



Final Report

SITUATIONAL ANALYSIS ON DIGITAL LEARNING LANDSCAPE IN INDONESIA

Submitted February 2021

Quicksand Design Studio Pvt. Ltd.

unicef 
for every child

Contents

1. Introduction / 6

2. About this research / 11

- 2.1. Research Objectives
- 2.2. Research Methodology
Research Limitations
- 2.3. Disclaimers

3. Pillar 1: Digital content and platforms / 14

- 3.1. The pandemic has resulted in an upsurge of platform and content innovations within the education space, by both the government and the private sector. However, little awareness and perceptions of low quality content have limited its uptake.
- 3.2. Private EdTech platforms are mostly focused on first mile users and final-year school students. While some government programs have come up to address private sector gaps, the needs of vulnerable communities are not yet adequately met, especially in the case of special needs students.
- 3.3. The shift of education outside the physical space of classrooms has led to challenges for monitoring teaching and learning performance.
- 3.4. Limitations on social interaction and safeguards for online safety have reduced active learning and posed a risk to the well-being of students.

4. Pillar 2: Internet, devices, and infrastructure / 39

- 4.1. Despite numerous initiatives to improve the poor internet connectivity across the archipelago, progress is slow and a large proportion of the population still does not have adequate internet connectivity to learn online.
- 4.2. Limited access to affordable quality internet and poor availability of appropriate digital devices makes learning from home less conducive for most students - especially those in remote and poor settings like 3T areas.
- 4.3. The Government's efforts to provide free internet packages have faced limitations in design and implementation, limiting its uptake.

5. Pillar 3: Digital skills / 56

- 5.1. Students have strong potential for digital learning, as many of them are 'digital natives'. Despite this, they lack adequate 'digital skills' that would prepare them for the 'digital economy'.
- 5.2. Many students struggle to adjust to this new way of learning, and their parents lack the capacity to adequately support them.
- 5.3. Inadequate support for teachers to transition to digital learning has posed challenges for them to adapt. This is accentuated by their poor formative training and limited pre-existing digital skills.

- 5.4. Government interventions focussed on teachers, have thus far been top-down in their approach and largely failed to include teachers in their design and formulation.

6. Recommendations / 84

Annexures / 95

Annex 1: EdTech providers offering free services.

Annex 2: Overview of the landscape of existing EdTech platforms in Indonesia.

Annex 3: Government of Indonesia EdTech initiatives

Annex 4: Citations

Annex 5: List of Experts

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We hope that the research is useful in creating a resilient education system which ensures that all children are able to learn and flourish in a safe digital environment - leading to a boost in Indonesia's human capital and recovery post the COVID -19 pandemic.

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Glossary

INOVASI - The Innovation for Indonesia's School Children

KOMINFO - Ministry of Communication and Information technology

KEMDIKBUD - Ministry of Education and Culture

MoEC- Ministry of Education and Culture

PSPK - Center for Education and Policy Studies

PUSDATIN - Data and information technology centre

Pustekkom - Center for Data and Information Technology, Ministry of Education and Culture

BPS - Central Bureau of Statistics

ICT - Information and Communication Technology

KPAI - Komisi Perlindungan Anak Indonesia, which translates to Indonesian Child Protection Commission

BOS - School Operational Assistance

1. Introduction

While literacy rates have been steadily increasing in Indonesia in the current millennium, digitization presents a new future for education. Law no. 20 of the National Education System, passed in 2003, stipulates a nine-year compulsory basic education (six years of primary and three years of junior secondary education) for all citizens of Indonesia aged 7-15 years and has helped increase enrollment in Indonesian schools¹. Furthermore, this law also requires central and local governments to allocate a minimum of twenty per cent of their budget to education². This drastically improved school enrollment of 15-year-olds in Indonesia from 46 per cent in 2001 to 85 per cent in 2018³. However, despite these efforts, according to the Central Bureau of Statistics Report of 2015, an overall estimated 4.4 million children and adolescents aged 7-18 years are still out of school⁴. As of an Oxfam Report from 2017⁵, only 55 per cent of children from poor families are enrolled in secondary school, highlighting that these efforts have still left out a significant number of young Indonesians.

In parallel, there is increasing digitisation and device availability across the archipelago. As the internet becomes cheaper and more widely available, giving more regular access, digital education becomes increasingly pertinent and advantageous to school-based learning. While subjects involving information and communication

technology (ICT) first appeared in school syllabi in 2006, the internet itself has equally become the means of delivering quality education opportunities to millions of students across the country. Though ICT was removed as a subject from the national curriculum in 2014, the government, having realised the importance of ICT, encouraged schools to conduct education processes within an 'IT environment', allowing students in schools to use computers and conduct online research inside the classroom⁶.

The government and the private sector have made efforts to support the growth of ICT and internet-based learning. The government has introduced initiatives including those targeting infrastructure and device access, developing platforms to make educational content freely and widely available, and training schoolteachers to adopt better technology practices. The private sector has also taken cognisance of these trends and come forward to develop education technology (EdTech) applications and platforms which are gaining popularity in Indonesia. These include platforms like Ruangguru, Zenius, and Sekohlamu that allow self-paced learning for students and others like Codemi and Quintal that provide learning management services for teachers and institutions.

Given the circumstances of a growing young population that is becoming increasingly familiar with the many uses of the internet, and the need to adapt to digitising markets, a move towards digital education is imminent. In spite of a general move towards digital education in Indonesia, there have been perpetuating challenges in its adoption. In

¹ The World Bank, *Indonesia Public Expenditure Review: Spending for Better Results*, The World Bank Group, Ministry of Finance Republic of Indonesia, European Union, Swiss Confederation and Australian Government, 2020.

² Jasmina, T., 'The Role of Government Spending on Basic Education at the District Level in Indonesia', 2007, p. 1-18.

³ Organisation for Economic Co-operation and Development, *Bridging the Digital Gender Divide: Include, Upskill, Innovate.*, OECD, 2018.

⁴ UNICEF Indonesia, 'Education and adolescents', <<https://www.unicef.org/indonesia/education-and-adolescents>>

⁵ OXFAM International, 'Towards a more Equal Indonesia', OXFAM Briefing Paper, Kilimani, February 2017.

⁶ Lukman, Enrico., 'A dilemma over Indonesia's curriculum that "removes" IT studies in schools', TECHINASIA, <<https://www.techinasia.com/dilemma-indonesias-curriculum-re-moves-studies-schools>>.

2020, this shift was hastened by the COVID-19 pandemic which resulted in the immediate closure of 530,000 schools across Indonesia and a rapid shift to distance learning, with a large number of students having to turn to digital interventions. However, the digital education infrastructure across the country is not adequately evolved to the level required to sustain and improve existing learning outcomes for all. Though the pandemic brought forward myriad innovations for digital learning, it also highlighted the gaps and inequities within the Indonesian digital education ecosystem that need to be addressed.

The Economist's 'Inclusive Internet Index 2020'⁷ commissioned by Facebook, which surveyed 100 countries revealed that, despite increasing internet connectivity across Indonesia, there are vast disparities within regions. Measured across four indices – availability, affordability, relevance, and readiness; Indonesia's ranked 63th overall, 55th in availability (the quality and breadth of available infrastructure required for access and levels of Internet usage); 61st in affordability (the cost of access relative to income and the level of competition in the Internet marketplace); 62nd in relevance (the existence and extent of local language content and relevant content); and 40th in readiness (the capacity to access the Internet, including skills, cultural acceptance, and supporting policy). Indonesia's poor performance across all metrics highlights the extent of Indonesia's unequal internet usage, underdeveloped internet infrastructure, and limited digital literacy.

COVID-19 impacts on schools and learning in Indonesia

There is an urgent need to address the digital divide in Indonesia more than ever before, a situation that the onset of the COVID-19 pandemic has only exacerbated further. The pandemic has resulted in the closure of schools across the country and forced 68 million students into distance learning

⁷ The Economist, 'The Inclusive Internet Index 2020', 2020, <<https://theinclusiveinternet.eiu.com/explore/countries/performance>>

systems⁸. According to estimates from the Ministry of Education and Culture (MoEC), 97.6 per cent of schools in Indonesia have implemented distance learning since March 2020⁹. Subsequent surveys by the MoEC and Ministry of Religious Affairs (MoRA) found that a small minority of only 2.4 per cent of teachers and principals did not implement 'learning from home'. Reasons for this included the lack of supporting devices and connectivity as many of them were from isolated areas. The methods employed by teachers under 'learning from home' were diverse and include activities like teachers conducting classes digitally, sending offline learning packets to students, referencing textbooks for lessons, recommending TV and radio broadcast programs, and even conducting physical home/community visits.



Image : UNICEF Indonesia/2020/Sumule

The transition to digital education has not been smooth for all – many students in rural areas lack internet connectivity and many low-income students lack access to devices required for existing 'home based learning' and EdTech solutions¹⁰. Children from lower income groups are likely to fall behind their wealthier peers who have better access to online learning infrastructure. Children with disabilities are likely to be worst affected as many have been unable to access special services required for their personalised

⁸ Variyan, George. and Agus Mutohar, 'Reimagining education in shadow of COVID-19 pandemic', *The Jakarta Post*, 2020, <<https://www.thejakartapost.com/academia/2020/10/02/reimagining-education-in-shadow-of-COVID-19-pandemic.html>>

⁹ Kemdikbud, 'Homepage', <<https://www.kemdikbud.go.id/main/>>

¹⁰ Yarrow, Noah, and Riaz Bhardwaj, 'Indonesia's education technology during COVID-19 and beyond', *The World Bank*, 19 May 2020, <<https://blogs.worldbank.org/eastasiapacific/indonesias-education-technology-during-COVID-19-and-beyond>>

learning¹¹. The ability for students to effectively access distance learning systems has been further complicated by Indonesia's geography. The fragmented island landscape results in infrastructural constraints leading to poor connectivity¹². According to the Global System for Mobile Communications' (GSMA) Mobile Economy Asia Pacific 2020 Report, about 61 million Indonesians do not have access to the internet¹³. According to data from Indonesia's Central Statistics Agency, around 21 per cent of people in low-income areas have access to the internet in contrast with the 93 per cent in high-income areas like Java¹⁴. Besides students and teachers too do not have the resources and skills to effectively engage in online learning. According to a Service Delivery Indicator (SDI) survey conducted by the MoEC and MoRA in 2020, 67 per cent of teachers reported difficulties in operating digital devices and using online learning platforms¹⁵.

The COVID-19 pandemic has changed the digital education landscape in areas including digital content and platforms, infrastructure, and digital skills. Both the government as well as the private player sector responses have given a significant impetus to the uptake of digital education. The pandemic has seen a sharp rise in the popularity of both public and private EdTech platforms, including the government's own platform Rumah Belajar¹⁶. Around 80 per cent of EdTech firms in Indonesia are

posited to have come into existence from 2013, when investment for EdTech has steadily been increasing over the years¹⁷. At the beginning of 2020, at least four private educational startups received funding¹⁸ namely Arkademi (from a US-based VC firm SOSV to scale its operations), Pahamify (led by Shunwei Capital), Gredu (from Vertex Ventures Southeast Asia and India), and Zenius (from Alpha JWC Ventures, Openspace Ventures, along with existing investors Northstar, Kinesys, and Beenext). In the second and third quarters, Eduka (from Init 6), ProSpark (from Agaeti Ventures), Infradigital (from AppWorks), and Kiddo (from OCBC NISP Ventura) received fresh funds. According to Crunchbase data, Ruangguru had approached a valuation of US \$ 1 billion (Rp.14 trillion) or the 'unicorn' scale during the year of 2020¹⁹.

While further opportunities to drive digital education forward exist, the opportunities for inclusion, especially among disabled students, economically disadvantaged students, and those in 3T areas (underdeveloped and outermost areas) remain limited. The World Bank estimates that the pandemic-induced income shock of negative 1.1 per cent could lead to 91,000 children in Indonesia dropping out of school²⁰. This new system of teaching is expected to negatively impact academic learning since effective distance learning requires new skills and increased internet access for both teachers and students²¹. The need to build evidence on the issue of digital learning warrants action that

¹¹ Gupta, Deepali and Khairina, Noviandri N., 'COVID-19 and the learning inequities in Indonesia: Four ways to bridge the gap. World Bank', 21 August 2020, <<https://blogs.worldbank.org/eastasiapacific/COVID-19-and-learning-inequities-indonesia-four-ways-bridge-gap>>

¹² Lee, Yen Nee, 'The pandemic's effect on education is not being discussed enough, says Indonesian minister'. Singapore Summit, 2020. <<https://www.cnn.com/2020/09/14/indonesias-education-minister-on-COVIDs-effect-on-students-learning.html>>

¹³ Devanesan, Joe, 'Can Open RAN help conquer Indonesia's connectivity issues?' TECHWIRE ASIA, 29 July 2020. <<https://techwireasia.com/2020/07/can-open-ran-help-conquer-indonesias-connectivity-issues/>>

¹⁴ Agahari, Wirawan, 'Digital innovation in Indonesia: inequalities between the east and the west', The Conversation, 10 October 2018. Retrieved from: <<https://theconversation.com/digital-innovation-in-indonesia-inequalities-between-the-east-and-the-west-95218>>

¹⁵ Yarrow, Noah; Masood, Eema; Afkar, Rythia., *Estimated Impacts of COVID-19 on Learning and Earning in Indonesia: How to Turn the Tide*, The World Bank, <<http://documents1.worldbank.org/curated/en/184651597383628008/pdf/Main-Report.pdf>>

¹⁶ Pusdatin Kemdikbud, Survey, 1 Jan-12 May 2020.

¹⁷ Wan, T., & McNally, T., 'Education Technology Deals Reach \$1.6 Billion in First Half of 2015. EdSurge', EdSurge, 29 July 2015, <<https://www.edsurge.com/news/2015-07-29-education-technology-deals-reach-1-6-billion-in-first-half-of-2015>>

¹⁸ Transforming Education EdTech Report, DailySocial/ DSRResearch, 2020.

¹⁹ Setyowati, D., 'Kans Ruangguru dan Alodokter Become Indonesia's 6th Unicorn during the Pandemic.', Katadata, November 2020, <<https://katadata.co.id/desysetyowati/digital/5fa18220d2ba9/kans-ruangguru-dan-alodokter-jadi-unicorn-ke-6-indonesia-saat-pandemi>>

²⁰ Gupta, D., N. Khairina, *COVID-19 and learning inequities in Indonesia: Four ways to bridge the gap*, 21 August, 2020, <<https://blogs.worldbank.org/eastasiapacific/COVID-19-and-learning-inequities-indonesia-four-ways-bridge-gap>>

²¹ Yarrow, Noah; Masood, Eema; Afkar, Rythia., *Estimated Impacts of COVID-19 on Learning and Earning in Indonesia: How to Turn the Tide*, The World Bank, <<http://documents1.worldbank.org/curated/en/184651597383628008/pdf/Main-Report.pdf>>

ensures accessibility, usability, and appropriateness for all and is more critical today than ever before.

