ICT-Based Learning During Covid-19 Outbreak: Advantages, Opportunities and Challenges

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Abstract

ICT-based learning is kind of learning that use Information and Communication Technology (ICT) to foster, optimize, enhance and support gaining knowledge. Covid-19 has caused the full transformation to ICT-based learning. This study aimed to investigate the advantages, opportunities and challenges of ICT-BL during the pandemic. Systematic analysis of the qualitative results indicated that possibility of Online learning, saving time and money, communication and motivation tool, usage of social media, sharing and processing the knowledge and improving the quality of education were the highest ranked advantages of the ICT-based learning and remote learning, extra time, adoption of new skills and more technologies and MOOCs in addition to family gathering were the most opportunities while internet accessibility, electricity problems, maintenance of infrastructure, high cost of ICT device and lack of expertise, ability to manage classrooms and plagiarism were the high ranked challenges for both students and lecturers to continue online learning. Developing countries need to develop new strategies and techniques to promote ICT-based learning based on innovation, socio-cultural and socio-economic aspects not only financial support.

Keywords: ICT-Based Learning, ICT-BL Advantages, ICT-BL Opportunities and ICT-BL Challenges, Case Study.

INTRODUCTION

ICT applications plays significant role in education in new technological era especially during covid-19 pandemic. Although, applications and practices of ICT-based learning (ICL-BL) are not adopted in developing countries as developed countries, but many of developing countries have been forced to adopt ICT-based learning. Developing countries have adopted ICT as part of educational system over the past two decades of the twenty one century (Shen & Ho, 2020). However, a very few progress have been made. Indeed, a small percentage of schools /universities in some developing countries including Indonesia have achieved middle levels of effective use of information and communication technology (Lestari & Prasetyo, 2019) to support and change the teaching and learning process in many areas of study. Others are struggling in the first stage of adopting information and communication technologies related to many problems and challenges such as poverty, conflicts, wars and sociocultural procedures Janssen et. al (2019) that hinder the progress in education in developing world. Implementing ICT in learning process in most of educational institutions in developing countries faces some

challenges including little to no computer experience, poorly equipped classrooms, most rural schools are not on the electrical grid, expensive and slow internet connections, most schools with computers are not using them as a medium of instruction and shortage of e-learning materials for students (Kettunen & Sampson, 2019; Hinostroza, 2018). On the other hand, implementing ICT in learning has many benefits such as improving engagement and knowledge retention, encouraging individual's learning and collaboration and learning different skills in flexible time.

According to the report from UNESCO 2020, the pandemic has a devastating impact on global education (Statista, 2020). By May 2020, 95% cent students around the world have been affected by the outbreak of the virus, representing 1.7 billion of the students worldwide, from kindergarten to postgraduate, in more than 200 countries (UN, 2020) where governments around the world ordered closures of schools and universities. Based on this fact, many schools and universities world-wide began to adopt online learning. Adoption of ICT-based learning resulted many advantages, opportunities and challenges and that was the reason to write this paper.
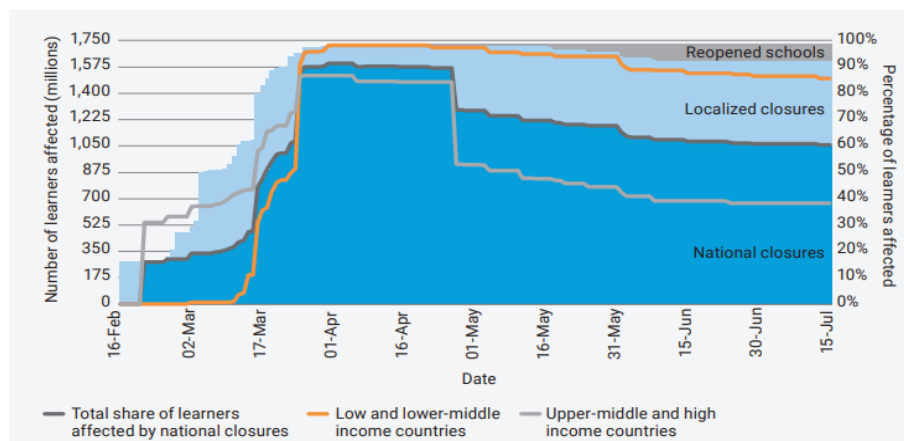

Figure 1. Number of students affected by school closures globally, source: (Statista, 2020)

