

ABS 61

by Icels_2 Abs 61

Submission date: 30-Sep-2020 11:31AM (UTC+0700)

Submission ID: 1401029314


File name: full_paper_abs-61_5848823923.docx (199.24K)

Word count: 2336

Character count: 12861

Distance Learning Technology Ecosystem During the Pandemic in Indonesia

Richardus Eko Indrajit


Jakarta State University
Doctoral Student
eko.indrajit@unj.ac.id
ORCID: 0000-0002-8138-5680

Basuki Wibawa

Jakarta State University
Faculty Member
basuki.wibawa@unj.ac.id
ORCID: 0000-0002-0290-1617

Atwi Suparman

Indonesia Open University
Faculty Member
atwi@ecampus.ut.ac.id

ABSTRACT

The Covid-19 pandemic forces all schools around the world to implement distance learning mechanism. Hundreds of thousands of schools in Indonesia are forced to do it immediately without undergoing appropriate planning and preparation. Statistics show that the majority of schools experience serious problems in adopting this modern learning concept. As teaching and learning process can not be stopped regardless the situation, every school is trying so hard to find ways in adopting to sudden changes that had not been previously thought of. The movement of schools in Indonesia in applying the distance education model has formed a unique technology ecosystem along the way. This article shows how the ecosystem had been shaped by the circumstances of the global catastrophe. The ecosystem is picturised in a conceptual framework that shows all interrelated components within the perimeter. More than 1,000 schools were analysed during the study in the past three months. This ecosystem framework can be used as a reference for schools who want to choose what kind of technology model is suitable to be applied according to their characteristic and needs for the purpose of adopting the most appropriate distance learning approach.

Keywords: Covid-19, framework, learning, teaching

Introduction

The Covid-19 pandemic has jolted the entire world population, including Indonesia. One sector that is affected by its presence is education. It has been more than six months since schools in

Indonesia had to be closed and the teaching and learning process was carried out by distance education (Budi et al., 2020). The geographical condition of Indonesia as an archipelagic country creates real problems when implementing this concept in various regions (Churiyah et al., 2020). The unequal access to internet infrastructure, poor network quality, the diverse economic conditions of educators and students, as well as the literacy of stakeholders are some of the components that make it difficult for thousands of schools to implement the modern learning concept. Apart from the problems faced, various education units in Indonesia are trying to adapt to the changes that have occurred (Utomo et al., 2020). The reality of their limitations makes each school try to find answers to the problems at hand.

The principle that is held firmly is how to keep the learning process running even though in conditions that educators and students are in physically different places because of the social distancing policy. Matters to be resolved relate to a number of aspects. The first is how teachers and students can communicate. The second is what kinds of teaching materials can be used. And third, how the interaction and feedback between the two can occur. The facts show that there are various ways that are carried out by various schools according to the situation and conditions in the field. A further study was conducted to find out how many types of distance education implementation models were born from the innovations of schools in Indonesia during the pandemic period. Through these various models, a comprehensive framework has been developed that can be used as a reference for educational units that have not chosen the most suitable way to adopt an effective distance learning model. The framework developed contains a number of modular components which can be adapted to the needs of each school wishing to develop its distance education technology model (customization).

Research Methods

The research was conducted by involving 1000 education units throughout Indonesia. The survey was conducted for two and a half weeks from 2 May 2020 to 20 May 2020 in collaboration with the Indonesian Teachers Association. The sampling distribution covers the entire archipelago which consists of six corridors, namely: Java Island, Sumatra Island, Kalimantan Island, Sulawesi Island, Nusa Tenggara Islands, and Maluku-Papua Islands.

Table 1: School's Sampling Distribution

School Area	Kindergarten	Primary School	Junior High School	Senior High School
Sumatera Island	40	80	60	60
Java Island	100	100	120	80
Kalimantan Island	12	38	32	18
Sulawesi Island	10	40	30	20
Nusa Tenggara Islands	17	33	25	25
Maluku – Papua Islands	10	20	15	15

The research was conducted by involving 1000 education units throughout Indonesia. The survey was conducted for two and a half weeks from 2 May 2020 to 20 May 2020 in collaboration with the Indonesian Teachers Association. The sampling distribution covers the entire archipelago which consists of six corridors, namely: Java Island, Sumatra Island, Kalimantan Island, Sulawesi Island, Nusa Tenggara Islands, and Maluku-Papua Islands. In each region several schools were taken from kindergarten, elementary, junior high and high school levels. The study was conducted through in-depth surveys and interviews with several related parties.

Results and Discussion

The results of the study of all these schools show that there are nine patterns of e-learning implementation models based on distribution and communication between educators and

students. The analysis includes the type of content, distribution patterns, and communication models carried out. The following is a brief explanation of each type of model in question.

