Building Ideal Digital Infrastructure in Supporting Long Distance Learning in Indonesia

Rommel Utungga Pasopati
Dr. Soetomo University
Surabaya, Indonesia
rommelpasopati@yahoo.com

Syarifuddin
DPR RI
Jakarta, Indonesia
uddin.syarifuddin@gmail.com

***Abstract*—**Because of COVID-19 pandemic in 2020, Long Distance Learning or Pembelajaran Jarak Jauh (PJJ) has been applied to limit broader outbreak of the virus. Youtube, Zoom, and Google Classroom have been widely used to support online education. Meanwhile, uprising pandemic has made Indonesian government to push digital revolution based on Information Technology and Communication (ICT) in its digital infrastructure. Online systems are widely used in many governmental sectors which also include educational one. However, digital infrastructures are only effective and efficient in big cities. Many remote regions are not well-touched by the era of digitalization. By emphasizing theory of connectivity and constructivism in qualitative method, this paper would like to answer the question; how to build a good digital infrastructure to support long distance learning systems?Responding to that question is a way to give input on policies to accelerate digital infrastructure development to support learning systems. Moreover, this paper would like to give better perspectives on which kind of ICT that are suitable to be applied in various regions in Indonesia.

Keywords—constructivist learning, digital infrastructure, long-distance learning system

I. INTRODUCTION

Since March 2020, there has been a Long Distance Learning (PJJ) policy as a substitute for face-to-face learning to reduce the wider spread of the COVID-19 virus. PJJ is implemented through Youtube, Zoom, Google Class Meets and other applications. At the implementation level, PJJ or online learning faces many obstacles, from absence of an internet network, limited online devices, and inability to master online devicesby teachers and students are main problems of this online learning.COVID-19 pandemic also made the Government accelerate realization of Digital Transformation through the application of ICT in public services. Based on assumption that PJJ will still continue because of the spreading pandemic and government's efforts to build better digital infrastructure, this paper comes with a problem formulation; how to build good digital infrastructure to support long distance learning in Indonesia?Through qualitative approach, this paper would like to spot perspectives on explorative one by

asserting theories and conceptsof constructivism and connectivity.Thus, this paper is divided into; Introduction, Condition of Online Learning in Indonesia, Digital Transformation to Support Education, Good Digital Infrastructure for Good Online Learning, Conclusion, and References.

II. RESEARCH METHOD

The method that is used in this paper is qualitative one. Explorative understanding is also widely asserted in this writing as this idea is never mentioned before in research world. By examining written data from several sources, this paper is suitable to widen further analysis in education, digital infrastructure, and online learning as well.

III. FINDING AND DISCUSSION

A. Condition of Online Learning in Indonesia

Online learning, or long-distance learning, or *Pembelajaran Jarak Jauh*(PJJ) actually is not new in Indonesia. There are various institution of education that have applied this kind of system before. Students do not have to come to class face to face to study the lessons, they just need to be online to attend the lecture. This online learning is related to e-learning which the modules, the lessons, and the lectures are stated within internet access(Darmayanti, et. al, 2007:100).However, online learning has become such obligation for every students today. From basic, middle, to higher education, online learning has to be applied because of COVID-19 pandemic situation. Studying at home is a must to prevent the spreading virus (Kristanto, 2020:4). Teachers and students have to adapt to keep the process going by not ignore the pandemic situation today. Based on Letter of Minister of Education and Culture of Indonesia Number 4 in 2020, both teachers and students are expected to do better understandings in online learning (Kemdikbud. 2020). Teachers are expected to shape meaningful learning experience to students especially in making creative various lesson activities and giving qualitative feedbacks of the assignments given. The main idea is how teachers should be closer to students even though there are real distance between them (KemristekDIKTI. 2016). The contents, the targets, and the designs of the learning process are pushed to be more creative and expressive in today's online learning. Students are not objects of education but the considered subjects of teachers. Blended learning between hard-copy books and online lessons should be done to help students to

learn in better situation and condition (KemristekDIKTI. 2016 and Kristanto, 2020:2). Teachers cannot leave the students only by giving tasks. In this aspects, teachers also need to be close to parents of the students. It is needed to help them in understanding online lessons so that family and education are not separated in online learning (Kemdikbud. 2020).

