing students' expectations will be a consideration for further research. Students have hopes of increasing the use of ICT in lecture activities by 80% - 100%, such as increasing internet access by 70% to make it easier and faster.

1. Introduction

When the Chinese government announced a new coronavirus outbreak in Wuhan, a few days later, the virus called COVID-19 received great attention. Given that COVID-19 has become a global problem [1], which has a serious symptom level of death [2] leading the World Health Organization [3] to declare COVID-19 a pandemic. The COVID-19 pandemic not only affects the economies of countries around the world but also has an impact on education, including in Indonesia, due to class delays due to Large-Scale Social Restrictions (PSBB).

Education systems around the world have responded to the pandemic with "emergency e-learning" protocols, marking the rapid transition from face-to-face classrooms to online learning systems [4]. The majority of universities are facing the current pandemic challenges with virtual learning [5]. These challenges include not having access to devices that will facilitate online teaching and learning, many homes that do not have Internet connectivity so that access becomes unstable, both teachers and students are not skilled enough to be involved in the online teaching and learning process [6]. Apart from these challenges, there are other challenges that teachers find it difficult to gain knowledge and follow the use of ICT [7].
Information and Communication Technology (ICT) is a combination of technological devices and resources, which are used to manipulate and connect information. ICT is currently a major player in the education system, bridging forms of knowledge and literacy, the intersection between places of study, homes, schools, workplaces, and communities.

ICT in technology-assisted learning is often termed e-learning [8]. Utilizing technology can be a great potential in the development of e-learning [9] because e-learning provides freedom of interaction without being limited to learning space and time [10]. In line with the opinion of [11], learning with the help of technological resources has many advantages. Besides, the use of ICT presents material through various stimuli such as sounds, images, and movements so that it meets the psychomotor, visual, and affective needs of students [12]. So that ICT can increase the creativity of students [13].

To get the benefits of using ICT in learning, students must have relevance to the content to be developed by with the objectives for various subjects. According to [14] the successful implementation of educational technology is very dependent on education, which ultimately determines how ICT is used during learning. This is in line with [15] who said that teachers should know how to use ICT and software programs. As [15] argues, teachers or educators must know how to use ICT to do their best, opening the door to the world of knowledge to students.

Although technological developments provide benefits from various aspects of life to the education system, the following studies suggest that science teachers are still lacking in using and following ICT developments which can be a factor in decreasing achievement in the field of science. [8] in his research said that the use of ICT in information technology by science teachers in Indonesia in the learning process is still low. Furthermore, in the research of [17], it is said that a lack of knowledge in the use of ICT can be a major factor in the decline and decline in achievement in the field of science. It can be concluded that a survey of prospective science teachers or science study program students is required.

Based on the background of the problems stated above, this study aims to investigate the level of understanding and use of ICT in the Science Education Study Program students, indicators of the level of student satisfaction with the use of ICT in learning, and explored with suggestions given by students for the Science Education Study Program to improve student technological/software skills.

2. Method
The research used the descriptive analysis method by distributing google form questionnaires which were sent by themselves to students of the science education study program to get information from the guest's response. Students come from Sarjanawiyata Tamansiswa University and Tidar University. The Google form was filled in by 30 students of the University of Sarjanawiyata Tamansiswa, 5th semester of science education study program, and 33 students of Tidar University, 3rd semester of science education study program. Sampling was taken by purposive sampling. The questionnaire consisted of 15 items, including 7 demographic information items and 13 ICT-related items needed in science learning.

3. Result and discussion
Based on a survey obtained from the distribution of online questionnaires, the results of the survey show that Science Education students believe that ICT is an important component in improving the learning achievement of the Science Education Study Program. Students are dominated by women as many as 55 people (87.3%) and male respondents as many as 8 people (12.7%). They think that ICT is very important to be applied in lecture learning 61.9%, by always utilizing mobile devices (android) in learning 93.9%.
3.1. Understanding and using ICT in science education student study programs

To explore students' opinions about ICT, researchers gave open questions so that students could freely share their opinions about ICT. Based on these answers, researcher gets an overview of the understanding and use of ICT for students. Based on these results, the researcher classified the answer descriptions into six aspects.

Table 1. ICT function in learning.

| Aspect                                           | (%) |
|--------------------------------------------------|-----|
| Expanding access to learning                     | 66.7|
| Improve the quality of learning                  | 63.6|
| Make it easier to understand and deepen the material | 60.6|
| Helps visualize abstract ideas and concepts       | 57.6|
| Show learning more interesting                   | 54.5|
| Allows for the interaction between material, learners, and learners | 45.5|

Based on the data in Table 1, it shows that 66.7% of students believe that ICT expands access to learning. Based on these answers, it is obtained the views of students who believe that ICT can be a support in increasing the effectiveness of learning efficiency. This result is in line with [18] that ICT learning aims to increase the effectiveness of learning efficiency. As stated by [19], ICT has the advantage of providing collaborative learning tools without limitation of time and place.

