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### THE ROLE OF INFORMATION TECHNOLOGY TOWARD THE DEVELOPMENT OF ONLINE LEARNING PROCESS IN COVID-19 PANDEMIC PERIOD IN INDONESIA

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#### **ABSTRACT**

Covid-19 pandemic has triggered the practice of online learning in Indonesia. Basically, Information and communication technology (ICT) that develops very fast is the key to the successful implementation of online learning. Indonesia is currently still in the to learn phase of ICT. Thus, application of online learning during the Covid-19 pandemic has not achieved maximum results yet. The government of Indonesia realizes that in the future, online learning will become a positive trend in education around the world. Various obstacles and challenges while conducting online learning so far are: lack of infrastructure, limited internet coverage, poor behavior during online learning, lack of standard implementation standards and academic quality control must be addressed and appropriate policies are made. by the government. The involvement of various parties will make the implementation of online learning well organized, effective and efficient. The government can't work alone in realizing governance in the field of implementing online learning. The government needs to involve private sector and citizen in implementing this online learning. Thus, the goal of education can be achieved.

#### **INTRODUCTION**

In early 2020, the world was shocked by the new outbreak that came from Wuhan, Hubei Province. Furthermore, it spread quickly to 190 countries and territories. This outbreak is named coronavirus disease 2019 (COVID-19) caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2).[1] Issues regarding education and the learning process in almost all parts of the world are currently affected by the determination of the status of the Covid-19 pandemic by WHO on March 11, 2020. Indonesia then followed WHO's steps by issuing Presidential Decree No.11 of 2020

concerning the Determination of Public Health Emergencies for Corona Virus Disease 2019 (COVID-19) and Presidential Decree Number 12 of 2020 concerning the Designation of Non-Natural Disaster for the Spread of Corona Virus Disease (COVID-19) as a National Disaster.

The policy brings huge implication for some sectors, such as: impacts on public health, the tourism, the employment, the economic the cultural, the political sectors, etc., especially the impact on the education sector. The real implication that occurs in the education sector during the Covid-19 pandemic, especially in Indonesia, is that almost all students in Indonesia can't go to school/campus due to the stipulation of a health emergency period and the imposition of Large-Scale Social Restrictions (PSBB).

This condition is then responded to by the application of online learning (in network/online) that is applied during the emergency period. All online learning processes are applied suddenly and simultaneously. The online learning policy is contained in the Ministry of Education and Culture Circular Letter Number 4 of 2020 concerning the Implementation of Education in the Coronavirus Disease (Covid-19) Emergency Period.

There are three important points in The Ministry of Education and Culture Circular: online learning (distance) is to provide a meaningful learning experience, without being burdened with demands to complete all curriculum achievements for class promotion and graduation. Second, it can be focused on life skills education, including regarding the Covid-19 pandemic. Third, learning activities and assignments may vary between students, according to their respective interests and conditions, including considering gaps in access/ learning facilities at home.

The circular is then strengthened by the issuance of a Circular (Press Release) of the Minister of Education and Culture Number 137/Sipres/A6/VI/2020 on June 15<sup>th</sup>, 2020 concerning Guidelines for Implementation of Learning in the New Academic Year and Academic Year in the Covid-19 Period. In principle, the government is still implementing distance learning (online) for all levels of education, starting from early childhood education, basic education, secondary education and higher education.

There are things that have not been prepared in providing education online, such as: internet network readiness, infrastructure, budget readiness, and others. The conditions of the Covid-19 pandemic have forced the Indonesian people to begin to be adaptive to changes and developments in information technology. The rapid information technology information in this globalization era can't avoid the effect toward education. The world requires that education should always and constantly adapt technological developments to efforts to improve the quality of education, especially adjusting its use for the world of education, especially in the learning process. [2]

The Indonesian nation can't avoid the attacks of information technology developments. Change and innovation are needed in the world of education in Indonesia. This is not only because the Indonesian nation is in a state of health

emergency, but because it will enter the 21<sup>st</sup> century, in which the world will be filled with developments in information technology. The core of the problem is actually in education sector. The weakness in conventional learning that relies on face-to-face contact between teachers and students, lecturers with students, trainers and trainees. Yet, this is an easy target and the easiest target to become a target who wants quality improvement in the world of education. [3]

In the development of the current era, the fast exchange of information requires educational institutions or institutions to start changing traditional or conventional teaching systems into teaching systems that are in line with the development of information technology. This is because the conventional teaching system is not effective if the teaching and learning process does not pay attention to current needs and developments in information technology.