Fully Physical Communication Model

Model-1

Teachers > Physical Materials > Physical Infrastructure > Physical Materials > Students

Students > Physical Materials > Physical Infrastructure > Physical Materials > Teachers

In this model, the relationship between educators and students is really done physically because of the unavailability of networks and digital devices around them (UNESCO, 2020). The teacher produces and sends physical teaching materials to students by utilizing physical infrastructure, namely by visiting students one by one at their home, or sending teaching materials via post or application-based transportation. Many remote or disadvantaged areas apply this model considering that schools have temporarily stopped operating (Gong, 2020).

Digital Content on Physical Infrastructure Model

Model-2

Teachers > Digital Content > Physical Infrastructure > Digital Content > Students

Students > Digital Content > Physical Infrastructure > Digital Content > Teachers

This model is similar to the previous one, except that it differs in the format of the teaching materials. If in the previous model the teaching materials were physical artifacts, in this situation the learning content already has an electronic format or in the form of digital files . If in the first model both teachers and students do not have technological devices, in this model educators and students already have computers or electronic devices (such as cellphones and tablets). Digital content is usually stored on a flash disk or CD-ROM before sending (Utomo et al., 2020).

Fully Direct Online Communication Model

Model-3

Teachers > Digital Content > Internet > Digital Content > Students

Students > Digital Content > Internet > Digital Content > Teachers

This type of model is the most ideal. Where educators and students can connect directly online because each of them has digital telecommunication tools and infrastructure. Schools that adopt this model are those located in big cities or crowded areas (Peterson et al., 2020).

Dual Content Agregator on Physical Infrastructure Model

Model-4

Teachers > Digital Content > Agregator > Physical Infra > Agregator > Digital Content > Students

Students > Digital Content > Agregator > Physical Infra > Agregator > Digital Content > Teachers

In this model involved a new party, namely the aggregator. The aggregator's job is to first collect digital content from both parties, before sending it to the other party through the physical infrastructure. Many parties function as an aggregator or collector (UNESCO, 2020). Most of them are volunteers who wish to provide assistance or contribution to the education sector. Other parties are technology vendors that create special systems or products such as kiosks or the like that function as automated aggregators.

Single Content Agregator at Teachers Site on Physical Infrastructure Model

Model-5

Teachers > Digital Content > Agregator > Physical Infrastructure > Digital Content > Students

Students > Digital Content > Physical Infrastructure > Agregator > Digital Content > Teachers

In this fifth model, the aggregator is on the teacher's side, while students can access all available digital content and sort it out via their device. This model is used for teachers who are in areas where the internet infrastructure is not good so they must be assisted by an aggregator to send

it to students. It is clear that in this model, the teacher will be more active in communicating with students than vice versa (Peterson et al., 2020).

Single Content Agregator at Students Site on Physical Infrastructure Model

Model-6

Teachers > Digital Content > Physical Infrastructure > Agregator > Digital Content > Students

Students > Digital Content > Agregator > Physical Infrastructure > Digital Content > Teachers

The sixth model is the opposite of the fifth, where the aggregator is on the side of the students. In this model each teacher sends their digital content through the physical infrastructure and then it will be accepted by the aggregator on the side of the students. Students will personally access the aggregator system with digital devices using wifi or bluetooth for example. Many villages have adopted this model. In this situation, students will tend to be more active than their teachers (Peterson et al., 2020).

Dual Content Agregator on Online Infrastructure Model

Model-7

Teachers > Digital Content > Agregator > Internet > Agregator > Digital Content > Students

Students > Digital Content > Agregator > Internet > Agregator > Digital Content > Teachers

This model is a reflection of an ecosystem consisting of a number of parties, considering that there are two aggregators, each on the side of educators and educational staff. The two aggregators can be the same or different parties, where both are connected to the digital infrastructure (internet) so that communication between educators and students can run smoothly. It should be noted that the aggregator can be any application, device or system (Churiyah et al., 2020; Khan, 2007; Webster & Hackley, 1997).

Single Content Agregator at Teachers Site on Online Infrastructure Model

Model-8

Teachers > Digital Content > Agregator > Internet > Digital Content > Students

Students > Digital Content > Internet > Agregator > Digital Content > Teachers

This model is similar to the fifth model, except that the communication infrastructure that connects teachers and students is digital. The teachers collect digital content in an aggregator before sending it via the internet in the form of digital content to each student.