This report examines the present scenario of digital education in Indonesia by taking a closer look at digital content and platforms; internet, infrastructure, and device access; and the digital skills among the primary users (teachers and students) and make recommendations to strengthen this ecosystem in the short and long term.

In the upcoming sections of the report, the key research approach and findings of the research under the following three pillars –

- 1. Digital content and platforms**
- 2. Internet, infrastructure, and devices**
- 3. Digital skills**

Each of the sections begins with an overview of the landscape and moves on to share insights on issues that might be impeding availability and effective uptake of digital learning.

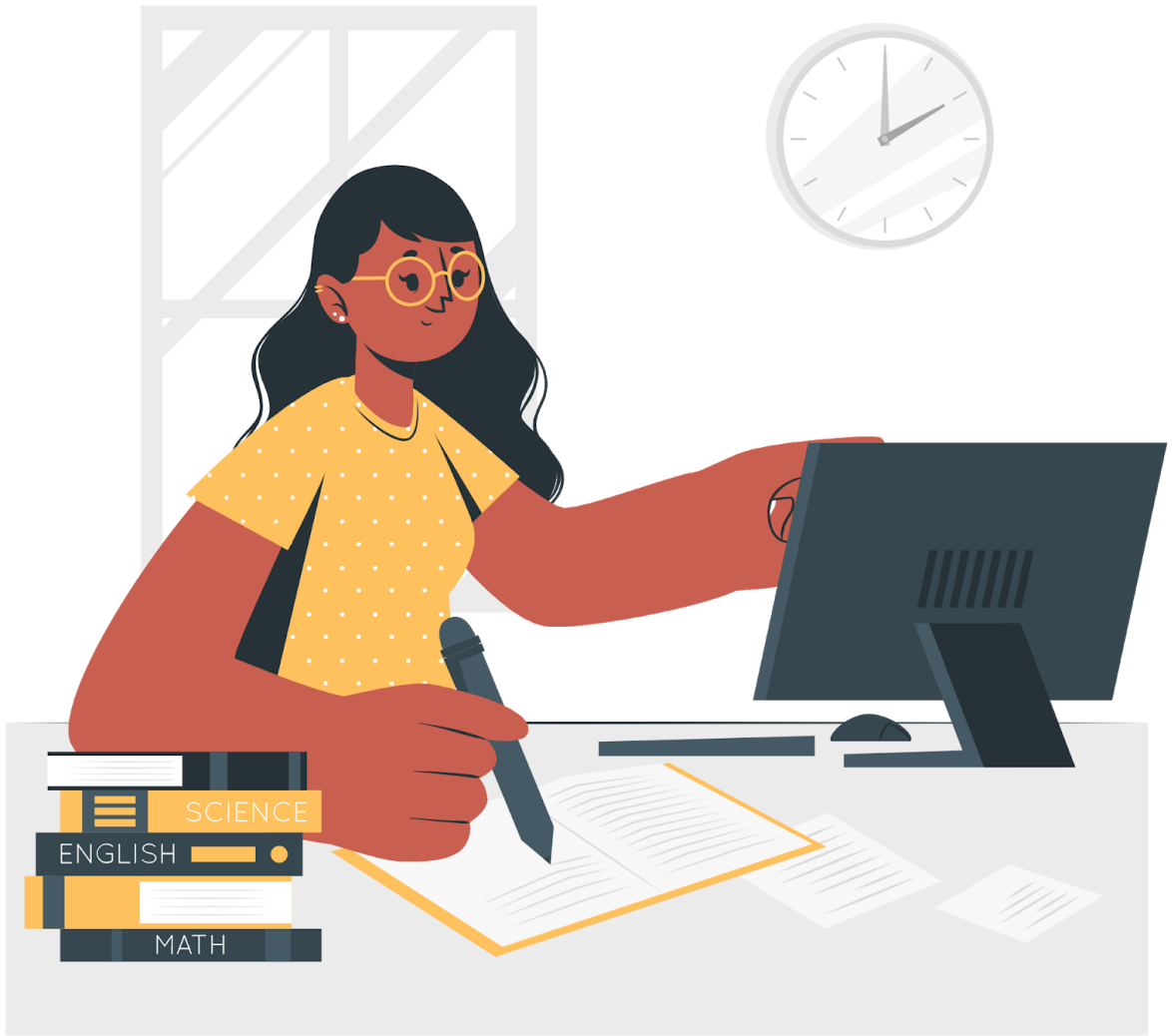


Illustration : Freepik

2. About this Research

This research intends to help UNICEF in its work to ensure equitable access to digital education for all. Through its GIGA and Reimagine Education initiatives, UNICEF aims to address gaps in digital learning by connecting every school to the internet, and every person to information, opportunity, and choice. The initiative aims to upgrade digital learning content and platforms and strengthen digital skills among both students and teachers. UNICEF also aims to enhance connectivity and digital capacity of learning systems in collaboration with the private sector. This research is focused on understanding user behavior and equity gaps in digital learning to support foundational research of UNICEF programs and potential opportunities for collaboration and scale up.

Research objectives

The study aims to carry out a comprehensive situational analysis of the digital learning landscape in Indonesia. It aims to apply an equity lens to highlight key disparities that exist among regions and socio-economic groups. It provides an overview of the access to and quality of digital learning; internet connectivity and affordability; availability of digital learning devices; relevance and content of platforms; and digital skills of students and teachers.

Specifically, it aims to:

- 1. Analyse the digital divide for children and adolescents in Indonesia (including accessibility and connectivity of schools and learning centres to the internet; availability, quality and use of digital learning content and platforms; and the skills gap for digital learning among teachers, students and other stakeholders) with a special emphasis on understanding equity gaps and other bottlenecks that could impact the quantitative and qualitative expansion of digital learning**
- 2. Provide practical recommendations on key strategies and priorities to be taken by the government, the private sector, and development partners (including UNICEF) to expand and improve digital learning across Indonesia**

Research methodology

The following journey mapp helped us identify lines of enquiries, various challenges, barriers, and possible opportunities that exist in the ecosystem for a young person to transition from a 'traditional learner' to a 'digital learner'.

Traditional Learner

Digital Learner

<p>Platforms & Content</p>	Do I have textbooks to study from?	Has my learning moved online?	Is there content available for my classes?	Is there content available in a language I can learn in?	Can I access those platforms?	Can I afford to access these platforms?	Can I effectively utilise online educational platform?
	Do I have digital device to learn from?		Do I have affordable and reliable internet connection?		Does my device get enough connectivity for me to access my learnings?		Do I have a device available for the amount of time needed to learn effectively?
	Do I have access to an environment that is conducive to my learning?	Do I have basic skills to access digital technology?	Can I communicate and collaborate with my teachers and peers over digital technologies?	Can I effectively participate in online classes?	Can I share and create content online?	Can I search for relevant information for my learning on the internet?	Can I effectively protect myself from threats online?

This mapping helped us develop our lines of enquiry to the experts, as well as respondents via the validation interviews.

A mixed methods approach was adopted for the research to arrive at validated and triangulated research findings. This included:

- 1. Secondary research:** Desk research review to gain insights into existing literature and data available has been collected from the following sources:

 - Information made available through UNICEF programs, surveys, and research repositories
 - Existing literature on state of digital divide and the gaps in knowledge in Indonesia
 - Demographic and geographic specific learning available through an analysis of databases

- Latest news articles and journalistic storytelling throwing light on current issues about the topic
- Qualitative data analysis on digital divide from analysing government reports, national and local statistics, Indonesian universities, think tanks, and civil society organisation initiatives
- Reports on the topic including the Digital Competitiveness Index 2020 Report for Indonesia by East Ventures and the World Wide Web Foundation’s Women’s Rights Online 2020 report

- 2. Interview with experts:** In order to strengthen the secondary research, the literature review was supplemented with 13 interview sessions with experts working on the specific issues and domain pertaining to this research. Their perceptions and experiences have played a crucial role in helping the research team build a holistic view on the research and identify

strategies to resolve existing challenges in partnership with key stakeholders for sustained impact. A list of all the experts interviewed has been provided at the end of this report, (see Annex 5). To respect the privacy of the experts, no personal data has been disclosed but their designation (or specified expertise) and affiliated organisation have been mentioned.

3. **Validation interviews:** The research collected via secondary research and expert interviews was validated by speaking to students, parents, and teachers across the archipelago. In order to obtain diverse profiles and contexts, our primary research included in-depth interviews and conversations with five students, five teachers and four parents from geographies including Papua, East Java, West Sulawesi, Central Palu, East Nusa Tenggara, Maluku, and West Java, from various socio-economic backgrounds, genders, and ages.

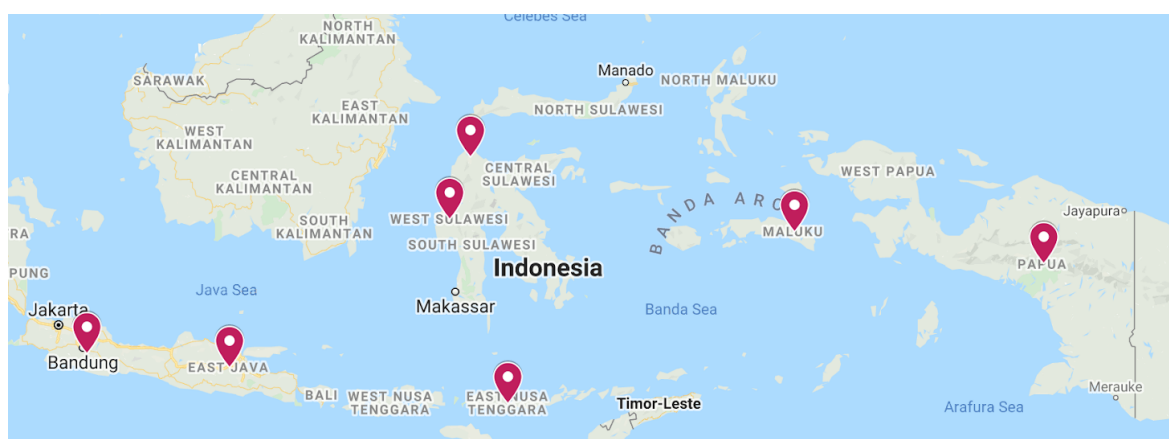
Research limitations

1. Key information gaps:
 - a. limited information on Madrasah (Islamic) schools
 - b. limited understanding of private EdTech innovations due to the inability to speak with more than two representatives from private EdTech companies

- c. limited understanding of digital learning challenges faced by students with disabilities
 - d. limited understanding of usefulness of initiatives like government educational radio and TV programs, offline learning packages and child safety helpline.
2. The research does not rely on new primary evidence but comprehensively presents insights.
 3. The research was conducted remotely for validation interviews due to the limited period of research study and the social distancing protocol due to COVID-19.

Disclaimers

1. All the quotes or opinions expressed by experts have been in their personal capacity. They do not represent the views of the organisation they are affiliated with.
2. Many of the expert and validation interviews were conducted in Bahasa and then translated into English, therefore a few have been adapted or edited to adequately represent what was said.
3. This research was carried out between November 2020 to January 2021, given the rapid pace with which things are taking place, a few findings and statistics might have changed.



Places where interviews were conducted.

Pillar 1: **Digital content and platforms**



Illustration : Freepik

3. Pillar 1 :

Digital content and platforms

The COVID -19 pandemic has created a vibrant ecosystem for digital learning in Indonesia. Prior to the pandemic, government support for digital learning primarily focused on TV programming and making digital versions of textbooks available online. In 2004, the MoEC launched educational TV programming – *Belajar dari Rumah* (Study from Home) as a key learning resource for students without access to the internet. The 'Electronic School Books program' was introduced in 2008 by the MoEC, to guarantee the availability of books to educational institutions, as well as, ensure teachers and students were protected from price rises²². The number of e-books provided by the government for free grows every year with thousands of resources available for download on the 'Electronic School Books program' [website](#). The Directorate of Learning and Student Affairs, Directorate General of Higher Education, and MoEC launched the Indonesian Online Learning System Implementation (SPADA) program in 2014. SPADA Indonesia is intended to increase student access to learning through quality massive open online courses (MOOCs) from tertiary institutions.



Image : UNICEF Indonesia/2020/Ijazah

Other key government initiatives for digital learning include:

Rumah Belajar

In order to support the process of digitizing education and creating an online learning environment, the MoEC initiated the Rumah Belajar portal in 2011²³. It includes features such as online classes, learning materials specific to the Indonesian education curriculum, facilities for interaction between educational communities, question banks, and virtual laboratories²⁴. To ensure inclusivity and that young children with limited financial resources can access learning material, the Rumah Belajar platform is free of charge. It is especially focused on equipping teachers with resources and avenues for online education. The platform provides ICT training for teachers called *Klinik TIK* (ICT Clinic). The Rumah Belajar platform was one of the most known

²² Muhaj, 'Presiden Resmikan Peluncuran program Buku Elektronik Gratis.', 20 August 2020, <<https://www.antaranews.com/berita/113478/presiden-resmikan-peluncuran-program-buku-elektronik-gratis>> .

²³ Wynn, Ines, 'The Emergence of Rumah Belajar', Bali Advertiser, 2013, <https://www.baliadvertiser.biz/rumah_belajar/> .

²⁴ Centre for Policy Research, Ministry of Education and Culture, Government of Indonesia, 'The Role of Digital Learning Platforms in Supporting Inclusive Quality Learning', 2020.

digital learning platforms during the unexpected jump into digital education caused by the COVID-19 pandemic in 2020. According to the Rumah Belajar website accessed on 9 March 2021, it consists of a registered user base of 273,509 teachers and 666,708 students²⁵. According to Kompas, on 4 March 2020 Rumah Belajar reached 18 million users²⁶.

Guru Berbagi

In June 2020, the MoEC launched the Teacher Sharing program, Guru Berbagi²⁷. Available for teachers to use for free, this platform makes available best practices around quality teaching methods and also includes lesson plans curated by the MoEC. Through Guru Berbagi, the government encourages teachers to have active involvement in teacher capacity building and become resource persons for ICT based learning in their area. An internal study of the MoEC shows that around 30 per cent of the total 3 million Indonesian teachers have accessed this platform²⁸.

