



Increasing students' understanding by using ICT in elementary schools

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Abstract— This study aims to explore students' experiences in using information and communication technology (ICT) in learning and how it can improve their understanding in primary school. This research was conducted using a qualitative approach, involving 12 students from an elementary school in X city. Data were collected by in-depth interviews and observations, the collected data were then analyzed using content analysis method to identify patterns, themes, and meanings from the generated data. The results showed that the use of ICT in learning provides a positive experience for students and can improve their understanding in various subjects. Students experience changes in the way they acquire and process information, as well as in the way they interact with teachers and classmates. In addition, the use of ICT also motivates students to be more active in learning and improves their learning outcomes. However, there are some barriers that students face in using ICT in learning, such as technical difficulties and limited access. Therefore, this study concludes that the use of ICT in learning can improve students' understanding, but it needs to be balanced with efforts to overcome the barriers that arise. The conclusion of this study explains that the application of Information and Communication Technology (ICT)-based learning media in schoolchildren

Keywords—Communication Technology, Elementary School, Student Understanding

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I. INTRODUCTION

The current technological development is Information and Communication Technology (ICT) which can make learning for the independent

curriculum in elementary schools. The world of education is currently required to have technology in learning because technology can facilitate and learning will be more interesting (Horner & Hulme, 2019). Learning resources using Information and

Communication (ICT) can be utilized by teachers in the teaching and learning process so that the existence of technology currently plays a very important role to help students in elementary schools. Technological advances in the teaching and learning process can make learning effective and efficient, so teachers must develop interesting technology-based learning media. Progress can be seen from the surrounding environment, where all human activities are made easier because of these technological advances (Kamphorst et al., 2019; Kim & Ju, 2019; Yamaguchi & Atkeson, 2019). But in this technological development there are also clearly visible positive and negative impacts (Sun et al., 2019; Wu et al., 2018). The positive impact of technological advances in the field of education facilitates the learning process with various forms of learning media that make the learning process interesting and not boring (Chen & Lei, 2018; Yu & Du, 2019). One of them is a learning media system based on Information and Communication Technology (ICT).

Learning media in the current era directs technology to provide easy access to teachers to recognize the world of learning (Agustini et al., 2020; Koontz et al., 2018). With the existence of Information and Communication Technology (ICT) as a concept regarding the development of technology, information, and communication (Firmansyah et al., 2021). The function of Information and Communication Technology (ICT) for educators and learners is to cover all activities related to the processing, management and transmission of information between other devices (Tirado Lara & Roque Hernández, 2019). Technological advances are currently developing so rapidly that teachers play a very important role in developing learning materials using technology and utilizing it, so that the teaching and learning process is more interesting so that it increases the enthusiasm of students to be active and contribute to learning. Therefore, if technological developments are utilized properly, the learning outcomes of students are in accordance with their abilities, therefore students should be more careful in utilizing current technological developments so that technology can be utilized in the teaching and learning process so that it can increase students' motivation and enthusiasm for learning.

Education is very important for human life, education can change the fate of a nation that is left

behind to become advanced, an advanced nation starts from quality education (Ekblom-Bak et al., 2018; Senashenko & Struchkova, 2019; Sluman et al., 2019). An educator at this time still uses a lot of traditional learning media technology, namely by delivering learning in only one direction or lecturing (Dolch & Zawacki-Richter, 2018). An educator tends to only explain without providing understanding that makes students understand and feel unsaturated when the delivery is given by an educator (Dhiab et al., 2020; Shanahan et al., 2018). The education system in Indonesia has undergone several curriculum changes with a very simple curriculum and most recently the 2013 curriculum (Sugandini et al., 2022). Despite the frequent changes in the curriculum, the goal is none other than to improve the previous curriculum. With the development of technology today can bring changes in the world of education, one of which is the existence of Information and Communication Technology (ICT) learning systems that can facilitate teacher and student communication so that learning will make it easier for teachers by using technology and communication.

