



Optimizing the Role of Information and Communication Technology in Educational Transformation

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ABSTRACT

Educational transformation is a form of effort to make changes in the world of education. Many things can be used as a tool to help realize change or innovation in the world of education. Along with the times, technology has played a significant role in making changes to the world of education. The role of technology cannot be denied, because with the existence of technology the education system begins to develop. The involvement of this technology is a source of change in the learning process, both with the support of information and communication technology. This information and communication technology needs to be used optimally and properly so that its role reaches all students. The purpose of this research is to find out that by optimizing the Role of Information and Communication Technology in Educational Transformation, education that is novel in nature will be realized both from the media used and the teaching methods used by educators. In addition, through information and communication technology, it is also hoped that it can provide innovations and solutions to current problems in the world of education and also as an opening for the transformation of education in Indonesia. The method used in this study is a quantitative method. The researcher conducted a survey by providing a questionnaire link using a Google form which contained several statements to be filled in by students. The results obtained by the researcher were the students' very positive responses to this research and the enthusiasm of the students in filling out the questionnaire link that the researchers provided. The results of the study also show that the role of information and communication technology in educational transformation is quite optimal, but educators need the latest breakthroughs to further optimize their use. The conclusion from this study is that the role of information and communication technology in educational transformation is already optimal but needs serious attention so that information and communication technology can be more optimal in its use in the educational process. The limitations of this study are that researchers only conduct research on schools and researchers do not directly conduct research at schools but by distributing questionnaire links on a Google

form containing statements related to optimizing the role of information and communication technology in educational transformation.

Keywords: *Communication, Information, Technology*

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INTRODUCTION

Education is the key to creating a nation's successor who is smart, qualified and characterized (Dewsbury & Brame, 2019). In education, a person is educated, trained and prepared to face future challenges. Through education, one will learn various types of technology as the key to mastering the future (Flores et al., 2019). As we all know, education and technology have a very close and inseparable relationship. Technology has a significant impact on education both in the teaching and learning process and the way information is collected and communicated (Manyukhina & Wyse, 2019). Technology really makes it easy for everyone, with information spreading very quickly. Moreover, technology also makes communication easier, the accessibility of communication is wider and can be done anytime and anywhere. Technology also provides educators and learners with an easy way to access subject matter (Guo et al., 2021). Technology opens access to rich and diverse learning materials such as articles, reviews, and videos that can be accessed by anyone, anywhere and anytime (Shannon et al., 2019). Technology also enables various learning processes, such as distance learning, where both learners and educators can carry out the learning process even though they are separated by different times and places (Spierings et al., 2019). Technology also allows students to learn individually and adaptively so that students can learn according to their own needs and abilities. This technology also provides flexibility for students and educators who face space and time constraints to conduct education. This technology contains many applications that can be used as communication aids and interactive learning. By utilizing technology in learning, unique innovations will be created to make the learning process from boring to more interesting.

The world of education will never be separated from improvement and development towards a better, more qualified direction. Because over time, education will continue to be updated (Sanchez & Plumettaz-Sieber, 2019). Therefore, it is very important for a country to transform education to achieve quality education for all its citizens. Education transformation is very important and must be considered by all education actors (Bogoviz et al., 2019). Without the transformation of education, the country's education will be left far behind by other countries that have far more diverse and complex technologies than this country (Hartong, 2019). In Indonesia, education transformation was undertaken to address the country's prolonged learning crisis and the situation exacerbated by the pandemic. Education transformation is an

effort made by Indonesia to improve the success of the country (Parker et al., 2019). Because education can be one of the factors that determine the success of a country. Good education can produce quality, creative and competitive human resources (Cabero Almenara & Martínez Gimeno, 2019). Therefore, a country's education needs to be evaluated and developed better, including transforming education. By transforming education, it is hoped that the learning crisis in Indonesia can be managed properly.

Learning without technology is impossible in this modern age. The role of information and communication technology in education is very important. With information and communication technology, the learning process will be fast and easy (Buhalis et al., 2019). In other words, information and communication technology is the key to realizing learning. Information and communication technology provides solutions to all problems, both for educators and students (Caragliu & Del Bo, 2019). All the necessary answers and documents can be easily obtained thanks to information and communication technology. In addition, rich and diverse teaching materials and learning resources are available (Wang et al., 2019). If a country can optimize the role of technology, especially information and communication technology in education, it is certain that the education system will experience significant changes. Information and communication technology enables the realization of a sophisticated and modern education system.