Guru Belajar

Guru Belajar is another initiative by the MoEC to capacitate teachers through different skill development programs. It provides teachers with an avenue to assess their competencies and develop them further through Teacher Learning Programs including the 'COVID-19 Pandemic Series', 'Life Skills Education Series', 'Minimum Competency Assessment Series', 'Teacher Learning and Sharing program Independent Study series for Prospective ASN PPPK²⁹ Teacher Registrants' and 'Teacher's program Learning and Sharing Inclusive Education series'³⁰. The 'COVID-19 Pandemic Series' specifically provides teachers with guidelines on how to conduct distance learning.

²⁵Ministry of Education and Culture, 'Rumah Belajar', <<https://belajar.kemdikbud.go.id/>>.

²⁶Kompas, <<https://epaper.kompas.id/pdf/show/20210304>>.

²⁷Ministry of Education and Culture, 'Guru Berbagi', <<https://guruberbagi.kemdikbud.go.id/>>.

²⁸Expert interview with an official of the Ministry of Education and Culture, of the Government of Indonesia, in 2020.

²⁹PPPK teachers are contract-based government employee (PPPK) teachers. ASN refers to the State Civil Apparatus composed of civil servants and contract based government employees.

³⁰Ministry of Education and Culture, 'Guru Belajar', <<https://gurubelajar.kemdikbud.go.id/>>

Other government digital education initiatives

The MoEC has a host of both online and offline initiatives to support digital learning. Online initiatives include e-modules catering to the national curriculum through programs like Gerbang Kurikulum; online courses for technical and vocational, language and digital skills; and educational multimedia (M-edukasi) in the form of virtual laboratories, Augmented Reality (AR) content, and educational mobile content. Offline initiatives include Radio Edukasi, tv edukasi, and suara edukasi. While Radio Edukasi provides educational news and programs on the radio; suara edukasi provides educational podcasts through the radio; and, tv edukasi is an Indonesian television station owned by the MoEC to spread educational information. In partnership with Indonesian public television network TVRI, the MoEC also launched *Belajar dari Rumah* (Study from Home), a series of educational TV programs as a key learning resource for students without access to the internet during the pandemic. An overview of all the digital education initiatives to provide platforms and content in the space by the Indonesian government can be found in the annex (see Annex 3).

The MoEC has also tried to strengthen the digital education infrastructure in Indonesia through its School Digitization initiatives under its *Sekolah Penggerak* (Pioneering Schools) program in 2021, elaborated in Section 4 of this report.

In addition to these initiatives, the MoEC has set up Wartek, a special task force that is constantly innovating to develop the digital ecosystem in Indonesia. They have four programs including a school resource management platform, a teacher learning platform, a curriculum and assessment platform and a career readiness platform.

Private sector-led digital education initiatives

In addition to the government's platforms and initiatives, the digital learning landscape in Indonesia includes several private sector EdTech platforms, the most popular of which is *Ruangguru*. *Ruangguru* was launched in 2014 as an online marketplace for private tutors but is now aimed at transforming educational performance by offering

a range of products and services³¹. It currently has more than 22,000,000 users offers services for more than 100 subject areas³².

Zenius Education, founded in 2007, even prior to the government's flagship platform Rumah Belajar, was one of the first EdTech platforms in Indonesia. Zenius offers video content and exercises for elementary to senior high school students, focusing on subjects that are tested in national examinations.

The majority of other private EdTech platforms in Indonesia were founded in the years after 2013, or in a post COVID-19 world, where people began to realise the potential of digital learning solutions. *Sekolah.mu* was launched and has already seen immense growth and consumer usage. Google Indonesia started a 'Google for Education' initiative that provides free, secure tools for students and teachers in schools and universities to learn, innovate and collaborate³³. Many free programs offered by private EdTech platforms are accessible through the government's Rumah Belajar platform. A list of EdTech solutions available in Indonesia can be found in the annexures (see Annex 2).

Despite these efforts, there continue to be challenges in the uptake of EdTech, the provision of inclusive EdTech solutions and in ensuring accountability, online safety and safeguarding the mental health and social interaction needs of students. The insights in this section aim to provide an assessment of these efforts in the landscape for digital learning content and platforms in Indonesia.



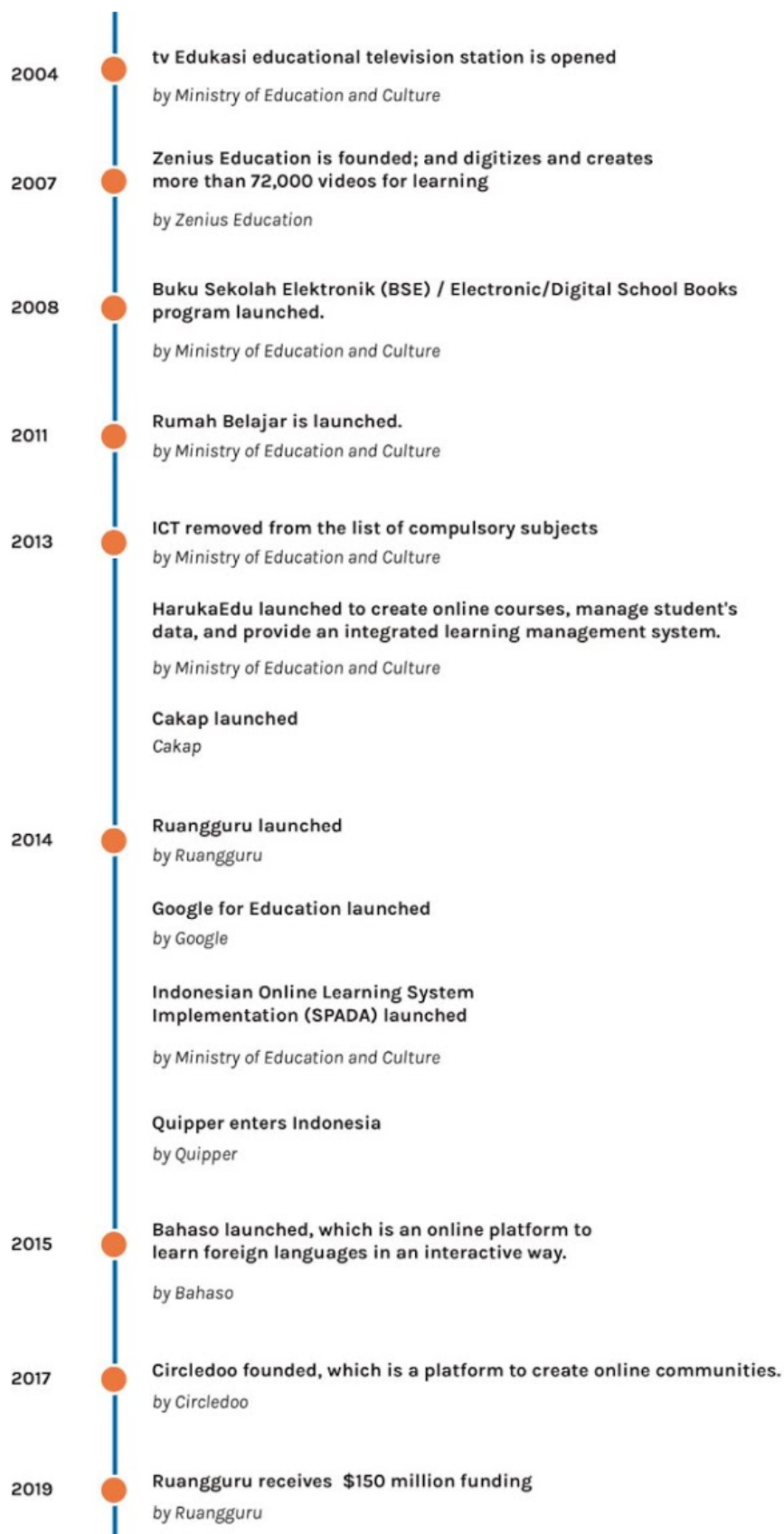
Illustration : Free

³¹ Pouezevara, Sarah, et al., *Scaling Access & Impact Realizing the Power of EdTech*, Indonesia, Country Report, RTI International and Omidyar Network, 2019, <https://omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact-Indonesia-Report_vFinal_r.pdf>.

³² 'Ruangguru', <<https://www.ruangguru.com/about-us>>.

³³ Google, 'Google for Education', <<https://edu.google.com/intl/id/>>.

Timeline of digital education initiatives - Content and platforms



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- A vertical timeline with a blue line and orange circular markers. The years 2019, 2020, and 2021 are listed on the left. To the right of each year, there are one or more entries, each consisting of a bold title and a smaller subtitle starting with 'by'.
- 2019**
 - Ruangguru receives \$150 million funding**
by Ruangguru
 - EdTech platform Pahamify launched, for test prep for K-12 students**
by Pahamify
 - 2020**
 - Sekolah.mu launched**
by Sekolah.mu
 - Zenius Free Learning Video**
by Zenius Education
 - Ruangguru Free Online School**
by Ruangguru
 - Guru Berbagi launched**
by Ministry of Education and Culture
 - 2021**
 - Sekolah Penggerak School Digitization Programme launched**
by Ministry of Education and Culture

3.1 The pandemic has resulted in an upsurge of platform and content innovations within the education space, by both the government and the private sector. However, little awareness and perceptions of low quality content have limited its uptake.



Illustration : Freepik

The government has tried to create an ecosystem for open-access digital education through their Rumah Belajar, Guru Berbagi, and Guru Belajar platforms, and public-private collaborations. However, limitations in the quality of content and low awareness of government platforms have posed a problem to their uptake.

The MoEC has promoted an ecosystem for open-access education through its initiatives like *Guru Berbagi*, *Guru Belajar* and private-public partnerships. For instance, the *Guru Berbagi* platform, allows teachers and educators to share © UNICEF/Image /Veska Learning Implementation Plans (RPP) and best

practices for digital learning through articles and references³⁴. The initiative *Sapa Duta Rumah Belajar* (*SapaDRB*), meaning ‘Greetings Rumah Belajar Ambassador’ was launched by *Pusat Data dan Informasi* (PUSDATIN-Center of Data and Information of the MoEC) in March 2020, to encourage teachers to use the *Rumah Belajar* platform to share best practices and materials for online teaching, especially those based on information technology³⁵.

“Guru Berbagi encourages open educational practices by acting as a sharing platform of ICT best practice learning and planning methods. An internal study of the MoEC shows that around 30 per cent of the total 3 million Indonesian teachers have accessed this platform.”

- *Expert, Ministry of Education and Culture, Government of Indonesia*



Image : UNICEF Indonesia/2020/Veska

³⁴Ministry of Education and Culture, ‘Guru Berbagi’, <<https://guruberbagi.kemdikbud.go.id/>>.

³⁵Expert interview with an official of the Ministry of Education and Culture, of the Government of Indonesia, in December 2020.

The MoEC has also collaborated with private EdTech companies to get access to content that it can provide for free on its Rumah Belajar platform to ensure increased access to diverse content and learning materials. In addition to this, many private sector digital learning providers offer free services under the government distance learning initiative called *Pembelajaran Jarak Jauh* (PJJ). The complete list of private EdTech companies providing free services under this scheme can be found in the annexures (see Annex 1.) The government has also collaborated with private sector entities, like Google and Microsoft for teacher training webinars on both ICT related technical knowledge and pedagogy.

“We have given the Ministry all our materials for free and converted Zenius problem sets into pdf versions to be distributed to teachers.”

- Expert, employee at Zenius

In spite of government efforts, the usage of the Rumah Belajar and Guru Berbagi platforms is limited. In the validation interviews, it was found that teachers across different areas of Indonesia, including Merauke in Papua, Lamongan in East Java, Mamuju in West Sulawesi, Kota Palu in Central Palu and Malaka Sari in Jakarta, do not seem to have integrated these platforms into their teaching. Four out of five teachers had not even heard of Guru Berbagi and the one who had heard of it (from East Jakarta) had never used it. All teachers had heard of Rumah Belajar but none had used it themselves or referred it to their students while teaching. Other than awareness, hesitation to use the Rumah Belajar platform might be attributed to its reported poor quality of content. According to an expert who works closely with the government on digital learning, these platforms often do not maintain a standard to the quality and quantity of their content³⁶. This poses a problem, as the International Telecommunication Union (ITU) reports that the quality of materials or learning content is the most important factor for people when choosing EdTech applications.

³⁶Expert interview with an official of the Ministry of Education and Culture, of the Government of Indonesia, in December 2020.

In an MoEC survey, 57 per cent of students report to still be unaware of the Rumah Belajar learning platform³⁷, while both students and teachers who had used it complained about the quality of the Rumah Belajar platform not being up to the same level as private EdTech platforms.

“Government has facilitated teachers to build their capacity on implementing online learning through Rumah Belajar and Guru Berbagi. However, the teachers have not yet integrated it into their learning process and rarely access it, consequently we have not seen any significant improvement on their quality of teaching.”

- Expert, Ministry of Education and Culture, Government of Indonesia

The unexpected push into digital learning has boosted EdTech platforms and facilitated the landscape for novel and innovative practices in the education space.

Even prior to the COVID-19 pandemic, innovations of private EdTech platforms have challenged the way learning and teaching was being carried out in mainstream education in Indonesia. Companies such as Arsa Kids, Digikids and Educa Studio have developed game-based and blended learning experiences like interactive storybooks and educational mobile apps to help improve early childhood educators' effectiveness³⁸. Other interesting innovations include content provided to students via animated premium learning videos, quizzes, and summaries that combine learning

³⁷Ministry of Education and Culture, *KPAI survey on Teachers and Students*, Indonesia, 3-8 April 2020.

³⁸World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf>>, accessed 8 March 2021.

science, filmmaking, gamification, and visuals like on Pahamify; MauBelajarApa, which is an online marketplace platform that makes it easy for learners to find and register for vocational classes that have been created by teachers; and Zenius that has a repository of more than 80,000 educational videos for K-12 students and has created a compressed version of their application to be easily accessed by those with poor internet speed and connectivity.

“Zenius focuses on goal setting, mind mapping, which is in contrast to traditional education in Indonesia. Google Meet is too large in space for many to access, so the Zenius team has created a compressed version that is 2MB per minute and there is web based and an application for it - this can be accessed on the mobile phone and by installing the application the students can view it on the video.”

- Expert, employee at Zenius

However, the unexpected push into digital learning caused by the COVID-19 pandemic has encouraged the use of digital solutions more than ever before. Even if such innovations existed before the pandemic, they were not as widely used. The validation interviews showed that four out of five teachers had never before used digital tools in their teaching prior to the pandemic, while five out of five teachers said they were currently using some digital solution for their teaching, mostly WhatsApp. Initial reluctance in adopting technology among some educational institutions, teachers and parents has been replaced by an urgent necessity to do so, with large numbers of students now reliant on online and distance education with the closure of schools³⁹.

³⁹World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf>>.