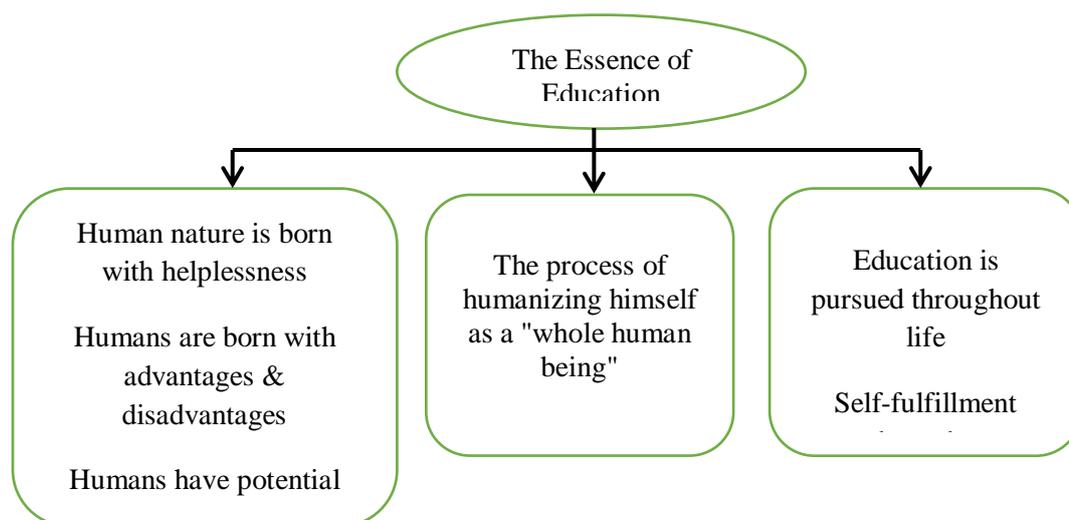
Based on the empiric facts above, the title of this paper is The Role of Information Technology toward The Development of Online Learning Process in Covid-19 Pandemic Period in Indonesia. This paper examines the role of information technology in online learning and the prospectus for developing online learning during the Covid-19 pandemic in Indonesia.

## **LITERATURE REVIEW**

### ***The essence, purpose and process of education in Indonesia***

Human beings can't be separated from education. Learning in the concept of education is one of the important sectors in development in every country. Article 1 of Law Number 20 Year 2003 concerning the National Education System states that education is a conscious and planned effort to create an atmosphere of learning and the learning process. Thus, students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills that are needed by themselves, the community, and develop all their potential. learners through the learning process.

Each formal education has been implemented from an early age (early childhood education/PAUD) to higher education (Dikti); but essentially, education is carried out for life from birth to death, as illustrated in Figure 1.



**Figure 1:** The Scheme of Education Essence  
Source: Authors, 2020

Based on the case, education is expected to be able to form human personality intact; to form human beings who are smart, intelligent (intellectual, emotional, spiritual), creative, innovative; and form an independent and resilient human being. Article 3 of Law Number 20 of 2003 concerning the National Education System formulates the objectives of national education to develop the potential of students to become human beings who believe in and fear God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen. It has also implanted since the human is still in the womb, birth, until adulthood in accordance with his development.

Furthermore, the law also formulated the purpose of early child education. It aims to develop personality and self-potential in accordance with the stages of development of students. Article 5 of Law Number 12 Year 2012 concerning Higher Education states that the goals of higher education include: developing the potential of students to become human beings who believe and fear God Almighty and have noble, healthy, knowledgeable, competent, creative, independent character. skilled, competent, and cultured for the benefit of the nation; generate graduates (humans) who master the branches of science and/or technology to meet national interests and increase national competitiveness; the application of humanities values in order to benefit the progress of the nation, the progress of civilization and the welfare of mankind; as well as an orientation to promote general welfare and to educate the nation's life.