ICT- based learning have many advantages and components such as quality of content, supporting learning system, ability of such system to interactive, ease of use and educational evaluation (Binyamin, Rutter, & and S. Smith, 2019). Besides, advantages could be different modes based on the type of learning such as availability in time and place, equity, enhancing collaboration between students and educators, direct access to different resources, ability to enhance service of education dimensions globally and ability to determine the progress rate in educational courses (Talebian, Mohammadi, & Rezvanfar, 2014). Use of ICT has positive impact on learning in high schools and ICT factors such as infrastructure, devices, techniques, methods and applications have more affective influence to learning in undergraduate and graduate levels (Al-Ansi, Suprayogo, & Abidin, 2019). In the other hand, penetration of

electronic devices in learning such as laptops, cell-phones and tablets and availability of these devices for students facilitated the ability of learning. Some of studies stated that number of mobile devices are more than the people in the globe where reached more than 7.9 billion devices. This enables usage of m-learning effectively and offers many of opportunities in learning anywhere anytime regardless some limitations in use of mobile device as learning tool (Criollo-C, Luján-Mora, & and A. Jaramillo-Alcázar, 2018). Advantages of ICT usage in learning include control of the content, control the approaches of presentation, creativity and modernity, ability to give feedback anytime and Adaptability (Padurean, 2009).

Regardless the negative impact of Covid-19 in our life today, ICT-Based learning has many opportunities during this pandemic including saving more time and expenses, adoption more technologies to learning, learning new skills and availability of learning materials online all the time in addition to the gathering with family while studying/teaching. Different previous studies discussed the opportunities of ICT-Based learning in enhancing the abilities and competencies of students/educators and facilitating learning process (Al Ansi & Al-Ansi, 2020). The use of social networking tools to enhance collaborative learning activities is seen as an effective way for students to experience a sense of ownership of the learning process. (Kurtz, 2014), and guide the student to discuss problems with their classmates. Other studies discussed the importance of collaborative learning role in saving time of students and educators in sending emails, saving, revising and editing materials and other activities which leads to improve their productivity (Huang, 2017). In another hand, social media plays an important role in ICT-based learning at the pandemic time and social distancing. Using of social media and sharing various information in the same platforms would significantly increase students' understanding of complex subject (Erturk, 2016) and able them to post and share their ideas. In addition, teleconferencing applications became the main tool for conducting online classes such as zoom and google teams. Besides, a chatting is a useful approach to mitigate some problems students may be facing when they learn a specific topic. This is due to saving these chatting and students have the ability to read and review anytime they need (Subramani, 2015).

On the other hand, ICT-based learning in developing countries faces many challenges (Garad & Al-Ansi, 2021). Some of these challenges are about the speed, coverage and cost of internet, electricity problems, high cost of infrastructure, managing and organizing classrooms, maintenance of hardware and software, lack of expertise and sometimes plagiarism. One Study by Cox, Preston and Cox (Çakici, 2016) mentioned some problems related to using ICT in classrooms such as inability to use software and hardware of ICT, shortage of technical support, no enough time to use ICT, some difficulties related to access resources, restriction of content and insufficient resources Technology. Another study by Manda and Dhaou (2019) investigated

the challenges in the 4th industrial revolution which included potential job loses, skill challenges, Infrastructure challenges, security and privacy. In fact, challenges of ICT-based learning differ among nations. Developed countries experience social challenges such as loss of jobs, disqualified HR, new kinds of stress and some problems related to increasing insecurity in social system (European Parliament, 2016) in addition to Changing business models, data issues, legal issues of liability and intellectual property, and mismatch of standards and skills (Dregger, 2016) while developing countries are more concern about infrastructure, advances in technology and manufacturing techniques, Low e-readiness levels, lack of digital connectivity, skills, knowledge, and innovation (Manda & Backhouse, 2016).

Different research have investigated the role of ICT in education, in addition to exploring benefits and challenges or ICT-based learning and comparing technologies development and implementations in developing and developed countries. This research is unique due to current condition of ICT-based learning. ICT-based learning became the only learning tool because of Covid-19 pandemic. Online learning depends on ICT applications and techniques (Al Ansi A. M., 2017). Many governments in developing countries invested in infrastructure of online learning during past few years where some universities were conducting some classes online through LMS of university. Covid-19 has caused many serious problems to our health system (Al-Ansi, 2021), economy and learning system as well. It is important to mention that adoption and implementation of ICT in education in developed countries are more effective and the problem that educational systems has or policies' makers face are not the same as in developing world. So, investigating the real problems related to ICT-based learning systems in developing countries after the total transforming of learning to be online is what makes this study significant.