“Digital learning was fairly limited before COVID-19 - besides Ruangguru (good private platform for online learning even before the pandemic) there was barely anything. There was not much demand for this. There was no real culture for online learning before COVID-19.”

- Expert, Child Protection, UNICEF

Consequently, local EdTech platforms have experienced exponential growth in their user base during the pandemic. Since the beginning of 2020, Ruangguru reported five million new customers⁴⁰. Other local platforms like Harukaedu (a platform offering online university degrees), and Cakap by Squireline (a tutoring platform for language learning)⁴¹ have also reported growth in their user base. Even newer platforms like Sekolah.mu which were launched recently in January of 2020 reported a large user base in the short time since their launch. The government's EdTech platform Rumah Belajar has also experienced an increase in its user base, going from 128,000 teachers, and 300,000 students as per November 2018⁴², to 18 million users on 4 March 2020⁴³.

“Sekolah.mu was launched in January 2020 and has already reached 2.5 millions users! It was launched during the pandemic, and has had tremendous uptake in less than a year.”

- Expert, employee at Sekolahmu

The COVID-19 crisis provides an opportunity for the EdTech sector to provide sustainable solutions in improving student learning, and in supporting traditional educational institutions in the delivery

⁴⁰Setyowati, D., 'Kans Ruangguru dan Alodokter Become Indonesia's 6th Unicorn during the Pandemic.', Katadata, November 2020, <<https://katadata.co.id/desysetyowati/digital/5fa18220d2ba9/kans-ruangguru-dan-alodokter-jadi-unicorn-ke-6-indonesia-saat-pandemi>>

⁴¹Yarrow, Noah; Masood, Eema; Afkar, Rythia., *Estimated Impacts of COVID-19 on Learning and Earning in Indonesia: How to Turn the Tide*, World Bank, <<http://documents1.worldbank.org/curated/en/184651597383628008/pdf/Main-Report.pdf>>.

⁴²Pouzevara, Sarah, et al., *Scaling Access & Impact Realizing the Power of EdTech*, Indonesia, Country Report, RTI International and Omidyar Network, 2019, <https://omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact-Indonesia-Report_vFinal_r.pdf>.

⁴³Kompas, <<https://epaper.kompas.id/pdf/show/20210304>>.

of online education⁴⁴. In 2020, Zenius Education provided free access to 80,000 video learning materials. This Zenius service can be used by students to undergo learning activities during their study period at home and can also help prepare for the optimal National Examination (UN)⁴⁵. In March 2020, Ruangguru also launched the Ruangguru Free Online School, where students could take part in online distance learning (live teaching) every Monday to Friday on the application, just like they would in school. Students who were not able to take part in the morning session could access the recordings. Apart from the live teaching facility, students can continue to practice through the free practice questions and online trial features⁴⁶.

The sudden transition to digital learning has also been a positive catalyst for motivating teachers to be more explorative and creative in their teaching techniques. They have been encouraged to adapt existing and create new teaching content by accessing sources like Guru Berbagi and multiple others sources on the internet⁴⁷. This has given them access to a huge body of content and teaching practices beyond their immediate schools and colleagues. On Guru Berbagi, teachers can also record material in media formats like video and audio compared to standard written formats for their students to learn from.

Wartek is currently working on the development of a comprehensive teacher app through which teachers will have access to a rich collection of toolkits that enable them to conduct individualized and differentiated learning based on the learning progress of each student. This app will be rolled out

across the country as part of Sekolah Penggerak implementation.



Illustration : Freepik

“There is a silver lining to the pandemic as we can see a shift in the efforts and mindsets of teachers. They are now more explorative than ever before to find teaching materials or are tweaking their methods.”

- Expert, PSPK, Government of Indonesia

“I have joined a WhatsApp group of model teachers from the Trakindo program⁴⁸. We often chat among ourselves and exchange approaches and methods of teaching. I have tried a few that fellow teachers had suggested.”

- Teacher, 28, Merauke City, Papua

Social media, followed by conferencing applications are preferred over EdTech platforms as the most popular choices for digital learning.

Social media platforms like Facebook, WhatsApp, and LINE; and conferencing applications like Google-meet and Zoom seem to be the most popular choices for conducting digital learning. These are

⁴⁴ World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf>>

⁴⁵ Zenius, ‘Dukungan Zenius untuk Kebijakan Belajar di Rumah: Zenius NB19’, 15 March 2020, <<https://www.zenius.net/blog/23693/corona-belajar-di-rumah-kebijakan-pemda>>.

⁴⁶ Alfarizi, M. K., ‘Pandemi COVID-19, Ratusan Ribu Siswa ‘Berkerumun’ di Ruangguru’, 16 March 2020, March 16 <<https://tekno.tempo.co/read/1320212/pandemi-COVID-19-ratusan-ribu-siswa-berkerumun-di-ruangguru>>, accessed 8 March 2021.

⁴⁷ Luhar, Bima, ‘Analisis Awal Terhadap Faktor Pendorong Ketimpangan Dalam Pembelajaran Jarak Jauh Di Tingkat Sekolah Dasar’, CATATAN ISU SMERU, 2020. <http://smeru.or.id/sites/default/files/publication/ib02_analisis_bjj-ind_0.pdf>

⁴⁸ Basil, Debra, Z. and Runte, Mary, S. ‘Trakindo Volunteer Mengajar Named as One of the Best Community Programs’, 8 August 2017, <https://www.researchgate.net/publication/44285629_Company_Support_for_Employee_Volunteering_A_National_Survey_of_Companies_in_Canada>.

used for educational purposes by serving as mediums for communication and the sharing of educational materials like assignments and notes. They seem to be preferred over EdTech platforms that curate specific courses and material.

In an INOVASI study conducted in April 2020, of 221 participants from 19 cities in 4 provinces mostly from SD (primary) schools, it was found that over 70 per cent of students are reportedly still learning offline with instructions communicated by SMS from teachers to parents⁴⁹. Of the 24 per cent that reported studying online, 98 per cent did so through instant messaging (WhatsApp, LINE, or Facebook), and very few did so through public online learning platforms like Rumah Belajar, or private ones like Ruangguru and Zenius.

“As time passed, more and more teachers are learning to use video conferencing such as Zoom or the Google Class Room facility, so that WhatsApp is not the only option.”

-Expert, PSPK, Government of Indonesia

In an MoEC primary school survey of 14, 668 respondents in April 2020, 70 per cent reported learning through WhatsApp groups and only 296 respondents (not even 0.1 per cent) reported learning through websites or school platforms. This was despite 39 per cent of students being advised to use Rumah Belajar, 23 per cent being advised to use Ruangguru, 10 per cent being advised to use educational TV programs, and 16 per cent being advised to use ‘others’⁵⁰. For teachers too, 89 per cent received ‘guidance’ through the school’s social media groups⁵¹.



Illustration : Freepik

The validation interviews conducted during the research further corroborated these findings, with five out of five students ranking WhatsApp, Zoom and Googlemeet as their most preferred platforms for digital learning. While four out of five students had heard of Ruangguru, but never used it themselves. Only one student from Jember, East Java had heard of private EdTech interventions like Brainly, Qanda, Zenius, and Quipper, but did not seem to mention it as one of the solutions she used regularly for her own studying. None of the five students had subscribed to any EdTech platform for their digital learning. As for Rumah Belajar, only two out of five of the students, one from Maluku and the other from East Nusa Tenggara had heard of it, but none of the five students had used it for their digital learning. Furthermore, five out of five teachers mentioned using WhatsApp, Google Meet, Google Classrooms, or Zoom for their teaching. None mentioned using any EdTech platforms with curated courses and material. Lastly, even all three parents interviewed mentioned that their children used WhatsApp or a video conferencing application like Zoom, or Google Classrooms for learning.

“I have so many WhatsApp groups for school. One for each subject and one big group for everyone at school. For each session, the teacher will use the subject WhatsApp group to share materials, which can be pdf, photos, voice notes, or link to youtube videos.”

- Student, 16, Garut District, West Java

⁴⁹ INOVASI, *Teacher Survey*, Indonesia, 13-14 April, 2020.

⁵⁰ Ministry of Education and Culture, *SD survey*, Indonesia, 3-8 April 2020.

⁵¹ Ministry of Education and Culture, *KPAI Teachers survey*, Indonesia, 3-8 April 2020.

Perpetuating choices shaped by one's low internet speed, affordability and poor digital skills are underlying causes behind the use of social media platforms as tools for online learning. In 2017, a large number of Indonesians only used the internet on their mobile phones via low speed 2G satellite technology, which prevented them even from using Google and Wikipedia effectively⁵². Mobile internet users tended to have limited prepaid data packages that prevented them from using EdTech platforms that would require a lot of data, limiting them to using social media⁵³. A recent report titled 'Indonesia: A Mobile Network Experience' shows that users of four out of five mobile networks now have access to 4G services at least 90 percent of the time⁵⁴. However, users still seem to prefer the use of social media due to familiarity and possibly also limited digital skills to use more curated platforms, especially in the case of teachers.

“I use Whats App and messenger only because those apps don't require a strong internet connection, and many of my students live in rural and mountainous areas with bad internet connection.”

- Teacher, 25, Mamuju District, West Sulawesi

“[For my teaching] I can only do WhatsApp, because we have been using it for a long time. But for Zoom or Google classroom, I do not know how to use it.”

- Teacher, 49, Palu City, Central Sulawesi

Uptake of EdTech platforms seems to be limited to urban, first mile users.

Validation interviews conducted across rural geographies showed that none of the five students spoken to had a paid subscription to any EdTech platform, and neither did the children of the three parents who were interviewed. Students had heard of Ruangguru, but never used it themselves. Only one student from Jember, East Java had heard of private EdTech interventions like Brainly, Qanda, Zenius, Quipper. None of the students had subscribed to any EdTech platform for their digital learning. No teachers mentioned using any EdTech platforms with curated courses and material.

In spite of private EdTech firms having made free versions, their premium versions with paid content are not affordable to the majority, resulting in equity gaps in access to digital education. In a survey conducted by Saiful Mujani Research & Consulting in August of 2020, of the 2,200 respondents, 94 percent found distance learning costly, out of which 67 percent said it was “very” or “quite” costly⁵⁵. Many EdTech firms in Indonesia have adopted a “freemium” pricing model as a means of attracting more users by providing a teaser for users to first try the product. However, less than 3 percent of those using the free versions of the products actually end up upgrading to the paid versions.⁵⁶ Additionally, the cost of internet and devices act as inhibitors to those other than urban, first-mile consumers using them.

⁵²Tapsell, Ross and Jurriens, Edwin, 'Bridging the digital divide in Indonesia.' East Asia Forum, 15 August 2017, <<https://www.eastasiaforum.org/2017/08/15/bridging-the-digital-divide-in-indonesia/>>.

⁵³Azali, Kathleen. 'Indonesia's Divided Digital Economy', *Perspective*, ISSUE: 2017, No. 70, pp.1-12, Singapore, ISEAS- Yusof Ishak Institute, 14 September 2017. <www.iseas.edu.sg/images/pdf/ISEAS_Perspective_2017_70.pdf>.

⁵⁴Khatri, H. , *INDONESIA Mobile Network Experience Report*, OPENSIGNAL, July 2020, <<https://www.opensignal.com/reports/2020/07/indonesia/mobile-network-experience>>.

⁵⁵Ghaliya, Ghina, 'Majority of Indonesians find distance learning costly: Study', The Jakarta Post, 19 August 2020, <<https://www.thejakartapost.com/news/2020/08/19/majority-of-indonesians-find-distance-learning-costly-study.html>>.

⁵⁶World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf>>.

“I have four school going children, and I have never heard of any EdTech platform. Anything related to purchasing a mobile and paying for an internet voucher must be expensive”.

- Parent, 59, Alor Kecil District, East Nusa Tenggara

HOW MIGHT WE...

- **Leverage an enabler:** *How might we support and scale innovative teaching methods that have come about during the pandemic?*
- **Leverage an enabler:** *How might we positively harness the pent up energy for change in the education innovation ecosystem in Indonesia?*
- **Overcome an inhibitor:** *How might we increase uptake and awareness of EdTech platforms, beyond urban students?*
- **Cover a gap:** *How might we improve the quality of content available on Rumah Belajar?*

3.2 Private EdTech platforms are mostly focused on first mile users and final-year school students. While some government programs have come up to address private sector gaps, the needs of vulnerable communities are not yet adequately met, especially in the case of special needs students.

Private EdTech solutions are focused on students in the final years of school and on private schools.

One in four EdTech firms was found to be exclusively targeting private sector education providers⁵⁷. Targeting private institutions was seen as desirable among private EdTech firms as they were considered to be more likely to have both the willingness and ability to pay for services. Furthermore, within formal education institutions (schools, universities, and training institutes), Indonesian EdTech firms typically target senior students, especially those in their final years of schooling (Grades 10 to 12) and those in university. Private EdTech solutions Ruangguru, Zenius, and Quipper develop and provide self e-learning content, interactive learning platforms and study tools that help K-12 students expedite the learning process and help with their assignments and test preparation. Solutions like Quipper, MejaKita, Indonesia X, HarukaEdu, Arkademi, and Skill Academy, to name a few, all focus on an older age group, students from high school and college or working, older working professionals.

⁵⁷ World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf>>.

“The challenge of EdTech in Indonesia is that the majority of the initiatives are business driven, so it's within their interests to maximise revenue, so as a result the equality part of EdTech becomes a lot more questionable. The moment they charge some fee or subscription it leads to the question whether their existence encourages equality or widens the gap, because those who can afford these resources will have more available than those who cannot afford it.”

- Expert, Wartek, Government of Indonesia.

Though there have been government efforts to provide access to digital education for vulnerable groups, their uptake has been limited. Furthermore, there are very few Civil Society Organisations that exist in the EdTech space to cater to these groups.

The government has tried to extend access for digital education to vulnerable groups through several means. Firstly, the MoEC EdTech platform, Rumah Belajar is free of cost. For poor and off-grid

communities, with limited access to internet devices, the government has offered TV and radio based programs, as well as, offline learning packages, referred to as *buku packet*. The offline learning packages include the mediums of SMS and printed materials that are based on the National Curriculum. These offline learning packages seem to be particularly popular, 40 per cent of 14,668 respondents in an MoEC rapid survey still reporting doing school work from offline learning packages, and respondents being three times more likely to be using offline learning packages than educational TV programs⁵⁸. An expert from the MoEC shared that the government is also currently piloting a platform similar to Rumah Belajar that can be accessed offline and makes use of project-based learning for areas and communities that have minimal connectivity⁵⁹.