In addition to expanding access to learning, ICT also plays a role in improving the quality of learning. Students believe that the implementation of ICT-assisted learning can help facilitate the learning process. It can be seen from the data table 1 that the function of ICT in learning, students choose aspects to improve the quality of learning 63.6%. This finding is by [18] which states that the use of ICT can make learning activities more effective, increase student learning motivation, foster positive student attitudes towards learning, carry out learning activities that are more interesting and fun, and create more learning activities and other things.

![Figure 1. The use of ICT which has been used as a learning medium.](image-url)
Based on figure 1 data, it shows that 90% of the majority of students have used the internet as a learning medium. Based on this, it can be concluded that students can already use one of the electronic accesses from ICT. As [20] said, ICT offers access to a series of electronic facilities such as interactive video, the Internet, e-mail, and the World Wide Web. In line with the opinion of [21] that the most commonly used types of ICT are the internet, e-mail, word processing devices, and the World Wide Web. It can be concluded that the internet is one of the advantages of using specialized ICT because it supports learning facilities as a whole and can interact in real-time [22].

| Table 2. The most frequently used ICT tools. |
|--------------------------------------------|
| Aspect     | (%)  |
| PPT         | 87,9 |
| Google      | 72,7 |
| Youtube     | 60,6 |
| Edmodo      | 51,5 |

PowerPoint (PPT) is a presentation program that was firstly used in the business world but has now penetrated the world of education. Based on the data in Table 2 shows PPT is an ICT tool that is often used in learning 87.9%. According to [23], PowerPoint is the preferred presentation software used for Computer Aided Teaching (CAT). In line with [22] who states that the use of PowerPoint undoubtedly provides opportunities for students and educators for the development of personal skills.

Based on the results of the analysis of the data on the understanding and use of ICT in students of the Science Education Study Program, it is concluded that students feel and know the function of using ICT which has been and is often used in learning and believes that ICT can be a support in increasing the effectiveness of learning efficiency.

3.2. Student constraints on the use of ICT in learning
The following shows the results of research regarding the obstacles experienced in the use of ICT in science learning which can be briefly seen in table 3.

| Table 3. Constraints experienced by students |
|---------------------------------------------|
| Aspect                        | (%)  |
| Don't understand device usage | 40   |
| Difficult to operate the device| 36,7 |
| Not used to using the device   | 6,7  |
| Others                        | 13,3 |

Based on table 3, it is clear that the majority of students have their respective obstacles to the use of ICT. Some of the obstacles found were not understanding usage as much as 40%, difficulty operating the device as much as 36.7%, followed by being unfamiliar with the use of ICT as much as 36.7%, no desire to know as much as 6.7%, and others as much as 13.3%. According to [19], these obstacles can occur because they are not used to applying ICT in everyday life. Supported by the opinion [24], the constraints of using ICT in the learning process, namely: lack of support, lack of trust, and lack of equipment. It can be concluded, it is necessary to use ICT in teaching in order to be accustomed and confident when it comes to using ICT knowledge.
3.3. Explore student expectations
Figure 2 below shows students' expectations of increasing the application of ICT in lecture activities.

![Figure 2. Percentage of student expectations.](image)

This research succeeded in getting some input from science students, the majority of students expect 80% -100% with an increase in the application of ICT in lecture activities. Slow Wi-Fi access is a problem complained of by respondents. The majority of students (70%) expect an increase in internet access facilities that are easier and faster. It can be concluded to support improving the quality of the study program, in its implementation, of course, it must be carried out in a manner gradually by taking into account the priorities and availability of resources owned. By following up on the input obtained from students, it is expected can improve the quality of ICT learning in science student lectures while improving student satisfaction.

4. Conclusion
Students' understanding of the use of ICT reveals various challenges faced in ICT development. In general, students know the function of using ICT and believe that ICT can be a support in increasing the effectiveness of learning efficiency, but on the other hand, students have problems with using ICT, one of which is not understanding the use of devices, difficulty operating devices, and not being used to using devices. To overcome these obstacles, it is necessary to know student expectations and become a consideration for further research. Students hope that with an increase in the application of ICT in lecture activities to make it easier and faster to access the internet and get used to using devices, so that science students can use and know the use of ICT.

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