The type of Information and Communication Technology (ICT) learning model, the development of technology today can be utilized in the world of education, one of which is Information and Communication Technology (ICT) in elementary schools where teachers can shorten the time in explaining material in learning (Belkhir & Elmeliği, 2018; Ferentinos, 2018; Yunis et al., 2018). Meanwhile, students have a wide space to explore the uniqueness of each of them (Bourke & MacDonald, 2018; Pennings & Hollenstein, 2020). Information and Communication Technology (ICT) has advantages in learning the independent curriculum as well as the following advantages: 1) Make students more enthusiastic in learning, 2) Actively participating in the teaching and learning process, 3) Accelerating in explaining learning material, 4) Making students not bored and bored during the teaching and learning process, 5) Learning can be done by attracting students' attention (García-Martín & García-Martín, 2022). The drawbacks are as follows: 1) Frequent misuse of technology, 2) The need for ICT relies on a stable internet network and if the network is unstable it will hinder the learning process, 3) Lack of teacher experience about the use of technology in education (Tchamyou et al., 2019). The educational

curriculum, especially Information and Communication Technology (ICT) in the learning process is currently needed because it can facilitate the learning process in elementary schools.

Based on the results of the above research with the title Application of Learning Media based on Information and Communication Technology (ICT) states that there are problems experienced during the teaching and learning process where students do not participate in participating in learning because educators are not creative and still make learning materials manually. Therefore, teaching materials that attract students' attention are needed so that learning is not boring. With the creativity of educators in making interesting learning media, it will make students more actively participate in the teaching and learning process. Thus, the learning objectives can be achieved so that it can produce better learning outcomes. This research also explains how to utilize Information and Communication Technology (ICT) in the teaching and learning process by using technology and communication. Through learning with the Information and Communication Technology (ICT) system, technology and a stable internet are needed to make it easier to get information about learning, and to convey material by educators quickly, precisely and efficiently. However, learning with the Information and Communication Technology (ICT) model really requires direction from educators and guidance in delivering learning materials. So that the teaching and learning process becomes effective and efficient. So with the Information and Communication (ICT) can make learning easily get information from teachers and students in following the learning process.

Based on previous research, it can be said that there is a difference and a novelty contained in the current research. In this study, researchers provide information about the application of Information and Communication Technology (ICT) in learning media for the independent curriculum in elementary schools. Where this information can make the role of learning media based on Information and Communication Technology (ICT) very important in the learning process in order to optimize student learning in the form of knowledge, information and values that students can use in real life in accordance with current developments and in order to help students easily understand the content of the material taught by educators, then educators can

take advantage of this information and communication technology for the benefit of learning and self-development.

The purpose of this research is to be able to find out how the benefits of Information and Communication Technology (ICT) in supporting learning in elementary schools and can find out the advantages and disadvantages of Information and Communication Technology (ICT), the benefits and use of Information and Communication Technology (ICT) in the learning process which can facilitate and facilitate teachers and students in communicating during the teaching and learning process in elementary schools. The type of learning Information and Communication Technology (ICT) can make learning more interesting and innovative, which Information and Communication Technology (ICT) can help teachers when they cannot follow the learning due to obstacles in the teaching and learning process. So with the existence of Information and Communication Technology (ICT), students can be inspired in learning and can take advantage of current technological developments as an interesting and fun learning media. The problem and problematics obtained when using this learning technique is the need for Information and Communication Technology (ICT) to rely on a stable internet network if there is no internet network, it will not be able to reach Information and Communication Technology (ICT). Factors that affect obstacles or obstacles when using Information and Communication Technology (ICT), frequent internet network obstacles during the teaching and learning process using ICT, this is due to the need for ICT to rely on a strong and stable internet network. With problems related to obstacles or obstacles to Information and Communication Technology (ICT), it can be seen that Information and Communication Technology (ICT) is useful or not in supporting learning in elementary schools.