Review of Literature

Information and Communication Technology

Information and communication technology or better known as ICT is technology related to the process of obtaining or disseminating information and how to communicate (Androutsopoulou et al., 2019). As is known, information and communication technology (ICT) provides many roles and benefits in various fields. ICT also plays an important role in education, which can be used to improve the quality of human resources so that the country's prosperity will also advance (Clerckx et al., 2019). in education ICT plays a very important role in the learning infrastructure where educational materials are available in digital format so that the learning process can take place anywhere and anytime. learners do not need to be obsessed with learning at a predetermined place and time. learners can learn at leisure and in public places, through their gadgets. Now, the source of education can not only be from book (Scheufele & Krause, 2019). ICT can be used as a source of up-to-date educational materials (Tang et al., 2021). There are many educational materials that can be obtained from anywhere in the world to increase knowledge. In addition, the learning process no longer has to use a blackboard and chalk, because the teaching and learning process is supported by ITK. As a vehicle and learning tool, ICT will make the teaching and learning process more creative and interesting (Whitelaw et al., 2020).

This method is also known to be more modern because it is more effective. For this reason, educators are also required to keep up with technological developments in order to teach according to current trends. Students can also explore knowledge more

broadly and individually. With ICT, learning can also be done anywhere including online by using the internet (Nambisan et al., 2019). There are many websites, blogs, forums or applications on the internet that allow people to learn online. For example, there is an online library, which is a library in digital form that uses the internet as a storage place (Tao et al., 2019). Everyone can easily access sources of knowledge without being limited by distance and time. There are also online discussions from forums formed on the Internet, where people can discuss and exchange arguments with people who are members of the forum.

Education Transformation

Transformation is a change in form, nature, function, and others. Meanwhile, the definition of education as a whole is the process of human learning through lifelong learning and development (Jerman et al., 2020). Based on these two definitions, educational transformation can be understood as human-made changes in the process of lifelong learning and development (Alkhowailed et al., 2020). Educational transformation is a form of change that takes place, is a cycle, a process that takes place continuously and ensures that the changes made are effective and effective in improving and developing the quality of educational outcomes, educational outcomes and student learning (Chen & Hao, 2022). Basically, education is the transformation of inputs into outputs. Education is the total effort of adults combined with children to help them mature physically and mentally. Education is also an effort to develop human abilities and motivations in order to live with dignity. both individuals and members of society. Education also leads to maturity in children, including intellectual, social and moral maturity, not just physical maturity (Flórez-Aristizábal et al., 2019). Education is also a conscious effort to develop personality, perfecting humans to achieve the desired goals. Pedagogical transformation of human resource production can adapt to the era of disruption and globalization brought about by the emergence of pedagogical innovation (Schröder & Krüger, 2019). Teachers, students, curriculum, methods/tools, infrastructure, and other means to support the success of pedagogy are assessed based on the evolution of digital technology. Realizing the religious, ethical, and humanist values hidden in educational management is able to give birth to transcendental human beings before the breakthrough trend of the times.

There are several previous research opinions regarding Optimizing the Role of Information and Communication Technology in Educational Transformation. The first research is according to (suranti, 2021), with the research title The Role of Information and Communication Technology in Pandemic Times in Improving the Quality of Online Learning and the results of his research are However, the problem of using information and communication technology in the learning process during a pandemic requires a more diverse response. One of them, Madrasah Tsanawiyah Miftahul Hidayah still has very minimal understanding and knowledge in the use of technology to improve the quality of learning. The service was carried out using the methods of socialization, counseling and training. The goal is to provide an understanding of the role of information and communication technology that supports learning during a pandemic while still maximizing to improve the quality of learning. The results of this service have a good impact, this can be seen from the enthusiasm of