Based on this case, the goals/purposes of education also change according to human development. Because education is experienced from birth to adulthood, the goal of education is also a process. The process of "humanizing himself as a human being" is an essential meaning in education. The success of education is "the ideals of life education in the world".[4]

## **THE DEVELOPMENT OF INFORMATION TECHNOLOGY IN COVID-19 PANDEMIC**

The advancement of information technology has provided a very broad source of information and communication from what humans already have. Although the role of information has received less attention for decades, the need for information and communication is no less important than the need for human clothing and food.[5] Information is a fundamental element that is implicitly inherent in the concept of a planned development. Although the role of information in a few decades have received less attention, but the real need for information and communication is no less important than human food and clothing needs. [5]

The existence of current technology and information cannot be separated from the historical development of this technology and information. Currently, the world is considered to be experiencing a third wave, known as the digital era. The first period was in 1400-1500s. it is believed as the beginning of technological revival. At that time, it was a massive industrial revolution, that was marked by the invention of the steam engine by James Watt, then the invention of the printing press by Johannes Gutenberg in 1455. With the presence of printing machine technology from Gutenberg, other technologies also emerged such as: linotype machines (typewriters), lithography (the first printing machine), photoengraving (the development of printing machines with a combination of photo techniques), photocopy technology to the use of computers in printing.[6]

The second era (period) was marked by the invention of the telephone by Alexander Graham Bell in 1876, who later patented it at a cost of \$ 100,000. The next development in this period was the discovery of radio networks which began to develop since the 1920s; and the invention of television technology in 1926.

The third era (period) is marked with computer invention. The invention of computers in the 1940s marked the beginning of the technological transformation from radio-television to the world of computers. The history of the first generation of computers is known as the Electronic Numerical Integrator and Calculator, which is an electronic digital device designed in 1942. After this discovery, computers experienced rapid development through five phases of development.[7] First generation (vacuum tube), in 1946, computers were created with a vacuum tube as the main component. The generation computer weighs was nearly 30 tons. The weakness of this first generation computer was very inefficient, because it required a very large electric power. This first generation computer still used machine language that could only be understood by the computer itself. The second generation (transistor), is called transistor generation because it used transistor as the main component that quite sophisticated in its time (1959-1965). Some of the advantages were smaller size, not too hot, and minimal failure rate compared to the first generation computer. This generation no longer uses machine language as before. The machine language has been replaced by FORTRAN and COBOL. The third generation of computer development is IC. The principle of the third generation of computers is that the transistor is reduced and then

placed on the IC along with several resistors and capacitors. The advantages of computers with ICs in their time were faster and more efficient. The first third generation computers used monitors and keyboards. The fourth generation of computer was developed by IBM in 1971. furthermore, it was developed by Apple in 1984. At this time the computer generation entered the microprocessor era. Along with this generation of microprocessors, the internet was born. The monitor display still used one color (green color). In addition, a chip was developed as computer memory. Over time, experts tried to complement what was missing, namely PC-Compatible.

The fifth generation (artificial intelligence) is marked with Artificial intelligence (AI), thus it can input better. In fact, this technology is called the computer of the future. AI was developed by Intel and Microsoft that was initiated by Bill Gates who is a pioneer of hardware and software standards worldwide. This generation is marked by the emergence of smartphones, tablets, netbooks and many others. Computers of this generation are small and simple, but have unquestionable speed and sophistication.

### **RESEARCH METHOD**

This research use qualitative approach, by using the secondary data. Qualitative research is research that is used to investigate, describe, explain, discover the quality or features of social influence that cannot be explained, measured or illustrated through a quantitative approach.[8]

The secondary data are comes from regulations, books, journals, research reports, reports from an expert, etc. The data should be collected and divided to find out the relevance to the issues. The next steps are analyzed based on the secondary data to answer the issues.