Based on the description above, the researcher is interested in taking a title of the application of Information and Communication Technology (ICT) in learning media for the independent curriculum in elementary schools. This research was conducted to find out whether the application of Information and Communication Technology (ICT) in learning the independent curriculum in elementary school children can be used as effective learning. With this research,

researchers can find out the advantages and disadvantages of Information and Communication Technology (ICT) in learning independent learning during the learning process and can find out the learning outcomes obtained by students with Information and Communication Technology (ICT) as a learning medium. Researchers hope that with this Information and Communication Technology (ICT) can find out the problems that exist in Information and Communication Technology (ICT) and how the learning process is used with Information and Communication Technology (ICT) with this study researchers can find out how the teaching and learning process uses technology and communication and can support learning activities in elementary schools by utilizing Information and Communication Technology (ICT) applications. Therefore, the existence of technology and communication can help learning to be more effective and efficient in using technology and communication in learning.

II. RESEARCH METHODS

Researchers found that Information and Communication Technology (ICT)-based learning media can be used as an alternative in the independent curriculum in elementary schools. Information and Communication Technology (ICT) based learning is very easy for educators and students in the learning process. The application of this learning model increases students' interest and enthusiasm for learning and makes it easier for them in the learning process. The method used in this research is quantitative, in this method many use numbers in the data collection process. Data collection is done through distributing questionnaires by utilizing the goggle form application. The source of data and information in this research is obtained through a questionnaire as a research tool or questionnaire.

III. RESULTS AND DISCUSSION

Researchers found that Information and Communication Technology (ICT)-based learning media can be used as an alternative in the independent curriculum in elementary schools. Information and Communication Technology (ICT) based learning is very easy for educators and students in the learning process. The application of

this learning model increases students' interest and enthusiasm for learning and makes it easier for them in the learning process. The method used in this research is quantitative, in this method many use numbers in the data collection process. Data collection is done through distributing questionnaires by utilizing the goggle form application. The source of data and information in this research is obtained through a questionnaire as a research tool or questionnaire.

N O	Statement	Answer			
		S	SS	TS	STS
1	Knowing ICT-based learning media facilitates learning activities at school	80,4%	11,8%	7,8%	0%
2	ICT (Information and Communication Technology) based learning can help processing, manipulation and management	74,5%	23,5%	2%	0%
3	ICT (Information and Communication Technology) based learning improves the quality of learning	72,5%	23,5%	3,9%	0%
4	ICT-based learning for independent curriculum expands access to education and learning	76,5%	19,6%	3,9%	0%
5	With the existence of ICT learning media increases learning intention	64,7%	23,5%	11,8 %	0%
6	With the application of ICT-based learning media for an independent curriculum communication becomes broad and effective	58,8%	35,3%	5,9%	0%

7	The application of ICT-based learning media for an independent curriculum makes the student learning process more enjoyable	62,7%	31,4%	5,9%	0%	learning media teachers can control student activities	58,8%	31,2%	10%	0%				
						15								
						16								
8	With ICT-based learning media for an independent curriculum, the learning process can be done anywhere	62,7%	27,5%	9,8%	0%	Learning media makes it difficult for teachers who do not understand technology	80,4%	15,7%	3,9%	0%				
						17								
9	Students easily understand lessons with ICT-based learning for an independent curriculum	68,6%	15,7%	15,7 %	0%	Learning media makes it easier for teachers in the learning process	66,7%	33,3%	0%	0%				
						18								
10	With ICT learning, students can follow learning according to the times	66,7%	31,4%	2%	0%	The government conducts teacher training so that they can apply ICT-based learning media	60,8%	33,3%	5,9%	0%				
						19								
11	ICT-based learning for an independent curriculum can make students familiar with technology	66,7%	27,5%	3,9%	2%	With the application of ICT-based learning media, it can improve the quality of education in our country.	78,4%	21,6%	0%	0%				
						20								
12	With the existence of ICT learning media for the independent curriculum, it will support the activity level of teachers and students to become more modern.	72,5%	25,5%	2%	0%	In the table above there are several questions about whether or not the use of Information and Communication Technology (ICT) can support learning in elementary schools studied by researchers in one of the elementary schools. The questions generated from these questions related to the use of Information and Communication Technology (ICT) in the independent curriculum								
						make learning effective and innovative because ICT has an attractive design. The questions tested on this researcher were 20 questions containing questions about increasing student understanding by using Information and Communication Technology (ICT) in elementary schools to make learning interesting for elementary school children. The statement Knowing ICT-based learning media facilitates learning activities at school obtained a percentage of 80.4% in the agree category. The								
13	With the application of ICT-based learning media for an independent curriculum, it is able to help practical learning become easier.	66,7%	25,5%	7,8%	0%									
14	With ICT-based	66,7%	13,7%	19,6	0%									