Online learning has both advantages and disadvantages from aspects of system, teachers-students relations, and at-home condition and situation (Prawiyogi, et. al. 2020:96). The advantages are, *first*, wider possibilities to improve education access. Since online learning does not need real class and school, students can easily get access to education. *Second*, learning lessons are not limited by time as seen in real class. Time to study could be more flexible based on own needs and experience (Munawaroh, 2005:174). *Third*, students could study by their own preferences. By having particular circumstances at home, students can study in informal or even casual situations (Prawiyogi, et. al. 2020:96). *Fourth*, students could manage their time to study in flexible and connective schedule. Students may take rest from studying or repeat it again to understand the lessons furthermore. *Fifth*, the curriculum could be more adaptive to progress of science. Questions could be answered directly and students could explore other lessons by ignoring obstacles of place and time (Munawaroh, 2005:176). *Sixth*, online learning is so interactive and constructive that involves students, teachers, and parents about the lessons. The more sides are included, the better outcomes will be realized.

Beside the advantages, the disadvantages of online learning are (Prawiyogi, et. al. 2020:97); *first*, if the electricity is out, online lessons are stopped. Some regions in Indonesia have to face unstable electricity which results to frequent blackouts. *Second*, bad internet connection which reflect unwell connectivity in Indonesia. This is the main problem in online learning where the main place and time of the lessons could not be accessed because of bad broadband signals of internet (Prawiyogi, et. al. 2020:97). *Third*, inconsistence of students and parent's commitments. Since students are used to study directly in class with their friends, studying alone at home brings such boredom thatalso affects parents' interest to help and results to meaningless learning. Studying, even though online, still needs to pay attention to certain habits and customs in the frame of constructivism (Munawaroh, 2005:175). *Fourth*, students becomes slower to

understand the lessons. Sometimes, online lectures are not so conducive that student could not ask teacher directly or teachers could not interact to students. *Fifth*, students only study in their online learning schedule. They refuse not to study in other scheduled time since teachers give them many tasks to do while they are so bored at home. The culture of normal studying is not well-reflected in online learning (Kristanto, 2020:8).

From above advantages and disadvantages of online learning, systemic and individuals are reflected in the learning process. Systemic issues are related to bad internet infrastructure while individual aspects are seen in teachers, parents, and students' will to be involved consistently in the online learning. Digital transformation in infrastructure is indeed needed to support online learning systems (Darmayanti, et. al, 2007:105). Government needs to put more concern to take care of digital connectivity in online learning process. Meanwhile, individual will should be supported with eager to adopt new online process in everyday life (KemristekDIKTI. 2016). Boredom may always happen in psychological aspects of education but students could not be left behind but they should walk together in a more constructive situation with teachers and parents. The online condition also brings in twofold condition, wider opportunities because of flexibility and less discipline realized to face the new normal circumstances (Prawiyogi, et. al. 2020:98). Indeed, teachers become more creative in giving learning lessons and more attractive in sending feedbacks to the tasks given (Kristanto, 2020:3). However, discipline is still needed to make rigid situations beside merely to depend on flexibilities. Incoming information must always be monitored to direct students' knowledge about the lessons and other things that may be going on today (Darmayanti, et. al, 2007:104).

B. Digital Transformation to Support Education

The COVID19 pandemic has forced Indonesian Government to change the direction of policies. As a response to various changing situations and behavior, physical interactions have been shifted into digital interactions by utilizing various online media.Technical constraints related to supporting infrastructure to the readiness of human resources in the education sector are said to be the main obstacles. The absence of an internet network to support online learning, limited online devices, and inability to master online devices and tools by teachers and

students restrict development of online learning.

In 2021, Indonesian Government will realize one policy priority to optimizeICTto push social and economic recovery post-COVID-19 pandemic. In the Financial Note document for the Draft State Revenue and Expenditure Budget for 2021, optimization is achieved by accelerating digitalization through (1) accelerating digital transformation for government administration; (2) realizing efficient and fast public services in education and health; (3) consolidating and optimizing infrastructure and shared services; and (4) realizing community inclusion in development priority areas (Financial Notes of the RAPBN 2021, 2020). These four things will become the direction of ICT development policies in 2021.The four policy directions are cross-sectoral policies of Ministries/Institutions (K/L) in general and have not yet become specific policies. There are strategic policies of ICT in 2021 as follows; 1) Provision of Base Transceiver Station (BTS) of 5.053 village locations in the 3T area, 2) Provision of internet access at 12,377 public service locations, 3) Development of a National Data Center, 4) Digital Literacy, Strategic Sector Digital Transformation, Digital Technopreneur, 5) Electronic System Operation Control, 6) Update on DTKS, IT equipment and Communication Network, and 7) Support digitalization of education such as procurement of ICT tools and learning media.