Madrasah Tsanawiyah Miftahul Hidayah students in participating in activities with fun. The second research according to (Marzoan, 2017) , with the research title *The Role of Information and Communication Technology to Improve the Quality of Learning in the Perspective of the 2013 Curriculum* and the results are ICT becomes a teacher's tool in the learning process in all subjects. This implies the importance of mastering ICT by teachers. If the learning process is carried out with the help of ICT, it is believed that it will improve the quality of learning. The third research is according to (Ismaniati, 2018), with the research title *Use of Information and Communication Technology in Improving the Quality of Learning* and the results of his research are If properly designed, ICT products can be utilized in learning both as learning aids, teaching-learning interaction tools, as well as tools or independent learning resources for students in order to improve the quality of learning both in terms of process and results. Some examples of the use of ICT in learning that occur today include the use of learning audio programs, learning video programs, the use of educational TV, the use of social networks, and e-learning.

The research conducted by the previous researcher is different from the research that the researcher is doing now. While the research that the researchers conducted was entitled *Optimizing the Role of Information and Communication Technology in Educational Transformation*. The results of the research explain that the role of information and communication technology in optimal transformation is quite optimal. With the existence of information and communication technology that helps the education process, innovations and changes are created in the education process both in terms of teaching materials and in terms of learning methods. However, it is still necessary to pay attention to the use of information and communication technology in education because it will create demands for educators to be able to master technology and create various kinds of learning support media using technology.

RESEARCH METHODOLOGY

When conducting research, it is very important to determine what methods will be used in the research (Tanaka et al., 2019). In this study, researchers used quantitative research methods with a quantitative approach. This quantitative method is identical to relevant theories (Nusinow et al., 2020). Research theory is the main guide in research, with theory can determine the direction of research as well as a reference for hypotheses to be tested (Zou et al., 2020). This quantitative research method produces data in the form of numbers obtained by filling out surveys on Google Forms and provided to students as research subjects. In addition, this quantitative method produces systematic, planned, and structured research. This quantitative research method is widely used in research (Kickingereeder et al., 2019). This quantitative method is defined as the process of discovering a phenomenon systematically and realistically by collecting information, then measuring it and confirming the truth by filling out questionnaires and interviewing stakeholders (Wilson et al., 2019). This research is mostly done through statistical research where quantitative data is collected through research studies. This quantitative research method provides information that is truly accurate and realistic because the end result is in the form of numbers.

This research uses a survey research design. The data from this survey contains an overview of optimizing the role of information and communication technology in educational transformation (Khan et al., 2020). The researcher's data collection technique is to seek and collect factual and current information on the spot. Data collection at observation points is a quantitative research data analysis technique (Johnson & Khoshgoftaar, 2019). When analyzing data, one does so by describing and characterizing the information collected, without changing the source of the information obtained (Van Engelen & Hoos, 2020). The first step of this quantitative research is to find the root of the problem or formulate the problem, then conduct a literature review, determine the hypothesis, determine the method to be used, determine the instrument or research tool, and conduct data analysis and finally draw conclusions.

RESULT AND DISCUSSION

Information and communication technology (ICT) is one of the latest forms of technological breakthroughs that are developing today. Information and communication technology (ICT) consists of two sides: information technology and communication technology. Information technology covers all issues related to the processing, use as a tool, processing, and management of information. Meanwhile, communication technology covers all aspects related to the use of tools to process and transmit data from one device to another. Thus, information technology and communication technology are an inseparable unit, containing a broad understanding of all activities related to the processing, manipulation, management and transmission or transfer of information between facilities. From the concepts of information technology and communication technology, these two technologies are equivalent technologies that cannot be separated, meaning that the two technologies are closely related.

The development of ICT as a bridge of knowledge. One of the uses of information and communication technology in today's modern era is as an information medium, such as the internet. Learners can more effectively explore information around the world by accessing the Internet. In addition to its role as a medium of information, the development of information and communication technology can also be utilized by students as a means of communication. For example, by using the internet to chat and send letters, students can communicate by exchanging information about what is being discussed. Not only communication between students, students and teachers or experts can also take place. In this way, students will quickly get ideas and arguments from different groups. With the development of information and communication technology (ICT), learning has become much more effective. The learning process is not always face-to-face as it used to be. Now, the learning process can be realized by optimizing the role of existing information and communication technology developments, so as to use time effectively. For Indonesia itself, given the geographical conditions that make it an archipelago, information and communication technology is more likely to be the main driver of equitable education in Indonesia. Because information and communication technology has the potential to create distance learning. Therefore, the development of information and communication technology is called the eradication of time and space boundaries.