statement about containing that ICT (Information and Communication Technology) based learning can help processing, manipulation and management obtained a percentage of 74.5 with the agreed category. In this study, researchers also discussed ICT-based learning (Information and Communication Technology) to improve the quality of learning which obtained a percentage of 72.5% for the agreed category.

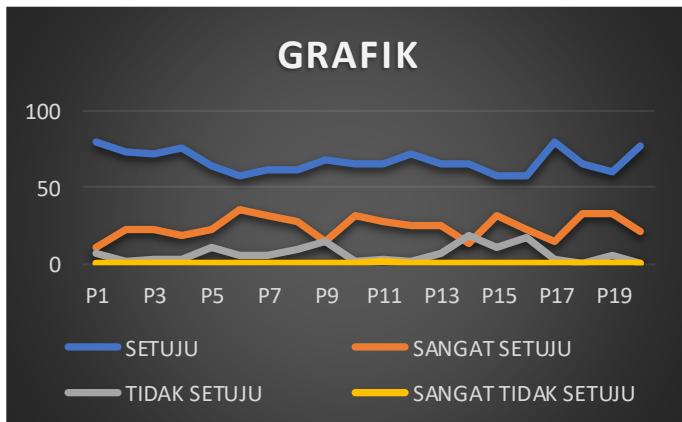
Research stating that learning ICT-based learning for an independent curriculum expands access to education and learning received a percentage of 76.5% in the agree category. The statement in this study also states that with the existence of ICT learning media, it increases learning intentions, obtaining a percentage of 64.7% in the agree category. The research also states that with the application of information and communication technology-based learning media for an independent curriculum, communication becomes broad and effective, getting a percentage of 58.8% in the agree category. In the statement that the application of information and communication technology learning media for the independent curriculum makes the learning and teaching process more enjoyable for students, it obtained a percentage of 62.7% in the agree category. In the statement with learning media based on information and communication technology for an independent curriculum, the learning process can be done anywhere, getting a percentage of 62.7% in the agree category.

In the research statement, students easily understand lessons with information and communication technology-based learning for an independent curriculum for elementary school children obtained a percentage of 68.6% for the agreed category. The statement about the existence of information and communication technology learning students can follow learning in accordance with current developments gets a percentage of 66.7% in the agreed category, the percentage gain on the statement stating that information and communication technology-based learning for the independent curriculum can make students understand learning with technology as much as 66.7% in the agreed category. Research stating that the existence of information and communication technology learning media for an independent curriculum can support the level of activity of

teachers and students to be more modern received a percentage of 72.5% in the agree category.

The percentage of statements with the application of learning media based on information and communication technology for an independent curriculum for elementary school children can help practical learning become easier with a percentage of 66.7% in the agree category. Research statements about learning media based on information and communication technology teachers can more easily control student activities with a percentage of 19.6% for the disagree category. In the statement of information and communication technology-based learning can be used as a learning method in elementary school children, the percentage obtained was 58.8% in the agree category. The statement containing that learning media using information and communication technology can make it difficult for teachers who do not understand technology to get a percentage of 23.5% in the strongly agree category.

The statement containing that the existence of information and communication technology-based learning can facilitate teachers in the teaching and learning process obtained a percentage of 80.4% for the agreed category. A statement stating that the government conducts teacher training so that they can apply learning media based on information and communication technology obtained a percentage of 66.7% in the agree category. Research stating that with the existence of learning media based on Information and Communication Technology it can be easier to improve the quality of teachers obtained a percentage of 60.8% in the agree category. In a statement stating that the application of learning media based on Information and Communication Technology can improve the quality of education in Indonesia with a percentage of 78.4% in the agree category.