The government has also initiated several programs to improve access to digital education for special needs students. These include Government Regulation No. 13/2020 and PUSDATIN's initiative for children with special needs. Government Regulation No. 13/2020 on 'Reasonable Adjustments for Students with a Disability' requires educational institutions to make appropriate adjustments to provide quality education to students with disabilities⁶⁰. PUSDATIN collaborated with Sekolah Luar Biasa⁶¹, schools for students with special needs to deliver learning materials to 20,000 student⁶². The Guru Belajar platform of the MoEC also has an 'Inclusive Education Series', which aims to increase the knowledge of teachers on how to provide learning services and systems that cater

to students with special needs⁶³. However, limitations in the quality and outreach of existing government initiatives along with few CSOs operating in the EdTech space pose a challenge to fulfilling the digital education needs of vulnerable communities. None of the experts consulted in this research were able to name any CSOs active in the EdTech space in Indonesia.

“There are few CSOs in the digital education space.”

- Expert, Inclusive Education, UNICEF

Children with disabilities, who already face exclusion from in-person schooling, are worse affected by the move to digital learning as there is a lack of support structures, methods, and platforms that adequately cater to their special needs.

Even prior to the shift into digital education, children with disabilities in Indonesia were unable to access education equal to their peers who do not have disabilities. While Indonesia has achieved near universal access to primary education, 3 in 10 children with disabilities have never been to school⁶⁴. Only 56 per cent of children with disabilities finish primary school, compared to 95 per cent of children who do not have disabilities. The gap increases for higher levels of education, with only 26 per cent of children with disabilities having completed upper secondary school compared with 62 per cent of children

⁵⁸Ministry of Education and Culture, *KPAI survey on Teachers and Students*, Indonesia, 3-8 April 2020.

⁵⁹Expert interview with an official of the Ministry of Education and Culture, of the Government of Indonesia, in 2020.

⁶⁰Australia-Indonesia Disability Research and Advocacy Network, 'COVID-19 New Normal? What does it mean for Inclusive Education and what government must do to support students with disabilities', AIDRAN, 3 June 2020, <<https://aidran.org/2020/06/03/COVID-19-new-normal-what-does-it-mean-for-inclusive-education-and-what-government-must-do-to-support-students-with-disabilities/>>.

⁶¹Special schools that are intended for children with special needs so they can get basic services that can help get access to education.

⁶²Expert interview with an official of the Ministry of Education and Culture, of the Government of Indonesia, in December 2020.

⁶³Ministry of Education and Culture, 'Guru Belajar', <<https://gurubelajar.kemdikbud.go.id/>>

⁶⁴United Nations Children Fund, Indonesia, 'New global UNICEF paper highlights major disparities in distribution of public education spending worldwide', Press release, UNICEF Indonesia, 20 January 2020, <<https://www.unicef.org/indonesia/press-releases/new-global-unicef-paper-highlights-major-disparities-distribution-public-education>>.

without disabilities⁶⁵. According to data from the Central Bureau of Statistics (BPS) in 2017, 70 per cent of children with special needs have not received proper education services. Only 30 per cent have received education and only 18 per cent have received inclusive education⁶⁶. Government regulations for children with special needs do not have a *Learning Implementation Plan* that makes provisions for their learning needs. Standards and indices of inclusive education do not exist in Indonesia to date⁶⁷.

“Supporting students with disabilities is something that we also need to develop better, because each disability has specific sets of needs and supports to enable a suitable learning environment.”

- Expert, 21st Century Learning & Education, VOX Populi Institute Indonesia

In 2020, UNICEF Indonesia conducted a study called ‘Rapid Assessment of Emerging Needs, Challenges, and Recommended Services During COVID-19 Pandemic for children with disabilities’⁶⁸, in which of the 533 surveyed, 72 per cent of parents felt that their children received assisting devices from schools before the pandemic and only half of them reported that they received them during the pandemic. Other learning support such as routine therapies and consultation sessions with counselling teachers had significantly reduced. A learning from the ‘Home Rapid Survey’,

⁶⁵United Nations Children Fund, Indonesia, ‘New global UNICEF paper highlights major disparities in distribution of public education spending worldwide’, Press release, UNICEF Indonesia, 20 January 2020, <<https://www.unicef.org/indonesia/press-releases/new-global-unicef-paper-highlights-major-disparities-distribution-public-education>>.

⁶⁶Wibowo, A.M. and Prihatin, T., ‘The Diffusion Innovation of Madrasa Ibtidaiya Inclusion from Regular School to Inclusive’, *Advances in Social Science, Education and Humanities Research*, vol. 443, Atlantis Press, 2019.

⁶⁷Purba, T. A., ‘70 Persen Anak Berkebutuhan Khusus Tak Dapat Pendidikan Layak’, 26 Maret 2019, 2019. <<https://lifestyle.bisnis.com/read/20190326/236/904431/70-persen-anak-berkebutuhan-khusus-tak-dapat-pendidikan-layak>>.

⁶⁸United Nations Children Fund, ‘Children with Disabilities Learning from Home: Rapid Assessment of Emerging Needs, Challenges, and Recommended Services During COVID-19 Pandemic’, PowerPoint presentation, 2020.

conducted by the MoEC and UNICEF using RapidPro showed that 73 per cent of children with disabilities were having difficulties with learning from home activities.

“Very concerning because there are no online learning methods that specifically consider the needs of children with disabilities. For this INOVASI is supporting the government to identify the learning profiles of disabled students to develop learning that fits their conditions.”

- Expert, Digital Learning Officer, INOVASI



Image : UNICEF Indonesia /2020/Ijazah

“Children with disabilities might be overlooked for support for engagement. Many online platforms are designed for ‘normal children’. The platforms of online learning have not been designed for students with disabilities. We are having difficulties engaging disabled students - they need a lot more support, and often even their parents cannot provide this.”

- Expert, Child Protection, UNICEF

The shift to digital education runs the risk of excluding special needs students from accessing learning opportunities further. This can be attributed to the lack of support structures, methods and platforms that adequately cater to their needs. Existing EdTech platforms do not currently have any special adaptations for students with disabilities. This presents the need for parents to assume the role of special needs

educators, for which they often lack the capacities.

HOW MIGHT WE...

- **Leverage an enabler:** *How might we increase innovations and foster solutions catering to the digital learning needs of disabled students?*
- **Overcome an inhibitor:** *How might we incentivize private EdTech providers to create solutions for vulnerable communities and communities at the last mile?*
- **Fill a gap:** *How might we encourage stakeholders beyond just CSOs to develop EdTech solutions for vulnerable communities, especially special needs and vulnerable communities?*

3.3 The shift of education outside the physical space of classrooms has led to challenges for monitoring teaching and learning performance.

There is a need for digital learning programs and platforms to enable teachers to systematically monitor and assess students' performance.

The absence of the physical space of the school and being in close proximity to a teacher who monitors their performance, has resulted in students taking their studies less seriously. Students reported challenges including putting less effort into assignments⁶⁹, not being able to understand learning materials clearly, feeling lazy, having less motivation to work, and 'cheating' by using Google or asking their parents or older siblings to solve their answers and assignments. Moreover, the mindset of people in Indonesia which equates digital spaces with leisure and entertainment rather than serious education poses further challenges⁷⁰. Students tend to get distracted by entertaining content available on the learning devices while using them to study, or other activities at home.

“Many children and parents do not understand the concept of learning from home. They interpret not going to school equal to time off, not learning from home. It occurs because: 1. Learning is something that is only associated with school and done only at school; 2. learning must be supervised and controlled by the teacher; 3. parents do not have the capacity to support the learning process from home.”

- Expert, Digital Learning Officer, INOVASI

Inadequate mechanisms by schools or learning platforms to monitor children when learning from home has resulted in cheating, a fall in learning outcomes, and students dropping out of school. A study by researchers with the World Bank in 2020 estimated that distance education methods achieve, on average, only 33 per cent of the learning effect of in-classroom instruction. The author's model estimates that secondary students in Indonesia will lose on average about 11 points in PISA reading scores under the scenario of four months of school closures caused by the COVID-19 pandemic in 2020. Furthermore, they hypothesize that the share of students who will not meet minimum PISA reading proficiency will rise from 70 per cent to 75 per cent under the current scenario⁷¹. This is detrimental in a country that already scores low on key competencies – ranking 74th out of 79 countries on reading, 71st out of 79 for science and 73rd out of 79 for mathematics as per the most recent PISA index, conducted in 2018⁷². The World bank also

⁶⁹Empatika, *Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia*, Indonesia, 2020.

⁷⁰Expert interview with an official of the Ministry of Education and Culture, of the Government of Indonesia, in December 2020.

⁷¹Yarrow, Noah; Masood, Eema; Afkar, Rythia., *Estimated Impacts of COVID-19 on Learning and Earning in Indonesia: How to Turn the Tide*, World Bank, <<http://documents1.worldbank.org/curated/en/184651597383628008/pdf/Main-Report.pdf>>.

⁷²Organisation for Economic Co-operation and Development, *PISA 2018 results*,

estimates that an additional 91,000 students in Indonesia are likely to drop out of school due to the pandemic-induced shift to digital learning⁷³.

“The weakness of online learning is that we teachers cannot oversee the learning process. Parents take our job as teachers at home – but some of them take it too much, they do their children's homework!”

- Teacher, 28, Merauke City, Papua

“My younger sibling always disturbs me while I am studying. I sit at my parents kiosk, so sometimes there are people who want to buy things so I have to pause my study and provide service for the buyer. ”

- Student, 15, Southeast Maluku District, Maluku

The shift to digital learning has resulted in challenges for obtaining feedback on assignments and fair scores from teachers. There is a need for mechanisms on digital platforms to monitor teaching performance.

During Empatika's research on 'Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia' in 2020 many students and parents said that they did not receive scores and feedback from teachers on assignments or exams that they had submitted. A few cases reported that students received better scores, while a few others shared that teachers give the same score to all students as long as they

<<https://www.oecd.org/pisa/publications/pisa-2018-results.htm>>
⁷³Gupta, Deepali and Khairina, Noviandri N., 'COVID-19 and the learning inequities in Indonesia: Four ways to bridge the gap. World Bank', 21 August 2020.
<<https://blogs.worldbank.org/eastasiapacific/COVID-19-and-learning-inequities-indonesia-four-ways-bridge-gap>>

submit assignments, indicating that the feedback has not been personalised to individual student performances⁷⁴. Some students mentioned they had to wait for longer than usual to receive a reply to queries and feedback on work submitted from teachers, and some even cited that they never received responses.

“In-class learning makes it easier to ask a teacher something, during distance learning I have sometimes written to my teacher and have not gotten a response. I only write to teachers I am close to and am afraid to ask ‘scary teachers’ my doubts and questions.”

- Student, 17, Garut District, West Java

Due to limited digital skills and ability to communicate effectively with their students through digital platforms, teachers complain of the inability to oversee student's learning effectively during digital education⁷⁵. This is especially challenging for teachers of younger students who require more supervision and monitoring. In the KPAI (Komisi Perlindungan Anak Indonesia, translates to Indonesian Child Protection Commission) Report survey titled “Persepsi Dan Evaluasi Guru Terhadap Pelaksanaan Pembelajaran Jarak Jauh” (Teachers' Perceptions and Evaluations of the Implementation of Distance Learning) with 602 private and public school teachers, it was found that around 50 per cent of respondents are still not monitored, evaluated, and guided in a routine way.⁷⁶

⁷⁴Empatika, *Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia*, Indonesia, 2020.

⁷⁵Ministry of Education and Culture, *SD survey*, Indonesia, 3-8 April 2020.

⁷⁶KPAI Report, *Persepsi Dan Evaluasi Guru Terhadap Pelaksanaan Pembelajaran Jarak Jauh*, 16-20 April 2020.

“My friends and I were wondering about how the non-active teachers (teachers who do not teach actively or frequently) gave us scores without sending materials and submitting any online tasks for a semester.”

- Student, 17, Garut District, West Java

“When there’s difficulty with the material and I message my teachers for help, some teachers don’t reply directly. Sometimes I need to wait hours or the next day for the reply.”

- Student, 15, Southeast Maluku District, Maluku

HOW MIGHT WE...

- **Overcome an inhibitor:** *How might we reduce the scope for students to be distracted by non-learning digital content, household work and boredom during online learning?*
- **Fill a gap:** *How might we create mechanisms to monitor teaching and learning performance on EdTech platforms?*

3.4 Limitations on social interaction and safeguards for online safety have reduced active learning and posed a risk to the well-being of students.

Students miss interactions with their peers and teachers in physical spaces. This negatively impacts their mental health and reduces their capacity to be active learners.



Illustration : Freepik

Distance learning reduces social interaction among students in contrast to a physical classroom where students can interact with one another and learn together. In a U-report survey conducted with 233 students, mostly in Java, 14 percent of respondents expressed their concern on missing and interacting with other people⁷⁷.

⁷⁷ UNICEF, *U-report- Ruang Peduli Kesehatan Mental (PEKA): Menciptakan Lingkungan yang Sehat bagi Kesehatan Mental di Tengah Pandemi COVID-19 (mental health during COVID-19)*, #UReportPEKA Vol. 4.

Another report also showed that 31 percent of parents found to consider the lack of direct interaction with teachers to be a major challenge⁷⁸.

This was corroborated by findings from the validation interviews where all five students interviewed missed interacting physically with their peers and stated a preference for physical interaction with their teachers as compared to distance learning. Further, all five students said they were looking forward to going back to school because they missed their friends. Even the three parents mentioned the same, citing that distance learning was not as effective as in-person learning due to the limited interactions their children had with teachers.

“I am looking forward to schools re-opening as my daughter’s relationship with friends and teacher will be better by physical interaction rather than virtual.”
- Parent, 47, Jember City, East Java

Interaction with teachers during distance learning was worse in rural areas with poor internet connectivity⁷⁹. This not only reduces the frequency

⁷⁸ United Nations Children Fund, *Transferable skills report*, UNICEF, 2019.

⁷⁹ Barasa, Arjuni Rahmi and Shintia Revina, ‘Home schooling exacerbates inequalities. More options are needed for reopening schools’, University of Melbourne: Indonesia at Melbourne, 2020.
<<https://indonesiaatmelbourne.unimelb.edu.au/more-options-needed-for-reopening-schools-to-stop-disadvantaged-students-falling-further-behind-tools-to-stop-disadvantaged-students-falling-further-behind/>>

but also limits the nature of interactions with teachers to SMS, WhatsApp or phone calls, due to poor and expensive internet connectivity. Around 50 per cent of teachers outside Java and in rural areas do not teach every day compared to 30 per cent in Java⁸⁰. Teachers outside Java are also found to provide less opportunities for students to ask questions, compared to teachers in Java. Communication with teachers in a distance learning setup is mostly reduced to a one-way interaction. In an MoEC survey of primary school students, 81 per cent reported that from the over 4 weeks of studying from home, their interactions were mainly limited to being given homework, only 11 per cent reported having discussions, and 18 per cent having question and answer sessions⁸¹. Teachers formed WhatsApp groups with students or with parents in the case of younger students. These groups were used to direct students to complete specific pages of work; share photos of specific materials or give written explanations of the material⁸². The scope for having discussion and question-answer sessions were also limited on these platforms. The same was reported to be the issue with other digital learning platforms like Google Classroom and Ruangguru. A survey by Empatika found that 29 out of 77 children rely on remote learning which has no personal communication with their teachers⁸³. EdTech platforms like Ruangguru too were reported to be limited in allowing for discussions.