Single Content Agregator at Students Site on Online Infrastructure Model

Model-9

Teachers > Digital Content > Internet > Agregator > Digital Content > Students

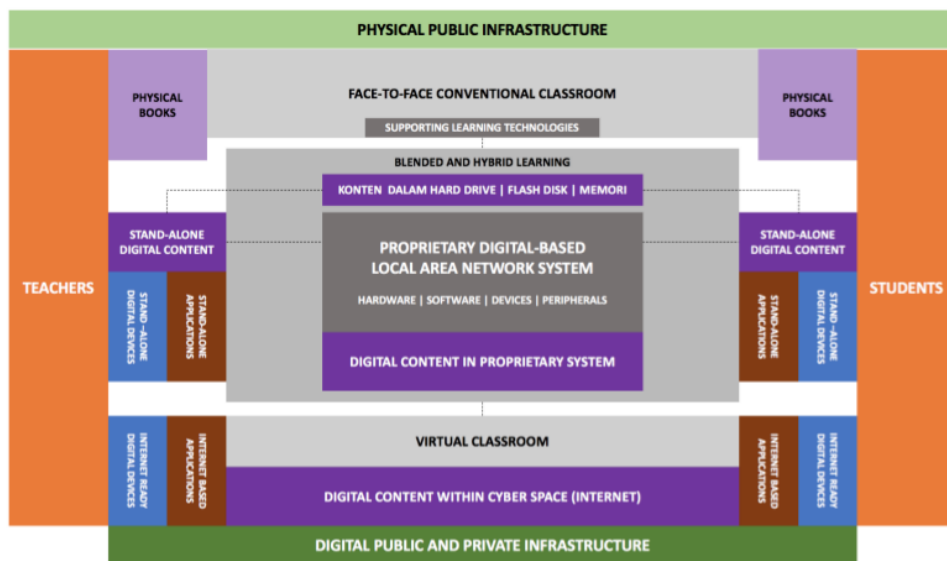
Students > Digital Content > Agregator > Internet > Digital Content > Teachers

This last model is the opposite of the previous ninth model where the aggregator is on the side of the students, not on the side of the educator. In this condition, a teacher sends learning content directly via the internet to the aggregator address.

The Ecosystem Framework

The main components in the framework of the distance learning technology ecosystem are educators and students. These two components can communicate directly or indirectly through two communication lines. The first route is physical, in this case through encounter using strict health protocols. In some cases teachers in the interior were found traveling from house to house to meet students so that they would not miss their studies. Another way is to ask a third party to help send teaching materials from the teacher to students, and then students do the same thing to deliver the assignments assigned to them. The most widely used third party is application-based transportation. Meanwhile, the second route is through digital infrastructure or what is known as the internet. With the internet, teachers and students can connect in real-

time to communicate and interact directly or indirectly. The next component is the existence of each of the computing technology devices on the side of educators and students, such as computers, tablets, or digital devices. The reality shows that not all parties have a computer connected to the internet. Even if they are connected, not all networks have a good quality connection.



Picture 1: Distance Education Technology Ecosystem Framework

The next component is teaching materials, which can be in the form of books or physical documents or digital content. In remote areas where digital infrastructure is not yet reached, the existence of physical books is still very common - although there are many e-books scattered everywhere. One more component in the ecosystem which forms a separate sub-system is the aggregator. An aggregator is a system (can be a program, application, or device) in which the content of teaching materials and learning software can be accessed locally without using public internet channels. This framework can be a reference for schools wishing

to plan and design the right technology ecosystem to be implemented by selecting the modules contained in the intended architecture.

Conclusion

Indonesia is an archipelago that is endowed with diversity. The variety of situations and conditions faced by each educational unit gave birth to different needs during the pandemic. Each school is trying to adapt quickly to change through the implementation of a distance learning model. Given the unique situations and conditions faced by each educational unit, various types of efforts are made so that the teaching and learning process continues well. Six months of experience shows that there are nine models that are mostly implemented in Indonesia. These nine cases are the main capital in developing a technological ecosystem framework for implementing distance learning processes in the archipelago. It is hoped that this framework can be used for those who have not yet decided what kind of technological approach they want to use in adopting a distance learning model.

Acknowledgement

The author expresses his highest appreciation to the Indonesian Teachers Association and the Jakarta State University who helped make this study a reality. Hopefully this framework can provide benefits for education practitioners, especially educational units who want to apply a distance learning model based on information and communication technology.

References

- 3
Spector, J. M. (2015). Foundations of educational technology Integrative approaches and interdisciplinary perspectives. Routledge.

ABS 61

ORIGINALITY REPORT

4%

SIMILARITY INDEX

2%

INTERNET SOURCES

1%

PUBLICATIONS

3%

STUDENT PAPERS

PRIMARY SOURCES

1

Submitted to Universitas Negeri Jakarta

Student Paper

2%

2

Submitted to Roehampton University

Student Paper

1%

3

educationaltechnology.net

Internet Source

1%

4

kerjadiindonesia.blogspot.com

Internet Source

<1%

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off