Through these seven strategic activities, building national digital infrastructure is in priority with its many strategic activities. This is inseparable from the condition that only 87.44% of villages or families have access to 4G class mobile broadband services and there are areas not reached by this service. In addition, the reach of fiber optic infrastructure only serves 2,672 of the total 7,175 sub-districts in Indonesia, so that only 37.24% of sub-districts are served by broadband fiber optic networks.This condition should be changed considering online learning, which may still take place in 2021, need supportive and adequate internet network and digital infrastructure as well. This is in accordance with the statement of Ministry of Communication and Information Technology (Kominfo) that digital transformation emphasizes infrastructure, regulation and ecosystem (www.kominfo.go.id, 2020).

COVID-19 pandemic has made digital ecosystem suited to online learning education or PJJ. In regulations, there is Government Regulation number 82 of

2012 concerning the Implementation of Electronic Transaction Systems (PSTE) which was revised to Government Regulation number 71 of 2019 which unfortunately only regulates digital business matters in terms of digital services. Governmental plans to improve ICT by adding digital infrastructure through strategic policies are in line with policies of education to accelerate quality of educational facilitiesin Indonesia. This infrastructure development is key to fix digital infrastructure imbalance. PJJ in COVID-19 pandemic era proves this as there are difficulties in internet access, especially in areas far from big cities.

Departing from this, building digital infrastructure needs to be hastened. Strategic activities "Supporting the digitalization of education such as the procurement of ICT tools and learning media" will not be successful without development of digital infrastructure. The construction of BTS towers is important to increase the reach of mobile broadband services as backbone of internet services in Indonesia. The Indonesian government may be proud of the Palapa Ring as a hub and equalizer of telecommunications networks in Indonesia, but the satellites must be supported by transceivers so that the network can be accessed by public. Therefore, construction of BTS is a short and long term solution that should be hastened.

In addition, the provision of additional internet access in various public service locations needs to be realizedas a temporary solution for areas that are not supported by good internet network coverage. Students and teachers can access internet at nearest public service place to carry out online learning.No less important, the renewal of internet access tools such as online devices must be considered together with human resources who can manage digital infrastructure properly and efficiently to improve quality of education in Indonesia.

C. Good Digital Infrastructure for Good Online Learning

The development of ICT infrastructure is a driving force for progress in underdeveloped, farthest and outermost (*tertinggal, terjauh,* and *terluar*or 3T) areas. Furthermore, infrastructure developments also build better environment, education, health, settlement, road connectivity, and transportation. In the field of education, infrastructure development is of a long-term solution, so it is necessary to formulate an effective and efficient policy pattern for the implementation of

onlinelearning.Increasing literacy, easy and affordable internet access, and ICT-based education services could be pushed by digital infrastructure developments (Arifin, 2017). Husaini (2014) mentions that there are three forms of using the internet for learning; medium for teaching media, medium for distributing teaching materials, and medium for teaching communication.

On the other hand, the constructivism approach as a learning concept is growing. As knowledge is human construction, knowledge is a social construction and knowledge is relative in nature. Constructivism views constructivist learning that requires not only a physical learning, but also a social and emotional environment (Widodo, 2007). Students' initial knowledge and education are important here. Maximized possible learning is made so that students are enthusiastic about learning from material presented and independent learning. In addition, conducive environment is also key to constructive learning to run.The need for digital infrastructure with constructivism in the learning process has a common ground in preparing ideal long-distance learning. To support this learning, easy and affordable internet access is a must. The expansion of mobile broadband network is a step forward. With the expansion of the broadband network, the opportunity for 3T areas to do the learning is even greater. In this case, the development of digital infrastructure that is being carried out is a form of effort to support constructivism-based learning. Besides being supported by good facilities and infrastructure, a constructivist learning environment must also have a conducive social environment. This social environment can come from teacher's knowledge to support learning atmosphere that encourages students to be able to study independently. Learning systems that are suitable for long-distance education must also be considered as part of the social circumstances according to constructivism theory.