The validation interviews corroborated these findings as all five students mentioned mostly using social media or direct SMS or phone calls from teachers for their school work. They all mentioned the limited capacity for discussions with teachers and peers of such platforms.

⁸⁰ Ulfah, A., 'COVID-19 widening Indonesia's Education Gap', *RISE program IN INDONESIA*, 2020, <<http://rise.smeru.or.id/en/blog/COVID-19-widening-indonesia-per-centE2-per-cent80-per-cent99s-education-gap>>

⁸¹ Ministry of Education and Culture, *SD survey*, Indonesia, 3-8 April 2020.

⁸² Empatika, *Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia*, Indonesia, 2020.

⁸³ Empatika, *Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia*, Indonesia, 2020.

“The worst part of my day is that I cannot meet my friends physically.”

- Student, 15, Southeast Maluku District, Maluku



Image : UNICEF Indonesia/2020/Wilander

Limited scope for interacting with peers and teachers is likely to contribute to boredom in learning and reduce the engagement of students, while having a negative effect on their mental health. 69 per cent of student responses in the 'Young People's Perspective about School Reopening, 2020' U-report poll said that they felt bored during learning-from-home, and 87 per cent felt that they wanted to go back to school soon⁸⁴. Students reported the following reasons for home-learning programs to be more stressful than regular classrooms⁸⁵: normal classes may have been difficult, but having friends makes it so much more manageable and less stressful; online classes do not have the benefits of having friends to socialize with; and being stuck alone with nothing but assignments.

“Some teachers give too many assignments during online learning, it is hard to manage all the work together, also we are having no support for all the work, it is difficult to manage it all alone.”

- Student, 14, Jember City, East Java

⁸⁴ UNICEF, *U-Report Poll Result on Young People's Perspective about School Reopening*. June 2020.

⁸⁵ P. Anghiri, R., 'Challenges of home learning during a pandemic through the eyes of a student', *The Jakarta Post*, 21 July 2020, <<https://www.thejakartapost.com/life/2020/04/11/challenges-of-home-learning-during-a-pandemic-through-the-eyes-of-a-student.html>>

During Empatika's field work for their study on 'Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia', one young participant from Sorong, West Papua referred to her group of classmates as a 'ghost class' having only seen their chat profile images on screen but not necessarily knowing who they were. Further, their study found that students who started university in 2020 felt they were missing out on social aspects having never met any of their classmates and making it hard for them to support each other⁸⁶.

While 78 per cent of the 365 responses in the 'Mental Health Care Room: Concerns in Distance Learning' U-report survey mentioned that distance learning was hard for them, 38 per cent expressed concerns in being able to follow subjects and materials⁸⁷. This is likely to come from the limited chances they have to interact with teachers to clarify doubts, raise questions and to stay engaged during distance learning sessions. Students also have fewer opportunities to interact with and learn from their peers.

“Moving to online learning has suddenly impacted students' mental health. Students lose direct interaction in learning, this brings a higher stress potential on students. Data from the national COVID taskforce shows that the condition has increased the potency of self-harm and stress among teenagers.”
- Expert, MoEC, Government of Indonesia

Children also reported feeling anxious, overwhelmed and suffering from poorer mental health due to the sudden, unexpected shift to digital learning. In a U-report survey looking at the effects of COVID-19 on mental health, 52 per cent of students said that they required mental health

professionals to support them due to their concerns with distance learning.⁸⁸ In the UReport survey, 'Creating a Healthy Environment for Mental Health Amid the COVID-19 Pandemic', conducted in September of 2020, 82 per cent of the total 233 student responses, felt that the move to digital education had resulted in their mental health “being not good”, and 48 per cent responded that their schools did not have any programs or schemes to adequately address their mental health needs.⁸⁹

“Remote learning has made subjects like Math and Physics more difficult. These subjects are harder now, despite the teacher sharing explanations over voice notes, but sometimes this is not enough and I cannot meet the teacher physically to clear doubts.”

- Student, 17, Jember City, East Java

“Sometimes I feel my brain is still empty. But I do not know who to ask, I worry about facing my senior year next year.”

- Student, 17, Garut District, West Java



Illustration : Freepik

⁸⁶ Empatika, *Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia*, Indonesia, 2020.

⁸⁷ UNICEF, *U-report- Ruang Peduli Kesehatan Mental (PEKA): Menciptakan Lingkungan yang Sehat bagi Kesehatan Mental di Tengah Pandemi COVID-19 (mental health during COVID-19)*, #UReportPEKA Vol. 4., Indonesia, <<https://indonesia.ureport.in/opinion/4598/>>

⁸⁸ UNICEF, *U-report- Ruang Peduli Kesehatan Mental (PEKA): Menciptakan Lingkungan yang Sehat bagi Kesehatan Mental di Tengah Pandemi COVID-19 (mental health during COVID-19)*, #UReportPEKA Vol. 4., Indonesia, <<https://indonesia.ureport.in/opinion/4598/>>

⁸⁹ UNICEF, *UReport survey, "Creating a Healthy Environment for Mental Health Amid the COVID-19 Pandemic, September 2020.*

Online education can often lead to threats to students' safety and well-being from exposing them to inappropriate content, cyber-bullying and grooming. Efforts to promote online safety and well-being by the government, UNICEF and the private sector have been largely insufficient.

Online education involving moving from physical into digital learning spaces poses the danger of exposing children to threats including cyber bullying, inappropriate content, scams, grooming, and advertisements. The National Cyber and Encryption Agency (BSSN) revealed that Indonesia had recorded more than 88 million cyberattacks during the first four months of 2020⁹⁰. In February 2021, Indonesia ranked 29th out of the 32 geographies for the most reported negative online experiences in Microsoft's annual *Digital Civility Index*.

“With children, increased risks include - sextoring, porn messages being sent - I couldn't find that this was related to the learning platforms, but because children are spending more time online and that's where they open different links, platforms, people, there are increased incidents of child protection cases.”

- Expert, Child protection, UNICEF

⁹⁰ Elok Sari, Eisy A., 'Indonesian internet users hit 196 million, still concentrated in Java: APJII survey', TheJakartaPost, 11 November 2020, <<https://www.thejakartapost.com/news/2020/11/11/indonesia-n-internet-users-hit-196-million-still-concentrated-in-java-apjii-survey.html>>

“I caught students accessing porn websites while learning.”

- Teacher, 35, Lamongan District, East Java

Experts also express concern over cybersecurity in Indonesia. Communication and Information System Security Research Center (CISSReC) chairman Pratama Persadha has also shared concerns over increased threats to cybersecurity, and went on to say that “a lack of education causes widespread low awareness of digital safety, which can be harmful as it increases people's vulnerability to cyber crimes”⁹¹. He recommended that the government should “include cybersecurity as part of the curriculum in schools and internet providers should constantly educate their consumers”, which does not seem to be a priority for many including EdTeach platforms. Similarly, digital literacy organization ICT Watch's program director, Indriyatno Banyumurti also mentioned⁹² that “the national curriculum should include lessons on digital literacy such as data privacy and security and critical thinking when gathering information online”.

Lawmakers in Indonesia commented on the need for a higher age limit of 17 years old, (an increase from the age limit on platforms like Facebook and Twitter which is 13 years) to better protect children from dangers online. An official from the Communications Ministry admitted that the new rules might be “hard” to impose, but would require users under 17 to have parental consent to open social media accounts⁹³.

⁹¹ Elok Sari, Eisy A., 'Indonesian internet users hit 196 million, still concentrated in Java: APJII survey', TheJakartaPost, 11 November 2020, <<https://www.thejakartapost.com/news/2020/11/11/indonesia-n-internet-users-hit-196-million-still-concentrated-in-java-apjii-survey.html>>

⁹² Elok Sari, Eisy A., 'Indonesian internet users hit 196 million, still concentrated in Java: APJII survey', TheJakartaPost, 11 November 2020, <<https://www.thejakartapost.com/news/2020/11/11/indonesia-n-internet-users-hit-196-million-still-concentrated-in-java-apjii-survey.html>>

⁹³ Folia, Rosa, 'Indonesian Teenagers Face Sweeping Restrictions On Social Media Use', VICE World News, 25 November 2020,

UNICEF has put in place several measures to promote online safety and wellbeing. UNICEF started the *Life Skills Education program* in 10 primary and 12 junior secondary schools in Sorong, West Papua. The program began in January, 2020 and has continued during the pandemic through educational radio broadcasts providing messaging and tips to students on what they can do to prevent cyber bullying⁹⁴. Additionally, UNICEF organized a 'coaching clinic' during the pandemic to strengthen the capacity of social workers in online protection. UNICEF has also tried to spread awareness on online safety by disseminating messages on their website and through EdTech platforms like Ruangguru. In spite of these efforts, students were still found to lack adequate awareness about online safety. This might be because EdTech platforms like Ruangguru primarily address threats to online safety through their customer services, and mechanisms to ensure online safety are not strongly built into the platform.

“It seems like the teachers are not ready to disseminate messages about online safety to the students. Students either do not receive those messages or do not know how to engage with these risks. From my experience - there have been no messages for my child. My child has class discussion about this once a week, but it is not very meaningful.”

- Expert, Child Protection, UNICEF

The government is also taking steps towards promoting online safety but these are currently inadequate to address the concerns around cyber safety of young people. The Ministry of Social Affairs has a child helpline (1500771) which is supposed to be disseminated widely. However, through our research, we found evidence that the awareness levels of young people about the

helpline are low. A draft data privacy law that is intended to put into place regulations for online data privacy is also currently under consideration by the government. Another serious challenge is that law enforcement officials lack training and resources to deal with ICT violence⁹⁵.

HOW MIGHT WE...

- **Overcome an inhibitor:** *How might we increase scope for social interaction for students with teachers and peers in digital learning?*
- **Overcome an inhibitor:** *How might we teach students how to navigate away from harmful content?*
- **Fill a gap:** *How might we ensure that online learning platforms focus on disseminating information regarding online safety?*

<https://www.vice.com/en/article/bvxxmam/indonesian-teens-face-sweeping-restrictions-on-social-media-use>

⁹⁴ Nagel, Yuanita, M., Building Confidence to Take On Bullying', UNICEF Indonesia, 11 November, <https://www.unicef.org/indonesia/coronavirus/stories/building-confidence-to-take-bullying> >

⁹⁵World Wide Web Foundation, Women's Rights Online Report Card Indonesia', 2016, http://webfoundation.org/docs/2016/09/WF_GR_Indonesia.pdf >

Pillar 2 : Internet, infrastructure and devices



Illustration : Freepik

4. Pillar 2 : Internet, infrastructure and devices



Image : UNICEF Indonesia/2020/Wilander

Majority of Indonesians have access to the internet, especially the youth demographic. According to the Indonesian Internet Service Providers Association⁹⁶ (APJII), internet penetration is over 74 per cent with 197 million having used the internet in 2020 – an 8.9 per cent points increase from 2019⁹⁷. Of these internet users in 2019, 70 per cent of them are between 13 and 34 years old.⁹⁸ Moreover, about half (30 million) of 65 million children and adolescents are estimated to be internet users in Indonesia.⁹⁹

However, internet penetration in Indonesia is characterized by unequal access and poor bandwidth. With high concentration in developed

urban metropolis areas like Java and poor connectivity in expansive rural land masses across Eastern Indonesia, there are many Indonesians who have never been exposed to digital technology in their daily lives¹⁰⁰. The island geography of Indonesia plays a large role in its erratic and unequal internet penetration and connectivity.

As per the SUSENAS survey in 2018, the percentage of households ever accessing the Internet (in the last 3 months) was at 78 per cent in cities and at 51 per cent in rural areas. In terms of distribution by province, the highest internet access for households in 2019 was in DKI Jakarta Province at 93 per cent and the lowest levels of access were in Papua Province and Nusa Tenggara at 49 and 31 per cent respectively.¹⁰¹ The disparities in accessing the internet vary by location, levels of education, and income and wealth. According to the 'Demographic and Health Survey of Indonesia' (2017), the percentage of women and men using the internet in the increases steadily by wealth quintile - only 11 per cent of men in the lowest wealth quintile have used the internet in the past 12 months and the percentage increased to 75 per cent for men in the highest wealth quintile.¹⁰² This unequal access to the internet in rural and remote

⁹⁶ APJII, Indonesian Internet Service Providers Association, Survey 2019.

⁹⁷ Herman, 'Indonesia Has 197 Million Internet Users in 2020, APJII Survey Shows', *The Jakarta Globe*, 9 November, 2020 <jakartaglobe.id/tech/indonesia-has-197-million-internet-users-in-2020-apjii-survey-shows>

⁹⁸ Omidyar Network, *Scaling Access & Impact Realizing the Power of EdTech. Indonesia Country Report*, 2019, <omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact_Indonesia-Report_vFinal_r.pdf>

⁹⁹ UNICEF, How to be safe on the internet.

¹⁰⁰ East Ventures, *Digital Competitiveness Index 2020: Insight Report - Opportunities and Challenges of the Digital Economy in Indonesia's 34 Provinces and 24 Cities*, pp 1-179, 2020.

¹⁰¹ Sub Directorate of Communications and Information Technology (Ed.), *Telecommunications Statistics in Indonesia 2019*. Badan Pusat Statistik, Jakarta - Indonesia, 1-359.

¹⁰² Demographic and Health Survey, Indonesia (2017-2018)

areas continues to be the reason why Indonesia fares poorly on global digital competitiveness. Owning a mobile phone is the key for access to the internet.

According to data from the Communication and Information Technology Ministry, 95.4 per cent of those who access the internet, use smartphones to do so.¹⁰³ In 2019, about 63 per cent of the Indonesian population owned and used a mobile phone. This number has increased exponentially from 38 percent in 2010. The highest share was found in Jakarta where over 78 per cent of the population owned a mobile phone. However, the same figure stood at 38.5 percent in Papua¹⁰⁴. It is estimated that around 45 per cent of people in rural communities have access to smartphones and the internet compared to about 70 per cent in urban cities¹⁰⁵. In 2019, 89 per cent households in Indonesia owned at least one active cellular phone number¹⁰⁶. In terms of cellular phone internet signal reception, the highest coverage is found in urban areas of Central and East Java and the lowest is in areas of Kalimantan Utara¹⁰⁷.