The picture above is a learning chart based on the use of Information and Communication Technology for the independent curriculum for elementary school children. The results of the data obtained in the statement of learning media based on information and communication technology are as follows: There were 51 respondents who filled out the questionnaire consisting of teachers and students as the object of research. This study provides 20 statements to get the results of the research obtained from these respondents. The highest research results obtained a percentage of 80% in the agree category (S), the second highest research results obtained a percentage of 33% with a strongly agree category (SS), the third highest research results obtained a percentage of 78% in the agree category (S). The lowest research results obtained a percentage of 0% for the strongly disagree category (STS), the second lowest research obtained a category of disagree (TS) with a percentage of 2%.

The data on the results of research with the existence of learning media using Information and Communication Technology can be explained as follows: The agree category gets the highest percentage acquisition of 80%, the agree category (S) is the category that gets the highest percentage of several categories in the graph above, while the lowest percentage acquisition in this agree category gets a percentage of 58%. The acquisition of the second highest percentage category was obtained with a percentage of 33% for the strongly agree (SS) category, while the acquisition of the lowest percentage in the strongly agree category was obtained with a percentage of 11%. The acquisition of the next category is the category of disagree (TS)

which obtained the highest percentage of 19%, while the acquisition of the lowest percentage in this disagree category with a percentage of 0%. The highest percentage gain in the strongly disagree category (STS) was 2%, and the lowest percentage in the strongly disagree category was 0%.

Application with the existence of learning media based on Information and Communication Technology is very useful, effective and efficient to be applied for positive student learning. Researchers found the results after conducting this research that, with the existence of learning media through information and communication technology, it really helps students to be enthusiastic in learning and can improve learning outcomes, with the application of the application of Information and Communication Technology in the learning and teaching process properly in the classroom making students enthusiastic and comfortable during the learning process in accordance with educational objectives so as to increase the effectiveness and quality of student learning at school. With the application of Information and Communication Technology-based media, it helps facilitate the obligations of educators in creating an interesting, creative and innovative learning system that can make students very motivated and active so that they can increase their enthusiasm for learning. Educators have an important role in creating a fun learning system so that students can feel comfortable and happy during the teaching and learning process.

Penerapan sistem media pembelajaran dengan Teknologi Informasi dan Komunikasi ini tentunya sangat berpengaruh terhadap pembelajaran siswa dalam pemahaman dan penguasaan materi yang diajarkan pendidik. Ketika pembelajaran daring peserta didik sangat sulit untuk mengerti apalagi memahami pelajaran karena malas dan tidak adanya bimbingan serta arahan dari pendidik. Sedangkan ketika proses belajar mengajar dilakukan dengan sistem pembelajaran yang berbasis Teknologi Informasi dan Komunikasi ini materi yang sulit di pahami oleh siswa bisa dijelaskan agar siswa tersebut dapat memahami pembelajaran yang tidak dimengerti sebelumnya.

IV. CONCLUSION

The sources and information obtained from the data above can be concluded that the application

of Information and Communication Technology (ICT)-based learning media as an alternative teaching and learning process for the independent curriculum in elementary schools can be a reference for teachers and students to facilitate the teaching and learning process carried out online or face-to-face in the classroom. Innovation in learning to make an update that has a positive and effective impact in accordance with educational goals. Some of the benefits of implementing the benefits of implementing a learning system based on communication and information technology include that students can be more effective and enthusiastic in learning. This study obtained data sources and information from 51 respondents consisting of educators and students in elementary schools expressed in graphs. In the graph, the percentage of opinions regarding the application of the learning process between a teacher and his students to achieve an independent curriculum in elementary schools is explained and in this study there is also a table containing questions from the statements tested by researchers to respondents. Based on the results of this study, the application of learning media based on Information and Communication Technology for an independent curriculum in elementary schools can be used as an alternative in the learning system that facilitates the implementation of the teaching and learning process between teachers and students to achieve effective learning and achieve educational goals.

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