This research aims to investigate the opportunities, challenges and advantages of using ICT in learning as solution to face outbreak of the virus worldwide. To get this aim, the following question is raising: what are the advantages, opportunities and challenges of ICT-based learning in developing countries such as Indonesia during the Covid-19 pandemic? Although many developing countries have promoted such technologies effectively since time ago but these countries have not adopted technologies in education as developed countries. To answer this question, direct interviews with students, lecturers, administrative staff and ICT specialist in Islamic schools, Malang city- Indonesia were conducted to explain the advantages, opportunities and challenges of ICT-based learning process in their schools.

METHOD

This research was conducted by using qualitative approach in four different settings of learning process including islamic primary school, junior high school, senior high school, and

university at undergraduate and post-graduate levels in Indonesia. Qualitative method in this research uses an explanatory method to illustrate the real advantages, opportunities and challenges of ICT in learning in Islamic school and universities in Malang city - Indonesia.

Participants

There were four categories of participants in this research. Category one includes head of school/university, category two includes two educators/lecturers, category three includes two administrative staffs and finally category four includes two students of each level of learning. Participants were from four different levels of learning including: level one: primary school, level two: secondary school, level three: undergraduate and level four: post-graduate. Participants were selected purposively according to preselected criteria relevant to a particular research questions. Preselected criteria included technology department representatives, IT Lectures and students who have experience of ICT-based learning during the pandemic. Names of participants have been coded and functional names were used in the writing. All procedures have been done based on the schools/university instructions.

Table 1: Demographics of Participants

| Categories | Number | Gender | | Age | Experience/ |
		Female	Male	(years)	Study level
School/University Head	4	2	2	45-60	20+
Educators/Lecturers	8	2	6	23-50	10-25
Administrative Staff	8	7	1	22-40	3-10
Students	8	5	3	8-34	All levels

Materials and Procedures

Data of this research were collected by interviews. Questions were designed as semi-structured and open-ended to give the researcher more flexibility to ask more questions and help the participants to give more information. Time of every interview was between 30 to 45 minutes. Some of these interviews were conducted in school/university while others online. General questions of interviews were concentrating on: overall review of ICT, using LMS, infrastructure of ICT, effectiveness of tools and applications, internet access and teaching materials of ICT in each level of learning process. Specific questions concentrated on the three subject of this research which are advantages, opportunities and challenges of ICT-Based learning. Some of the interviews were conducted as group discussion online. In some conditions when all participants are not available at the same time, interviews were conducted separately.

Qualitative Data Analysis

Systematic analysis method has been adopted to analyze data from interviews and observations in addition to the narrative method for writing the report by following Braun and Clark (Braun, 2006) six steps starting with: familiarizing data with researcher, coding stage,

searching themes, revising these themes, defining and naming themes and finally writing the report . Advantages, opportunities and challenges of applying ICT applications in learning process are collected by answers of the related questions during interviews with students, lecturers, researchers, staff and head of educational institutions.

RESULTS AND DISCUSSION

During the Covid-19 pandemic, ICT-based learning has increasingly importance to be fundamental factor to keep learning process going. Advantages of ICT-based learning not only in developing countries, but around the world enquire significant attention by different parties including governments and educational institutions. However, there are some limitations and obstacles facing developing countries more than developed countries.

Advantages of ICT-based Learning

Learning process includes many factors, perceptions, ideas, and behaviors and so on. Human learn by hearing, watching, touching, thinking, conducting and interacting with environment around. Nowadays, interacting with ICT in learning is an essential part for students and lecturers. Based on participant's answers of questions of interviews, benefits of ICT could be summarized as follows:

ICT made online-learning Possible*:* all of participant's first answer about using ICT in learning is that "*ICT makes online-learning possible and even better*" and they explained how learning became possible, easier and better. For instance: "*ICT made learning easier because I can browse for information anytime anywhere I want without I attend classes anymore*" high school students said. "*Online learning is my favorite method to learn and write my research where I can download many of journals about specific subject that I do research about*" student of higher education said. Using ICT devices and tools at and out of classrooms to do research and download educational applications is very common for all students from all levels of learning. In addition, using internet for looking information and research about learning subjects also plays an important role in student's life. Social media also as a new communicating approach plays an essential role in learning students and very important tool for communication between students with each other and lectures.