Illustration : Freepik

Mobile ownership (while high) does not translate to computer and fixed internet availability which are essential for digital learning. As per the Indonesian Internet Service Providers Association survey in 2020, less than 10 per cent of the internet users used a fixed broadband connection at home, offices or in public spaces. Online learning remains affected by poor connectivity and device ownership as less than 15 per cent of children in rural areas and 25 per cent of urban children have computers for home-based learning.

Government programs that enhance and support internet and device access have focused on a combination of solutions: introducing institution-level intranet and internet connectivity, providing budgets to schools to purchase devices (e.g. tablets), increasing device availability in 3T areas, and increasing the reach of fibre-optic cable internet across the archipelago. Some key initiatives include:

JARDIKNAS (National Education Network)

program: Based on the policies contained in the 2006 Presidential Decree, through the Ministry of National Education the Government of Indonesia launched the JARDIKNAS program, national scale network infrastructure connecting all educational institutions –provincial, city, district education offices, universities, and schools – throughout Indonesia. In line with the JARDIKNAS program in 2006, the Directorate General of Higher Education (Dikti Depdiknas) also developed a special national scale network infrastructure between tertiary institutions called INHERENT (Indonesia Higher Education Network). There were 32 state universities that became local INHERENT nodes,

¹⁰³ Herman, 'Indonesia Has 197 Million Internet Users in 2020, APJII Survey Shows', *The Jakarta Globe*, 9 November, 2020 <jakartaglobe.id/tech/indonesia-has-197-million-internet-user-s-in-2020-apjii-survey-shows>.

¹⁰⁴ 'Indonesia: Share of population owning a mobile phone 2019', *Statista Research Department*, 10 December, 2020, <www.statista.com/statistics/1084069/indonesia-share-of-population-owning-a-mobile-phone/>.

¹⁰⁵ Agahari, Wirawan, 'Digital innovation in Indonesia: inequalities between the east and the west', *The Conversation*, 10 October 2018, <<https://theconversation.com/digital-innovation-in-indonesia-inequalities-between-the-east-and-the-west-95218>>.

¹⁰⁶ Sub Directorate of Communications and Information Technology (Ed.). (2019). *Telecommunications Statistics in Indonesia 2019*. *Badan Pusat Statistik, Jakarta - Indonesia*, 1-359, 2019.

¹⁰⁷ Sub Directorate of Communications and Information Technology (Ed.). (2019). *Telecommunications Statistics in Indonesia 2019*. *Badan Pusat Statistik, Jakarta - Indonesia*, 1-359, 2019.

distributing their connections to other universities in their respective regions. It was estimated that until the end of 2013 only about 25,000 schools throughout Indonesia had been provided with ICT learning services by the government.¹⁰⁸

Universal Service Obligation (USO) program:

For institutions in the 3T areas, the Government of Indonesia provided assistance in the form of internet connections and ICT devices for learning¹⁰⁹. The USO program was started in 2015 as a collaboration between the MoEC and the Ministry of Communication and Information Technology. In 2018, the number of schools that had received internet access assistance through USO was 1,472, but this is far from sufficient. By 2019, the government estimated that as many as 4,000 schools in 3T areas would be supported to the internet network for teaching and learning activities in schools with this assistance scheme¹¹⁰.

Palapa Ring Project: The government's aim to unify Indonesia via the internet reached a milestone in 2019 through the Palapa Ring Project when it was inaugurated by the President. The 12,128 kilometer fiber optic backbone network project was built by the government through the Telecommunication and Information Accessibility Agency (BAKTI) of the Ministry of Communication and Information Technology. The Palapa Ring project, which began in 2015, is part of the 'Sky Toll Road' infrastructure that connects 514 cities/regencies in Indonesia with fiber optic networks. Palapa Ring is a manifestation of the government's affirmative policy to provide fast internet and reduce the digital divide, especially in the outermost, frontier, and disadvantaged (3T)

areas, which are not seen as commercially viable by private telecommunications operators.

School Digitalization program: In order to prepare schools to enter the era of the 4th industrial revolution, the MoEC is also developing a School Digitalization program. Funds are allocated to schools through the School Operational Assistance (BOS) in the form of Affirmation BOS and Performance BOS. Affirmation BOS is given as a form of the government's support for schools in special areas (like the 3T areas), while BOS Performance as rewards for schools that improve their quality. In 2019, the School Digitalization program reached an estimated 30,227 schools through BOS affirmations and 6,004 schools through BOS Performance.

This program was launched to increase the development of school digitization, especially in frontier, outermost, and disadvantaged (3T) regions. The inaugural launch of the program was carried out in Natuna Regency, Riau Islands. Since, marked by the provision of information and communication technology (ICT) learning facilities like PCs, laptops, LCDs, routers, and external hard disks to schools, and tablet computers to students.¹¹¹ The ability for students to access all teaching material or exam material on a single network is said to be the advantage of this program.¹¹²

In November 2020, the MoEC shared that there are still around 12,000 schools in 3T areas that do not have internet access. They added that over 48 thousand schools in these areas have bad internet connectivity.¹¹³

¹⁰⁸ *Contribution Of Ict And Its Utilization Training To Increase The National Examination Values In Maluku Province*, Jurnal Teknodik Vol. 17 - No. 3, Waldopo, 2013.

¹⁰⁹ Kominfo, P., 'Guru Harus Melek Internet', 16 June, 2016, <kominfo.go.id/content/detail/7674/guru-harus-melek-internet/0/sorotan_media>.

¹¹⁰ Kemendikbud Berikan Bantuan Perangkat TIK kepada Sekolah Daerah 3T, 21 September, 2020, <www.kemdikbud.go.id/main/blog/2018/09/kemdikbud-berikan-bantuan-perangkat-tik-kepada-sekolah-daerah-3t>.

¹¹¹ Ministry of Education and Culture Launches School Digitalization Program, 19 September 2019, <en.bizlaw.id/read/381/Ministry-of-Education-and-Culture-Launches-School-Digitalization-Program>.

¹¹² Indonesia Window, Ministry launches School Digitization program, 18 September 2020, <indonesiawindow.com/en/ministry-launches-school-digitization-program/>.

¹¹³ Fadel, Thousand Schools Still Don't Have Internet Access, November 11, 2019, <liputanislam.com/english/121097/>.

Internet Quota Assistance programs: MoEC and MoRA have partnered with telecommunications operators to distribute free internet quotas for teachers, students, university students, and lecturers to maintain the continuity and quality of education during the pandemic. Internet quota packages include a) study quota for access to ed-tech apps; and b) 5 GB of general quota for access to other online apps and social media. The provision of free internet quotas ranges from 20 GB for early childhood education to 50 GB for university students.

MoRA also collaborated with the state-owned PT Telkomsel to create the 'Affordable Quota Provision program' to support distance learning for madrasah students, staff, and employees to get an affordable data quota package while helping related institutions carry out teaching and learning activities remotely. The program ran from September 21 to December 31, 2020. There are two data package options available under this program, namely the 'Society Package' and 'Bulk Package'. The 'Society Package' is a data package for teachers and other education personnel in Madrasahs with a choice of quota sizes starting from 10 GB and prices starting from IDR 40,000. Meanwhile, 'Bulk Packages' can be purchased by Madrasah administrators and provide various data quota options in it for students, both those using prepaid and postpaid Telkomsel services.¹¹⁴

Digitalisasi Sekolah (Pioneering Schools) under Sekolah Penggerak: Sekolah Penggerak is a program launched in 2021, as an effort by the MoEC and the regional government. It aims to realize the vision of Indonesian Education in realizing an advanced Indonesia that is sovereign, independent, and has a personality through the creation of 'Pancasila' Students. Pancasila, translated as Five Principles, is the official, foundational philosophical theory of Indonesia promulgated in 1945. The Five Principles, viewed

as a form of pluralism and moderation for modern Indonesia, are: the belief in one God, just and civilized humanity, Indonesian unity, democracy under the wise guidance of representative consultations, and social justice for all the peoples of Indonesia. The MoEC defines the profile of the Pancasila Student as being made up of 5 characters: independence, critical thinking, mutual cooperation, creativity, global diversity and noble character. The program is based on developing student learning outcomes holistically which includes literacy and numeracy competencies with superior human resources (school principals and teachers).

The Pioneering School program is carried out through five interventions to boost the quality of learning. These include strengthening human resources, forming a new learning paradigm, data-based planning, digitizing schools and mentoring the central government to local governments. The driving school program is a refinement of the previous school transformation program and will accelerate public and private schools in all school conditions. The digitalization component is focused on building an easy and accessible technology platform aimed to support the implementation of educational policies applied to Pioneering Schools for the learning process, teacher competency development, and governance of school resources. Schools will be supported through various resources to develop the internet infrastructure required for optimised use of the technology platform. The MoEC will support content development in offline mode for schools in areas of low connectivity. While the technology platform is expected to be ready in the new school year between 2021 to 2022, its development will be on-going one and is expected to continue to develop to be suited to the needs of teachers and other users.

The timeline below represents various initiatives aimed at boosting the internet infrastructure in Indonesia.

¹¹⁴ Kolaborasi Telkomsel dan Kementerian Agama RI Hadirkan program Bantuan Kuota Terjangkau Madrasah. 9 June, 2020. Retrieved from <https://www.telkomsel.com/about-us/news/kolaborasi-telkomsel-dan-kementerian-agama-ri-hadirkan-program-bantuan-kuota>

Timeline of digital education Initiatives - Internet, infrastructure, and devices



Despite efforts made by the government and private sector to boost internet connectivity, the digital divide has impeded the government's efforts to support digital learning in the time of the pandemic. In August 2020, President Widodo announced that his administration would allocate Rp 30.5 trillion (US\$2.1 billion) in the 2021 state budget for ICT development to accelerate digital transformation for governance and to push for connectivity inclusion¹¹⁵. Yet, long-distance learning or *Pembelajaran Jarak Juah* (PJJ) has been suboptimal on account of poor electricity, bad networks, affordability and accessibility in

students' homes which are far or difficult to reach¹¹⁶. This is particularly pronounced in Eastern provinces spread over expansive land masses characterized by poverty and low revenue per user.

In this section, we present some of the findings related to availability, uptake, utilisation related to the internet, infrastructure and devices that may influence digital learning and its effective uptake in the time of the pandemic. The insights provided below provide an evaluation of these efforts in the landscape for internet infrastructure and devices for accessing digital learning in Indonesia.

¹¹⁵ Eloksari, E. A., Indonesian internet users hit 196 million, still concentrated in Java: APJII survey, 11 November 2020, <www.thejakartapost.com/news/2020/11/11/indonesian-internet-users-hit-196-million-still-concentrated-in-java-apjii-survey.html>.

¹¹⁶Prabowo, H., Apinino, R., & Setiawan, R., Saat Kebijakan Menteri Nadiem Memunculkan Klaster Baru COVID-19, August 14, 2020, <tirto.id/saat-kebijakan-menteri-nadiem-memunculkan-klaster-baru-COVID-19-fXE1>.

4.1. Despite numerous initiatives to improve the poor internet connectivity across the archipelago, progress is slow and a large proportion of the population still does not have adequate internet connectivity to learn online.

The geographic landscape of Indonesia makes it challenging to put into place adequate internet infrastructure. It is also unprofitable for private network providers, in spite of government efforts to address this through initiatives like the Palapa Ring infrastructure project.

Expansion of broadband services faces several hurdles on account of geography. Indonesia spans over 17,500 islands and underdeveloped infrastructure in eastern and rural areas making the challenge of ensuring all students have access to education infrastructure enormous. Network operators struggle to put in place infrastructure over expansive landmasses required to give rural population access to communications services. This is because low average revenue per user in these areas results in relatively poor returns on heavy cost investments.¹¹⁷

Government infrastructure programs like the Palapa Ring initiative that aim to support infrastructure development have failed on

account of operational feasibility and viability - especially in areas characterised by poverty. Moreover, there has been hesitation from network providers to use the Palapa Ring fiber optic network due to its high cost rental charges. The low revenue per user leads these to become unprofitable investments for businesses.¹¹⁸ Moreover, the Palapa Ring needs more outreach to the interior as the infrastructure is only connected to the outermost and Western regions so far.

“This gap of accessing technology and the internet occurs between generations, socio-economic conditions, geography and also at the school level. The connecting seven islands program is one of the government’s programs to tackle this condition, but still needs a lot of improvement.”

- Expert, Ministry of Education and Culture, Government of Indonesia

¹¹⁷Devanesan, Joe, ‘Can Open RAN help conquer Indonesia’s connectivity issues?’ *TECHWIRE ASIA*, 29 July 2020. <<https://techwireasia.com/2020/07/can-open-ran-help-conquer-indonesias-connectivity-issues/>>

¹¹⁸Anam, ‘Palapa Ring’s Broken Promises’, 2020. <<https://magz.tempo.co/read/36452/palapa-rings-broken-promises>>

The speed and reliable quality of the internet in Indonesia is one of the poorest in the ASEAN region and is insufficient to support digital learning.

While internet penetration has been on the rise, overall penetration, inclusive access and internet speed in Indonesia is also one of the slowest in the South East Asian region¹¹⁹. Connectivity remains slow in many parts of the country.¹²⁰ According to the Speedtest Global Index¹²¹ in March 2019, Indonesia was placed 118 out of 139 countries for its mobile internet speed of 10.51 Mbps, and 111 out of 178 for its fixed broadband speed of 16.7 Mbps.

In February, Opensignal - a London-based company that specialises in mapping wireless coverage - found that in terms of the best 4G speeds offered in each country, Indonesia ranked 68 out of 77 countries with an average of 18.5 Mbps during off peak hours¹²². This was validated in more recent studies conducted in 2020, Surf Shark's 2020 Digital Quality of Life Index Report which reported that Indonesia is among the lowest performing on stability and reliability of the internet as well as on e-infrastructure development - at ranks 80th and 76th respectively out of a total of 85 countries¹²³. On the same index, it ranks at 79th position for individuals using the internet per 100 habitants exhibiting low penetration per capita.

This is likely to impact digital learning as a large number of Indonesians only use the internet on their mobile phones via low speed 2G satellite technology. Moreover, these mobile internet users have limited prepaid data packages that prevent them from using EdTech platforms that would require a lot of data limiting their use to social media platforms. According to survey data by SMERU, teachers are also more likely to teach their students everyday if they have access to the internet but because of the erratic internet connectivity, teaching routines are impacted, especially for those in rural areas¹²⁴. Where connectivity is available or even free of cost, it is unable to support video calls on programs such as Zoom without interruptions¹²⁵.