Figure 1: Illustration of the role of ICT in Education

Based on the picture above, it can be concluded that the role of information and communication technology in the world of education is very large. Almost every movement in the world of education uses information and communication technology as its driving force. It can be said that if there is no information and communication technology, maybe learning will be boring and allow the emergence of lazy learning in students. Information and communication technology includes all activities related to the processing, management and transmission of information from sender to receiver. Meanwhile, the importance of information and communication technology for education means the availability of channels or media that can be used to deliver educational programs. Communicative learning becomes much more effective, the development of information and communication technology also takes a role in the management of educational institutions.

In the context of educational transformation itself, which means changes in the world of education, information and communication technology has also shown its superiority. How not almost the entire learning process can use the role of information and communication technology. Transformation of education using information and communication technology will have a huge impact on education in Indonesia. By using ICT, the learning process will become younger and more flexible. However, the demands of the use of information and communication technology will force the education system in Indonesia to always be able to adapt to technological developments in order to improve the quality of education, especially the adjustment of the use of information and communication technology in education, especially in the learning process. The existence of information and communication technology will also change the learning patterns of students, because by using ICT, learning can be done anywhere and anytime. Looking at the current reality, it is undeniable that information and communication technology will create opportunities and challenges in the world of education.



Figure 2: Forms of ICT utilisation in learning

Based on the picture above, it can be seen that there are many applications of information and communication technology that can be used as supporting media in the learning process. Through information and communication technology, it is possible for learning to be diverse and more varied than before. The existence of information and communication technology will facilitate learners in creating a more dynamic and interactive learning experience. It can also help students easily understand the subject matter. Advances in information and communication technology can also make it easier for learners to access remote learning resources and flexible schedules so that learners are not tied to a specific learning schedule. Technology that provides access to a variety of educational resources such as videos, images, animations and other multimedia content can enrich learners' learning experience, which also makes students less bored with lessons. The presence of ICT can allow students to easily access the information and data needed. For example, a learner uses Google. In this way, learners can explore the material more widely and deeply.

Researchers collect data on the perspectives and responses of students towards optimising the role of information and communication technology in educational transformation through distributing questionnaire links to students. The purpose of distributing this questionnaire is to obtain results and to find out whether the role of information and communication technology in educational transformation is optimal or not. The questionnaire or questionnaire given by researchers to students contains 15 statements that include optimising the role of information and communication technology in educational transformation. The questionnaire was created using google form. In addition, researchers also need to pay attention to aspects of relevance to the statements given, also related to the accuracy of the statement with the research title. The response of students who filled out the questionnaire was very positive towards the role of information and communication technology in educational transformation. The data that researchers get then researchers summarise in one table, as below:

NO	Statement	SS	S	RR	TS	STS
1	I feel that the use of information and communication technology can help transform education.	60%	40%			
2	I feel that information and communication technology has a positive impact on educational transformation.	33,3%	50%	16,7%		
3	I feel that information and communication technology can facilitate the education transformation process	40%	60%			
4	I feel that information and communication technology can support educational transformation.	66.7%	33.3%			
5	I think that the development of information and communication technology should be followed by every educational institution.	55%	45%			
6	I feel that information and communication technology can make it easier to understand learning in educational transformation.	50%	50%			
7	In my opinion, information and communication technology is very suitable to be applied in educational transformation.	60%	40%			
8	I think that with the existence of information and communication technology the education transformation process will run more effectively	50%	50%			
9	According to information and communication technology as educational transformation	50%	50%			
10	I feel that with the existence of information and communication technology, information is quickly obtained	60,7%	39,3%			
11	I feel that with the existence of information and communication technology, the communication process has become easier.	60 %	40 %			

12	I feel that every learner should be able to master information and communication technology because technology has many benefits in its use.	50%	50%			
13	I feel that the education transformation process will improve if information and communication technology is used.	66,7%	33,3%			
14	I feel that information and communication technology can change the way students learn.	50%	50%			
15	I think the use of information and communication technology in transformation does not consume a lot of time	33,3%	50%	16,7%		