Saving Time and Money*:* the second important advantage of ICT-based learning during the pandemic is saving time and money for both students and educators/lecturers in addition to administrative staffs in education. Students don't need to travel another cities to study, rent places to keep near of campus and live with other friends in dormitory. Instead, they can stay home and enjoying their times with family and learn/teach online. "*As a university students, I feel happy when I remember I don't need to go campus anymore while I can study online and*

live with my family" undergraduate student said. On the other side, families will have more saving while they don't need spend more money for their children studying in another cities.

ICT as *Motivation Tool*: both of teachers and students were agreed about role of ICT to motivate them for learning/teaching. Students are more interactive when they use computers, laptops and cellphones. "*As a teacher, I noticed that students are more motivated and happy to use computers as a tool for learning especially when the computers are connected to internet*" primary school teacher said. Traditional method became boring to use board and books all the time. Students spend average six hours every day at school and they need to be motivated and do some different activities. "*I hope I could study all my courses by using laptop, I will not get tired to use laptop all the day*" student of secondary school said.

ICT as Communication Tool*:* students, lecturers and staffs usually use social media applications and email to contact each other. Physical attending became the last and very rare option. Some of electronic devices are effective in the communication between students and campus community such as computers, laptops, telephones and cell phones. Using social media is the common tool between students, teachers, stuff, administrations and faculties. "*We have group for all students in class in what's app where can communicate and deliver information and homework to each other*" undergraduate students said. *Using what's app and other media is also common between staff.* " If there is any problems in systems we just use what's app and send pictures to maintenance team and if we want to contact students we just send them massages by what's app or telegram" administration stuff said.

Mobility: ICTs have enabled learning anywhere anytime. Students are able to study anytime which called as asynchronous learning and anywhere they want to. This advantage is critical for both students and educators to not worry about timing. Many of online courses are available online all the time and students can learn anytime. In addition, some of educational institutions and governments are offering remote learning through radio and TV especially for primary schools, so, they don't need to gather again in physical space anymore such as schools or campus. In addition, synchronous learning also available through teleconferencing for higher educational students. "*ICT made access to internet easier by using our phones anytime and anywhere we want*" students of higher education said. "*We encourage students to use their laptops or tablets at class rooms for looking some materials and install some applications by using Wi-Fi in classrooms*" lecturer at higher education said.

Access to Remote Learning Resources: many of learning resources are available online, so, students and educators need not to worry again about printed books and other materials in library anymore. Thousands of books and articles of every subject are available online and when they need just one klick to reach these resources. "*We encourage our students and give them*

courses every first semester how they can research for journals and articles in our university" library stuff of said. "*I have access to many online resources through the system of university where our university have joined many research centers and other universities libraries locally and internationally*" graduate student said. Access to online educational materials is significant to many of developing countries related to lack of books in libraries and available articles by researchers and universities. In addition, internet access enabled students to reach out many of scholars, researches and lecturers around the world.

Social Media: these days; students, lecturers and staffs rely on ICT applications such as what's app, Facebook and so on to contact each other, share information and homework, consulting, determining activities inside and out of campus and many other activities. Social media replaced all the physical and old communications tool and lately is used broadly in learning. "*It is very hard if we still use telephone to communicate and it's not effective anymore these days because we can send picture and videos by using social media easily*" students of higher education said.

Browsing Information*:* maybe the most important role for teachers and students about using ICT are the benefits of direct and quick access for looking information and course online and using some applications like social media, educational applications and YouTube. Higher education students always depend on ICT in all their activities and researches. There are many different ways enable students and researcher to gain information online. "*I always open internet and looking for information I need by using my phone*" higher education students said. All information is available now and students are free to browse them anytime. Teachers also have uploaded many materials online for them to read and use. In addition, students and educators use social media and e-mails to contact each other and provide each other with different information.

Improving the Quality of Education: ICTs enhances the quality of learning/teaching for both students and educators. Having all classes online add more skills about ICT and its approaches to learning materials. This all leads to improvement of quality of education as well. "*ICT is the technology of today and it's the effective way to enhance learning and teaching process*" head of school said. Learning online have enabled many students to learn new skills and improve their abilities in learning. For instance, doing homework and solving theoretical problems is not everything where they have to learn how to do it online or send it in different social media to be available for all other students and educators and they have the ability to edit again if they need.