### **RESULTS AND DISCUSSION**

#### ***The role of information technology toward the development of online learnig process in covid-19 pandemic period in indonesia***

The policy of government that applies online learning process in covid-19 pandemic period needs to be appreciated. A modern learning system based on information technology provides a wide range of quality that is very suitable for the millennial community that can be accessed at various places and times. The online model minimizes educators and students from seeing each other in this time of pandemic. This system can be accessed by various levels of society from middle to medium level. The development of technology and information during the industrial revolution 4.0 eases people to connect online, such as social media and be able to access information quickly.[9]

Minister of Education and Culture (Mendikbud) Nadiem Makarim explained that areas in the red zone are required to eliminate face-to-face learning processes. This is because of concerns over the spread of the Covid-19 virus in their respective regions. The existence of information technology today is considered to have an important role in human life as a support in carrying out various activities both in carrying out work and in terms of education.

Online course is a learning method conducted by utilizing internet network. Online lecture/course is supposed to be developed after all this time education in Indonesia has been carried out with a conventional system. Yulita Pujilestari said that this conventional system should be integrated with multimedia communication media, especially since the discovery of this multimedia communication media. Due to the nature of the internet that can be contacted at any time, it means that students can take advantage of educational programs provided on the internet at any time according to their spare time. Thus, the space and time constraints they face in finding learning resources can be overcome. [3]

According to Abdulhak, there are the classification of the use of information and communication technology (ICT) that are: first, ICT as a medium (aids) for education, namely only as a complement to clarify the description given; second, ICT as a source, namely as a source of information and information seeking; and third, ICT as a learning system.[10] The use of ICT in Indonesia is currently just entering the to learn stage (to learn) various possibilities for the development and application of ICT for online-based learning processes. This was reflected when the online learning process was first held, almost many educational institutions were not ready. However, the initiative needs to be appreciated, when this unpreparedness raises creativity so that online learning can take place, such as using the WhatsApp media in providing learning materials, collecting assignments, to monitoring students; Besides that, there are also many educators who use email (email) and YouTube as learning media. After one month of online learning, the government and educational institutions start to seriously develop or improve an online learning system or application.

Based on this case, the Minister of Education and Culture collaborates with various parties for online learning.[11] It was recorded that as of March 22, 2020, the Ministry of Education and Culture has collaborated with 12 platforms or applications in organizing online learning, including: Learning Houses, Desks We, Icando, IndonesiaX, Google for Education, Smart Class, Microsoft Office 365, Quipper School, Teacher Room, Your School, Zenius, and Cisco Webex.[12] This collaboration is the first step in introducing online learning to the world of education in Indonesia. during the covid-19 pandemic.

There are four benefits of online learning based on Bates and Wulf as follow: increasing the level of learning interaction between students and lecturers/teachers or instructors (enhance interactivity); enabling learning interactions from anywhere and at any time (time and place flexibility); reaching students in a broad range (potential to reach a global audience); facilitating the improvement and storage of learning materials (easy updating of content as well as archivable capabilities).[9] Besides having enormous benefits in the online learning process during the Covid-19 pandemic, there are several problems in Indonesia. which causes information technology and the internet can't be used optimally. Yulita Pujilestari said that the readiness of the Indonesian government is still questionable in this regard. One of the main causes is the lack of availability of human resources, the process of technological transformation, telecommunications infrastructure and the legal

instruments that regulate it. [3] Is the legal infrastructure that underlies educational operations in Indonesia sufficient to accommodate new developments in the form of the application of IT for education?

In addition, there are still obstacles in the field of infrastructure and infrastructure procurement for information technology, telecommunications, multimedia and communication, that are a prerequisite for the implementation of the internet of things for education, while the penetration of computers (PCs) in Indonesia is still low. Internet access that coverage is still not extensive, is also a separate obstacle in the online learning process.

*Prospectus of online learning process while applying new normal life*

Covid data in Indonesia on August 21<sup>st</sup> 2020 reported 149,408 patients confirmed positive or increased 2,197 cases from the previous day. Graphically, the development of the Covid-19 case in Indonesia is still up or on an upward curve, as seen in the following figure:



**Figure 2:** Data of Covid-19 Growth in Indonesia (August, 21<sup>th</sup> 2020)

**Source:** <https://covid19.go.id/peta-sebaran>

Based on the data, it can be ensured that online learning process will continue until the normal condition. This means that the prospect of organizing online learning from early childhood education, children's education, basic education, secondary education, to tertiary education will be wide open to continue even though Indonesia has announced that it will soon enter a new "new normal life" phase of life.