Figure 1: Table of questionnaire filling by students

Notes:

SS = Strongly Agree

S = Agree

RR = Undecided

TS = Disagree

STS = Strongly Disagree

The table above is a table of assessment results from a questionnaire given to students. Responses or responses given by students are needed to provide an assessment of the role of information and communication technology in educational transformation whether it is optimal or not. In the statement there are 5 assessment categories, namely Strongly Agree (SS), Agree (S), Undecided (RR), Disagree (TS), Strongly Disagree (STS). Based on this table, the first highest assessment result is 60% with an agreed assessment category. While the second assessment is 66.7% with a very agree assessment category. The role of information and communication technology in educational transformation is quite optimal, although sometimes there are still some obstacles in its implementation. With the use of information and communication technology, the learning process becomes more individualised and flexible. Students feel the renewal of learning by using the role of information and communication technology.

Furthermore, the researcher will describe the results of filling out the questionnaire. For the first statement, I feel that the use of information and communication technology can help the transformation of education, it obtained a response with a strongly agreed category of 60% and an agreed category of 40%. For the second statement, I feel that information and communication technology has a positive impact on educational transformation obtained a response with a strongly agreed category of 33.3% and an agreed category of 50% and a doubtful category of 16.7%. For the third statement, I feel that information and communication technology

can facilitate the process of educational transformation obtained responses with a strongly agree category of 40% and an agree category of 60%. For the fourth statement, I feel that information and communication technology can support the transformation of education obtained responses with a strongly agree category of 66.7% and an agree category of 33.3%. For the fifth statement, I think the development of information and communication technology must be followed by every educational institution to get a response with a category strongly agreeing 55% and a category agreeing 45%.

Furthermore, for the sixth statement, I feel that information and communication technology can make it easier to understand learning in educational transformation, the response was strongly agreed 50% and agreed 50%. For the seventh statement, I think information and communication technology is very suitable to be applied in educational transformation, obtaining responses in the category of strongly agreeing 60% and agreeing 40%. For the eighth statement, in my opinion, with the information and communication technology, the education transformation process will run more effectively, obtaining responses with a strongly agree category of 50% and an agree category of 50%. For the ninth statement, according to information and communication technology as an educational transformation, the responses were strongly agreed 50% and agreed 50% categories. For the tenth statement, I feel that with the existence of information and communication technology, information is quickly obtained by obtaining responses in the strongly agree category 60.7% and agree category 39.3%.

Furthermore, for the eleventh statement, I feel that with the existence of information and communication technology the communication process has become easier, obtaining responses with a strongly agree category of 60% and an agree category of 40%. For the twelfth statement, I feel that every learner must be able to master information and communication technology because technology has many benefits in its use obtained a response with a strongly agree category of 50% and an agree category of 50%. For the thirteenth statement, I feel that the education transformation process will be improved if information and communication technology is used, obtaining responses in the strongly agree category 66.7% and agree category 33.3%. For the fourteenth statement, I feel that information and communication technology can change the way students learn obtained responses with a strongly agree category of 50% and an agree category of 50%. For the fifteenth statement, I think the use of information and communication technology in transformation does not spend a lot of time obtaining responses with a strongly agree category of 33.3% and an agree category of 50% and a doubtful category of 16.7%.

CONCLUSION

Based on the results and discussion above, it can be concluded that the role of information and communication technology in the transformation of education is quite optimal. With information and communication technology, an innovative and creative learning process will be realised that is far more diverse than the previous learning process. Information and communication technology allows students and educators to carry out the learning process online, even though they are separated by time and place. The benefits of using information and communication technology optimally in

education will enable the birth of a sophisticated and advanced education system. Hopefully this research can provide meaningful solutions and contributions to every educational institution. And also researchers hope that educators can take advantage of the role of information and communication technology that is developing every day significantly and sustainably. There are so many benefits caused by information and communication technology if implemented optimally and directed. With the role of information and communication technology, it is expected that the learning process becomes more diverse, both in terms of teaching materials and in terms of learning methods. Information and communication technology also allows the creation of adaptive and flexible learning. Furthermore, ICT can also create effective and efficient interactive learning for students that is tailored to the needs and abilities of students.

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