ICT as Learning Tool: ICTs are the basic for online learning and its components such as web, videos, audio, presentations and e-books enhanced the way of learning where students can read, listen and interact. Such content enable students to enhance their abilities and be engaged to

learning process. In addition, interaction between students and educators or between them with each other through video-call and social media increase their motivation and encouragement to learn. *"Online learning and videoconferencing is an effective way I use to contact other lecturers around the world to participate and join scientific conferences and share knowledge and experiences"* ICT lecturer said. It's significant to understand that ICT became the only approach for learning after the closure of schools and transformation to e-leaning. It became the only tool for learning and will continue to be in the future.

Sharing Knowledge: Students/educators are able to use ICT in different ways to present their work. They can create many files online, edit them any time they want, share them with others and interact with as well. University also plays important role in formatting and controlling of the contents of students work and collect them through the LMS or library. *"Students are asked after they finish their thesis and dissertations to deliver electronic copies to the library and administration to publish them online and share them for their classmates and colleagues"* library administration staff said. Such academic works increase the rank of university and spread knowledge worldwide and keep the privacy and copyrights for both researcher and university.

Opportunities of ICT-based Learning

In addition to the different advantages of ICT-based learning, here are some important opportunities concluded in the following points based on the interviewees' perceptions and perspectives.

Remote Learning: universities are able to attract more students around the globe while students have the same opportunity to join any university around the world. *"Our plan was to attract more students in different departments of our university, so, after the pandemic, we could attract more students from different countries especially those who were not able to travel for studying"* rector of one state university said. Since schools/universities adopted distance learning as solution for the covid-19 pandemic whereby teaching is undertaken remotely and on digital platforms, hundreds of applications and platforms were created and many others are developing their own LMS and platforms in addition to technological companies and programs' developers in field of education.

Availability of Time: although some of students and lecturers feel uncomfortable about this sudden change, but this problem gave them chance to rethink about what they do again. Many lecturers thinks that they have more time now to do academic research and enhance their abilities and skills to learn new techniques about teaching and creating new methods for teaching. *"During quarantine, I have time to follow up my academic research and I could publish several journals that I was not able to finish them before"* computes science lecturer

said. On the other side, students don't need to spend more time going to and coming back from campus. They have more time to spend in learning new skills and searching information and knowledge.

Adoption More Technologies*:* in responding to the high demand, many platforms facilitate free access to their services. Students/lecturers need to access for courses materials through remote devices and interactive platforms. More devices, webs, LMS, platforms, forums, software and hardware in addition to teleconferencing applications and social media will be promoted to enrich ICT-based learning process. *"During the pandemic, our university has activated LMS and adopted many video call applications such as Zoom, Google Meet, Microsoft Teams and Skype"* ICT specialist said. Redesigning new learning space, collaborative learning, innovative methods and deeper learning are the new trends in future of learning.

Online Materials or (MOOCs): there is a high demand of Massive Open Online Courses (MOOCs) such as handrED, khan academy, and edx show us the importance of these platforms in facilitating learning outside of classroom. Future of learning depends on whether or not they are able to meet those needs. *"Although we have many classes online by using video call applications but the most amazing thing is that many of courses are available online and our lecturers record some classes and upload many presentations and materials to be available for us all the duration of study"* Undergraduate student said. In addition to these new techniques, there are many courses recommended by lecturers and many of students enjoying videos and presentations in many different platforms.

Learning New Skills*:* quick outbreak of Covid-19 showed the importance of flexibility to face this threat. One of these threats is the sudden change in learning from traditional to full e-learning. It is also chance for students/educators to learn new skills and adopt new knowledge. Some of these challenges are informed decision-making, creative problem-solving and perhaps above all flexibility. To ensure that these skills remain a priority for all students, flexibility must be built into educational systems as well. *"Regardless the high impact of the sudden change to online learning, we feel we have the ability to cope this problem and continue learning because we implemented online learning since while ago where 20% of classes were conducted online"* lecturer at graduate level said. Both students and lecturers are learning new technologies, approaches, techniques and theories about online learning. For instance, students has to do sports exercise assignment where students were asked to record activities and send back to their teachers, it took more time for students to record, edit and upload this assignment while s/he is learning new skills.