Indonesia has implemented the first stage of the education or online learning system, namely: three months during the Covid-19 pandemic. It is necessary to study the weaknesses and shortcomings of implementing online learning in the last three months. These shortcomings and constraints must be evaluated, and then policies are taken in order to improve online learning in order to achieve educational goals effectively and efficiently.

Some notes that must be evaluated during online learning phase 1 during the Covid-19 pandemic. First, the uneven availability of infrastructure (computers, laptops) owned by students and educators. Economic limitations are the trigger for many Indonesians haven't had hardware and/or software to support online learning process activities.

Second, the reach of the internet network has been not wide and it is unstable. There are still many areas that have not been hit by the internet network or have difficulty signals. The digital divide in Indonesia occurs mainly between the regions of West Indonesia and East Indonesia, urban areas and rural areas.[13] Furthermore, Yayat Hidayat argues that the problem of geographic differences has always been one of the concerns about how the diffusion of a new technology takes place. [14] There is an assumption that technological developments follow the process of spreading from urban areas (core areas) to rural areas. Urban areas will become centers for the development of information-communication technology, on the other hand, rural areas will be late in adopting information-communication technology so that they will experience delays in experiencing changes.

Third, the mental readiness of students and teacher still needs to be improved in the event of a change in behavior that is initially face-to-face learning, then online learning. This mental unpreparedness can be seen in many students who just take online learning, not trying to enjoy online learning. Many students learn online while sleeping, while watching television and they are attending class but their presence is not visible. Likewise with teachers, there are are just attending or just filling in presence, educators only provide material files without explaining, educators only give a lot of tasks to their students. Thus, teachers do not have an organized concept in the online learning process.

Fourth, Indonesia has not had qualified standard about online learning, starting from the level of early childhood education to higher education. Each educational institution carries out online learning based on its own interpretation. Fifth, the absence of standard online learning standards will lead to the supervision and quality assurance of education. This still looks weak and it is very clear weakness in terms of supervision and quality assurance of education in the online learning process. It can be honestly considered that the effectiveness of online learning has not yet been achieved. Those challenges should be found the solution by all stakeholder, such as government (as regulators and supervisors), educational institutions, society (including students). There must be good governance in the implementation of online learning in the future. Kadewibawa stated that good governance is basically a concept that refers to the process of achieving decisions and their implementation which can be accounted for collectively. [15, 16, 17] As a consensus reached by the government (state), citizens (citizen or society), and the private sector (corporate) for governance in a country.

From the statement, the implementation of online learning should start to applying the principles of good governance, by involving many actors to achieve maximum results or the nature of education goals to be achieved

effectively and efficiently. In the future, online learning will become a trend to further develop. New life arrangements will be more welcome to online learning patterns. Humans must be adaptive in facing new normal life; as in the theory of evolution put forward by Charles Darwin, that species that are able to withstand change are not only strong species, but species that are adaptive (able to adapt to change). This is the key to the success of online learning in new normal life later.

### **CONCLUSION AND RECOMMENDATIONS**

Online learning process in covid-19 pandemic period in Indonesia has been going quite well, with the various obstacles and challenges. Information technology plays important role in implementing online learning. The relationship of information technology with the success of online learning is directly proportional. Good mastery of information technology, then the success rate of online learning is also good; vice versa. The prospects for providing online learning in the future are very good. This is because the need and development of information technology can no longer be stopped. The Indonesian nation needs an adaptive attitude towards changes in welcoming new normal life in the future. Thus, it can survive and win life in a new life order later.

Some recommendations can be given for the problems in this paper, as follow. The government much build infrastructure related to information technology and expanding the internet network. The limitation of the government can be conducted by cooperating with private parties or investors. There should be optimal socialization related to changes in attitude or behavior in a new life later. This is necessary in order to create a good and strong mentality in facing the ongoing online learning process later. Lastly, there should be the determination of standards for online learning, including supervision and assurance of the quality of education.

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