Good digital infrastructure to support distance learning consists of two sides, physical and non-physical facilities and infrastructure. Physical infrastructure is stated in expansion of electricity network, internet coverage, and ownership of devices, so that the learning process goes as expected. On the other hand, non-physical infrastructure can be started from curriculum or teaching and studying materials. Live streaming or video call models may not be suitable for PJJ. PJJ can be carried out in a variety of other methods as long as constructivist efforts for effective and quality learning can be

implemented. The teachers' understanding in mastery of technology and constructivist learning process must also be improved. Adequate digital infrastructure, the ability of teachers to control devices, and learning methods as well as the ability of students to access digital infrastructure, to understand teaching material, and to discuss them are the best combinations in ICT-based of long-distance learning.

VI. CONCLUSION

Digital infrastructure is crucial to support online learning in Indonesia. Not just in today's pandemic era, good digital education must be realized to build equal education for all students in Indonesia. It is true that online learning has proven advantages and disadvantages, but digital transformation is a must to catch up with globalization era nowadays. ICT tools and learning media should be embraced furthermore to run better online learning. Building better infrastructure to increase internet and electricity coverages are two important points to increase abilities of long-distance learning. Constructive learning should also be pushed forward to understand knowledge as socio-cultural things so that it may bring in better education in future.

REFERENCES

[1] Arifin, Husni, Muhammad. 2017. *Internet, Ketimpangan Digital dan KebijakanInklusif*. Retrieved from repository.ut.ac.id/7203/1/fhisip2017-01.pdf accessed on November 10th 2020.

[2] Darmayanti, Tri, Made YudhiSetiani, and BoediOetojo 2007. "E-Learning Pada Pendidikan Jarak Jauh: Konsep yang MengubahMetodePembelajaran di Perguruan Tinggi di Indonesia". *Jurnal Pendidikan Terbuka dan Jarak Jauh*, Vol. 8, No. 2, pp. 99-113.

[3] Husaini, M. 2014. "PemanfaatanTeknologiInformasidalamBidang Pendidikan (E-Education)". *JurnalMikrotik*, Vol. 2, No. 1.

[4] Kemdikbud. 2020. *Panduan Pembelajaran Jarak Jauh*, Jakarta: Kemdikbud.

[5] Kemenkeu. 2020. *Nota KeuanganRancanganAnggaranPendapatan dan Belanja Negara TahunAnggaran 2021*. Jakarta:Kemenkeu.

[6] ----------. *PaparanPemerintah Pada RapatPanjaBelanjaPemerintah Pusat, Pembahasan RAPBN TA 2021*, September 16th 2020.

[7] KemristekDIKTI. 2016. *Kebijakan Pendidikan Jarak Jauhdan E-Learning di Indonesia*. Jakarta: Kemristek DIKTI.

[8] Kominfo. 2020. *Infrastruktur Jadi Syarat Utama PercepatanTransformasi Digital*. Retrieved from www.kominfo.go.id/content/detail/27222/infrastruktur-jadi-syarat-utama-percepatan-transformasi-digital/0/berita_satker accessed on November 7th 2020.

[9] ----------. 2020. *KominfoTekankanTiga Pilar Transformasi Digital Indonesia*. Retrieved from kominfo.go.id/content/detail/24698/kominfo-tekankan-tiga-pilar-transformasi-digital-indonesia/0/sorotan_media accessed on November 7th 2020.

[10] Kristanto,YosepDwi. 2020. *COVID-19, Merdeka Belajar, dan Pembelajaran Jarak Jauh*, retrieved from people.usd.ac.id/~ydkristanto/index.php/2020/03/covid-19-merdeka-belajar-dan-pjj/, accessed November 9th 2020.

[11] Munawaroh, Isniatun. 2005. "Virtual Learning dalamPembelajaran Jarak Jauh",

MajalahIlmiahPembelajaran, Vol. 1, No. 2, pp. 171-181.

[12] Prawiyogi, AnggyGiri, Andri Purwanugraha, Ghulam Fakhry, Marwan Firmansyah. 2020. "EfektivitasPembelajaran Jarak JauhTerhadapPembelajaranSiswa di SDIT CendekiaPurwakarta. *Jurnal Pendidikan Dasar*. pp. 94-101.

[13] Widodo, Ari. 2007. "Konstruktivisme dan PembelajaranSains". *Jurnal Pendidikan dan Kebudayaan*, No. 64.