Family Gathering: finally, it is important to mention that, family members can stay together while they go on their studies. It is an important chance for some students and families where they could meet their families once a year.

Challenges of ICT-based Learning

Information and communication technology has recently gained great interest in education, especially e-learning. In one way or another, it became important to many scientists around the world. Their nature has greatly changed the face of education over the past few decades. On the other hand, learning community still face some problems about using ICT effectively and these challenges as following:

Low speed and Bandwidth of Internet: the main problem during do the interviews in related schools and university was the problem of internet speed and bandwidth. The speed is very important factor because students, lecturers and staffs depending on the internet for accomplishing their work. Administration and all infrastructure system at all faculties and applications are online and available for all students, lecturers and staffs. "*May be the main problem in our faculty is the speed and bandwidth of internet where we try to develop this services and put in middle with the head of faculty and university specialist of ICT*" lecturer in higher education faculty said. Same problem in primary and high school, although students have ID and password for using internet at campus, but still there is problem of connection and bandwidth. Based on this, most of students, lecturers and staff using their own data connection and using hot spot to browsing data in their laptops.

Electricity Cut: after the limitations of speed and bandwidth of internet, the problem of electricity cut causes a serious problem. Some of departments have generators but not all of them can overcome the problem. Staff the most category who suffer from electricity cut because they have all the application online. "*Electricity cuts is really bothering us because all of our work depend on online systems*" administrator staff said. When electricity cut takes long time they are forced to not use applications and prepare documents and papers manually where this way takes much time and not effective anymore.

Maintenance of Software and Hardware*:* stuff and lecturers always has problems with systems and infrastructure of ICT, so they get training about using ICT and maintain their ICT equipment. But there is still a problem when they cannot handle and they need to emergent help to fix their systems. In another word, there is still lack of maintenance and human resource expertise that do this work. "*Sometimes we have problems in our systems so we have to wait or working manually to finish tasks because of fail of systems*" administrator of high school said.

Lack of Electronic Tools*:* there is a lack in technological equipment such as computers in laps and libraries. Actually, there is no specific place for computers in faculties, there is only very little computers at library and some of them not connected to internet. These computers are not enough according to high number of students at related schools and university. Same problem at primary and high schools where there is only one class for computer and students have an hour to train every week. "*We have few numbers of computers were used in library, but because of lack of maintenance, these computers became not useful*" Lecturer at Faculty of higher education said.

The High Cost*:* in some situation, students are not able to afford laptops or cellphones. On the other side, schools and university are not equipped well to accommodate all the students' needs. In addition to high cost of electronic devices, the cost of Wi-Fi and internet packages is unaffordable as well. "*Even though university has facilitated infrastructure for online learning such as LMS, teleconferencing applications and internet packages but we still have some problems connecting to Wi-Fi and coverage in some countryside areas is limited*". Undergraduate students said.

Classroom Management*:* according to new requirements by government to have social distancing and closure of schools and university, distance learning was the best way to continue learning process. High number of students in every class made managing and organizing classes more difficult. Lecturers have to spend more time to wait students connect to class through teleconferencing applications. "*Usually, I spent more than 15 minutes waiting students to be join video call conferencing. In some cases, we have to conduct offline classes through email or social media applications*" lecturer in undergraduate level said. Other students who are able to afford online learning expenses are complaining when their classmates keep connecting and disconnecting during online classes. At the end, more time will be spent in maintaining distance learning classes and limitation are recorded in teaching/learning and final assessments.

Plagiarism: although there are many advantages of ICT in learning but might the most common advantages of ICT is online resources where this could be a disadvantage because of plagiarism. There are hounds or millions of journals, articles, subjects and thesis online. Students could easily download any book or article they need anytime. Using same journals or copy/paste without using general resources as references is the plagiarism. Incredibility of journals and validity of information have to be checked by schools and special software to reduce this problem. "*I think the plagiarism is the most common problems between students where they 'copy-past' from many online resources without references and self-writing*" ICT educator said. In addition, due to full adoption of online learning, many lecturers feel that the assessment of

classrooms became inappropriate due to distance learning and they need to improve new techniques to able them evaluate classes more effectively.

Lack of Human Resource Expertise*: sometimes the problem is about human resources experience. According to information collected in interviews there is a lack in specialist and human resources who working in the ICT field. ICT devices need to be maintained and updated regularly. "*The problem that we are facing is the limitation in human resources where we have few employees to do maintenance and solving system's problems such as updating and hanging of some software*" specialist of ICT said.

Indonesian government and educational institutions have responded immediately to the change in education due to the Covid-19- pandemic. Total transforming to ICT-based learning took many different style of learning such as online learning for high education institutions and using radio or TV for kindergarten, primary and secondary school. Lack of ICT infrastructure, financial support, slow response in addition to students and lecturer' skills were the barriers in well-adopted learning process comparing to some developing countries with 60% difference (UN, 2020). As developing country, Indonesian educational system has some advantages and different challenges need to be faced to overcome the change in learning environment. Many of opportunities during the pandemic are need to be taking into consideration to improve the learning process. Table (2) summarized these advantages, opportunities and challenges.

Table 2: Feature of ICT-BL in Developing countries, Indonesia

ICT-BL Advantages	ICT-BL Opportunities	ICT-BL Challenges
ICT made online-learning Possible Saving Time and Money Communication & Motivation Tool Mobility and Usage of Social Media Access to Remote Learning Resources Improving Literacy, Numeracy and Science Improving the Quality of Education Sharing and Processing Knowledge	Remote Learning Adoption of More Technologies Online Materials or (MOOCs) Gaining new experiences and Skills Availability of More Time Family Gathering again!	Low speed and Bandwidth of Internet Electricity Cut Lack of Electronic Tools High Cost of Maintenance of ICT Infrastructure Classroom Management Plagiarism Lack of Expertise

The importance of conducting this research is to understand the new challenges and to develop new opportunities to enhance ICT-based learning as solution to cope the new obstacles facing learning process in developing countries. Understanding the advantages and determination of opportunities and challenges are significant for policies' makers and governments to improve the learning process. The following table concludes the most advantages, opportunities and challenges of ICT-based learning in developing countries like Indonesia.

CONCLUSION

In summary, responding to ICT-BL challenges and gaining of ICT-BL opportunities differ among different countries world-wide. This research explains the high-ranked issues related to ICT-BL in Indonesia as developing country that has been experienced during the Covid-19 pandemic. Educational institutions and governments are recommended to follow more innovative strategies and create suitable policies to decrease the implications resulted of total transforming of traditional learning to ICT-based learning. The main features of advantages included the use of internet, social media, teleconferencing applications as communication and learning tool. The opportunities included remote learning availability which was limited before the pandemic, using new technologies, having more experiences during learning online. Finally, challenges were represented by the problems of connection, internet speed, and coverage in some areas, electricity cuts and lack of skills of using technology. During the outbreak of Covid-19 pandemic worldwide especially in developing countries like Indonesia, there are more difficulties compared to developed countries.

SUGGESTIONS

This research included some recommendations for educational institutions and governments to have some policies and regulations regarding e-learning lncluding for universities and schools should find new approaches to train students and educators to gain new knowledge and skills about ICT-BL to cope the difficulties resulted of Covid-19, for governments should update the policies and regulations of education to enable educations institutions to continue learning and encourage students to prepare themselves for future, for educational systems have to find urgent solution to mitigate the consequences of pandemic and to be able to measure the quality of education in short and long term, it is important to have international framework for corporation and collaboration to reshape and restructure the regulations and policies of education system and exchange the skills and lessons gained of facing this pandemic, and it is critical to draw challenges of educations systems in developing countries such as unpreparedness of adopting ICT, inequalities in internet access, weak infrastructure and unpreparedness of both students and educators.

Implications for policy and practice including ICT-Based learning can replace traditional learning during emergency cases such as (covid-19 pandemic) effectively by implementing new policies and techniques, ICT-BL infrastructure can be improved by restructuring curriculum, improving LMS and redesigning learning platforms, educational institutions and governments can support students and educators to adopt ICT-BL as new approach for learning and cope the rising challenges, assessment of e-learning systems and capitalization on ICT and providing professional training and building effective partnerships worldwide.

Limitations related to inequality between students to afford internet access and to have computer or laptop to learn online inclusing educing time of learning at home less hours compared to regular learning at school/campus, many of learners/educators experiencing e-learning as first time in developing countries, depression, stress and anxiety resulted of losing regular classes and staying at home, another limitation related to the case study of this research and choosing Islamic schools and university in Malang Indonesia.

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