“In the beginning I tried making videos but it took too much quota while loading and sending, so I changed to voice note and text. I also tried video calling but the signal was unstable.”

- Teacher, 35, Lamongan District, East Java

“Not every family can afford buying internet quota. In addition, old smartphones aren't proper for learning applications because they are slow.”

- Parent, 47, Jember City, East Java

¹¹⁹ The Economist, The Inclusive Internet Index 2020: Executive summary, 2020
<theinclusiveinternet.eiu.com/assets/external/downloads/3i-executive-summary.pdf>.

¹²⁰ Omidyar Network *Scaling Access & Impact Realizing the Power of EdTech. Indonesia Country Report*, 2019,
<omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact-Indonesia-Report_vFinal_r.pdf>.

¹²¹ Speedtest Global Index
<<https://www.speedtest.net/global-index/indonesia#fixed>>

¹²² Khidhir, S., Indonesia is too slow!, April 26, 2019,
<[theaseanpost.com/article/indonesia-too-slow#:~:text=According to the Speedtest Global,broadband speed of 16.65 Mbps.](https://theaseanpost.com/article/indonesia-too-slow#:~:text=According%20to%20the%20Speedtest%20Global,broadband%20speed%20of%2016.65%20Mbps.)>

¹²³ Digital Quality of Life Index 2020, 2020,
<surfshark.com/dql2020>.

¹²⁴ Alifia, U. et al, .Learning from Home- A Portrait of Teaching and Learning in times of the COVID-19 Pandemic, Smeru Research Institute & Knowledge Sector Initiative, pp. 1-8, Rep. No. 1/2020.

¹²⁵ Faza, What the pandemic looks like for girls around the world, Evoke, 2020.
<www.evoke.org/articles/october-2020/girls-around-world-offer-window-into-lives-during-pandemic-covid-19?utm_source=LI&utm_medium=MG_OG&utm_campaign=EVER&utm_content=102320_POST_NF>.

Limited coordination amongst government ministries has made it difficult to efficiently map school connectivity.

Several experts commented that, often different ministries with complementary responsibilities tend to work in silos – each with their own protocols, budgets, and services, and with limited communication with each other.

The mapping of data for madrasa schools is under the domain of MoRA and limited information is available on their connectivity. All other public schools are in the domain of MoEC. The limited coordination between the two Ministries has resulted in a gap of mapping schools connected to the internet. It is worth highlighting that while the proportion of students served by regular schools outnumber those in madrasa, most madrasas are run by private foundations. These private schools account for approximately 48 per cent of all primary and junior secondary schools¹²⁶, and therefore the inability to adequately map their connectivity results in the lack of reliable data. This, in turn, further affects the planning and effective roll out of ICT programs and services.

Moreover, this setup of multiple authoritative bodies in the education system requires EdTech companies wishing to scale to successfully communicate, negotiate, and design for many stakeholders ranging from central and regional-level government to different ministries. This makes the ecosystem less conducive for providers who not only have to manage diverse stakeholders but also have to design for the differing needs of regular vs. madrasa and public vs. private schools¹²⁷.

¹²⁶Omidyar Network, *Scaling Access & Impact Realizing the Power of EdTech. Indonesia Country Report*, 2019. <omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact_Indonesia-Report_vFinal_r.pdf>.

¹²⁷Omidyar Network, *Scaling Access & Impact Realizing the Power of EdTech. Indonesia Country Report*, 2019. <omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact_Indonesia-Report_vFinal_r.pdf>.

There is also evidence from the research with experts on the need for increased coordination between the MoEC that works on motivating students and teachers towards digital learning with the Ministry of Information and Communication that is leading the infrastructure development.

“MoEC and MoRA do not talk to each other. This leads to lack of coordination on budget allocation and consistent policy formulation and thereby on accessing digital learning solutions.”

Expert, Inclusive Education, UNICEF

HOW MIGHT WE...

- **Overcome an inhibitor:** *How might we create better and more affordable access to infrastructure for digital learning both inside and out of schools?*
- **Leverage an enabler:** *How might we incentivise the private sector to create innovations service delivery for effective outreach?*
- **Fill in a gap:** *How might we increase the speed, availability and quality of the internet in Indonesia to effectively support the digital learning landscape?*
- **Overcome an inhibitor:** *How might we improve coordination across government ministries to optimise the implementation of digital learning in Indonesia?*

4.2 Limited access to affordable quality internet and poor availability of appropriate digital devices makes learning from home less conducive for most students - especially those in remote and poor settings like 3T areas.

The high cost of internet and lack of reliable 4G connectivity makes digital learning inaccessible for the majority of students and their families.

While geographical barriers are paramount, the research shows that poverty and affordability of the internet is the primary reason why most people have limited access to the internet. For instance, experts mention that while East Java is mountainous with patchy internet services, the majority of schools have good connectivity. Areas characterised by extreme poverty like Maluku, NTT and Papua have the worst connectivity. The bad connectivity may be attributed to poverty as opposed to their geography alone. Market growth is also limited for the rising demand for data, with existing networks frequently criticised by consumers as slow and unreliable. Provider companies are unwilling to invest in high cost infrastructure in these locations (like Papua) on account of their poor economic status making the return on investment unviable due to low marginal revenue per user¹²⁸.

“Families, especially those who live in villages do not have the capacity to procure facilities for digital learning – like mobile devices and reliable internet connection.”
- Teacher, 45, Palu City, Central Sulawesi

¹²⁸ Anam 2020: Palapa Ring's Broken Promises
<<https://magz.tempo.co/read/36452/palapa-rings-broken-promises>>

As a result of this, service providers struggle to ensure affordability of good quality mobile and fixed broadband data¹²⁹. Network limitations in these remote areas have worsened this condition and people need to pay a premium to access the internet as compared to other areas. In addition, distance learning appears to have shifted internet access cost from occasional expense to runtime expense making it difficult for communities to allocate expenses to access learning online.

Majority of students find distance learning costly. In a survey conducted on distance learning with 2200 students in August 2020 by Saiful Mujani Research and Consulting, 94 per cent of student respondents considered distance learning costly - out of which 67 per cent said it was “very” or “quite costly”¹³⁰. 80 per cent of respondents had a maximum income of Rp 1 million (US\$67) per month. The survey showed that the higher a person's education, the lower the tendency to state that distance learning was quite or heavily costly, and the higher a person's income, the lower the tendency to state that it was costly - implying the socioeconomic burden of distance education¹³¹.

¹²⁹ Iswara, M.A., 2020 NDTV.(2020). Microsoft to Invest in ant Group-Backed Indonesian Startup Bukalapak. Gadgets 360, 3 November.
<https://gadgets.ndtv.com/laptops/news/microsoft-bukalapak-ant-group-investment-azure-cloud-digital-skills-training-indonesia-2319985>

¹³⁰ Ghaliya, G., 'Majority of Indonesians find distance learning costly: Study', The Jakarta Post, 19 August 2020.
<<https://www.thejakartapost.com/news/2020/08/19/majority-of-indonesians-find-distance-learning-costly-study.html>>

¹³¹ Ghaliya, G., 'Majority of Indonesians find distance learning costly: Study', The Jakarta Post, 19 August 2020.
<<https://www.thejakartapost.com/news/2020/08/19/majority-of-indonesians-find-distance-learning-costly-study.html>>



Illustration : Freepik

“5GB internet quota only lasts for about 2 weeks and my parents have no money to buy internet quota for me. Once, I called my parents and asked for money to buy an internet quota and they said they don’t have any money. The internet quota for my phone number is expensive. I used to buy 11GB internet for Rp 85,000 (~6 USD) while studying from home. So when I have no internet access and need to send my assignment, I ask for a hotspot from my friend.”

- Student, 18, North Timor Tengah District, East Nusa Tenggara

The internet services of the Government provider are more reliable but come at a high cost which are not affordable even in Jakarta. In a research study conducted in 2020 by Empatika in Sorong West Papua, Pasaman and Central Lombok, it emerged that parents perceived that spending on internet quota was expensive and while costs varied by location and how many in the family they were sharing the quota, parents were spending IDR 80,000 (~5.5 USD) per child per month on an average. Some families also reported that they buy internet quota only when they have extra cash at the time the data runs out. While this was not a problem earlier, it resulted in periods when their children could not receive or submit assignments. Internet costs have also increased as children spend more time at home watching videos and spend less time in-person

socialising. Older students whose parents rationed monthly internet use often struggled to make sure they had enough internet for both school and entertainment. It also emerged from this study that university students are likely to spend about IDR 150,000/month (USD 10) though this could be as much as IDR 100,000/ week (USD 7). These costs are burdensome for them in addition to the rent that they have to pay¹³².

In an online survey (U-Report) conducted on ‘Young people’s perspective about school reopening’ by UNICEF in June 2020, more than 35 per cent of 4000 students reported that internet access is the main challenge for learning from home. Other key challenges include the high cost of a decent gadget for video conferencing, price of internet data package, and slow or non-existent signals¹³³.

According to the World Web Foundation in 2016, with the provision of 1 GB of data at an average of 1.4 percent of monthly incomes, Indonesia has met its “1 for 2” Alliance for Affordable Internet target – one of the Sustainable Development Goals set by the global community in September 2015. This initiative calls for universal, affordable internet access by 2020 where 1 GB of mobile broadband data is priced at two per cent or less of average monthly income.¹³⁴ However despite this, the lack of supporting internet infrastructure in rural and remote areas makes securing reliable the internet connectivity challenging and expensive¹³⁵. The struggle to provide internet connection in remote areas has led to unequal access to the internet and has kept Indonesia in

¹³² Empatika, Remote Insights Gathering study into People’s Experiences of the COVID-19 Pandemic across Indonesia, 2020.

¹³³ Faza, What the pandemic looks like for girls around the world, Evoke, 2020, <www.evoke.org/articles/october-2020/girls-around-world-offer-window-into-lives-during-pandemic-COVID-19?utm_source=LI&utm_medium=MG_OG&utm_campaign=EVER&utm_content=102320_POST_NF>.

¹³⁴ A4ai, Affordable Internet is “1 for 2”. <a4ai.org/affordable-internet-is-1-for-2#:~:text=Changing how we define affordability,less of average monthly income>.

¹³⁵ World Wide Web Foundation, Women’s Rights Online Report Card Indonesia, 2020, <webfoundation.org/docs/2016/09/WF_GR_Indonesia.pdf>.

low place in the global digital competitiveness index.¹³⁶

“Internet connection in the house is good and reliable. However, it is costly, so parents do not always buy the top up voucher.”

- Parent, 50, Palu City, Central Sulawesi

“Many of my friends struggle with having no mobile phone, living in a rural area where there’s internet signal difficulty.”

- Student, 15, Southeast Maluku District, Maluku



UNICEF Indonesia/2020/Wilander

Issues of affordability have emerged for teachers too. In a survey on ‘Learning from home’ conducted in August 2020, 62 per cent teachers answered they use their personal budget to pay for internet access and their teacher credit spending has increased by 69 per cent per month since learning from home started¹³⁷. Moreover, in a survey conducted by the MoEC titled, ‘Support and safety nets for early childhood (PAUD) educators affected by COVID-19’ of the 42,357 respondents, 47 per cent of PAUD teachers’ wages had been affected, 35 percent were unpaid at all, and 13 percent received pay cuts. Of these affected teachers (19,907 teachers), 70 per cent did not

¹³⁶ Eloksari, E. A., Indonesian internet users hit 196 million, still concentrated in Java: APJII survey, 11 November 2020. <www.thejakartapost.com/news/2020/11/11/indonesian-internet-users-hit-196-million-still-concentrated-in-java-apjii-survey.html>.

¹³⁷ Survei Belajar dari Rumah Tahun Ajaran, Survey on learning from home, August 2020.

have an alternative means of income¹³⁸. It emerged from the survey, in remote and non-remote areas alike, that an internet package with supporting devices is the most pertinent need for a seamless learning experience. Thereby showing that some of the MoEC initiatives, though well intended, did not adequately support the teachers.

“Most people are familiar with WhatsApp. It is easy to manage but rather costly, because sending pictures and videos will take much of your balance.”

- Teacher, 45, Palu City, Central Sulawesi

Many students from poorer contexts do not have access to the appropriate digital devices for adequate lengths of time to undertake conducive learning at home.

According to the Indonesian Internet Service Providers Association survey in 2020, 95.4 per cent of internet users in Indonesia use smartphones to connect to the internet¹³⁹ and less than 10 percent use a fixed broadband connection at home, offices or public spaces¹⁴⁰. In addition to this, with 60 per cent of Indonesian students with no individual access to internet access and digital technology devices, digital learning outcomes are negatively affected. According to estimates by UNICEF, less than 15 per cent of rural children have computers to use for home-based learning while 25 per cent of urban children do¹⁴¹. As a result, most ‘online

¹³⁸ MoEC, PAUD: Support and safety nets for early childhood PAUD educators affected by COVID-19’ Presentation.

¹³⁹ Herman., Indonesia Has 197 Million Internet Users in 2020, APJII Survey Shows, 9 November, 2020, <jakartaglobe.id/tech/indonesia-has-197-million-internet-users-in-2020-apjii-survey-shows/>.

¹⁴⁰ Eloksari, E. A., Indonesian internet users hit 196 million, still concentrated in Java: APJII survey., 11 November 2020, <www.thejakartapost.com/news/2020/11/11/indonesian-internet-users-hit-196-million-still-concentrated-in-java-apjii-survey.html>.

¹⁴¹ UNICEF, Transferable skills report, 2019.

learning' still takes the form of using smartphones through messenger applications (WA, Line, Facebook, SMS) and or by using *Lembar Kerja Siswa* (worksheets) as a form of work given by teachers.

Most teachers report having access to laptops or computers, smartphones and the internet for digital learning. However, from the survey conducted by INOVASI in April 2020 with 221 participants only a small portion reported that their children have these facilities.

“Digital learning using mobile is a good idea, in the sense that students could use mobile for learning. However, it is difficult to implement equally for all students, due to limited ownership of mobile and the cost of purchasing internet vouchers.”

- Parent, 59, Alor Kecil District, East Nusa Tenggara

In the survey on learning from home conducted in August 2020 by the MoEC titled; *Survei Belajar dari Rumah Tahun Ajaran'* (Home Learning Survey Academic Year), it emerged that most students relied on smartphones and access the internet via cellular phone data packages. 46.5 per cent for students in 3T areas and 77.4 per cent in non-3T areas access the internet from their mobile networks. For most teachers, the access pattern was the same - 7.8 per cent for 3T teachers and 63.3 per cent for non-3T teachers answered that they access the internet from mobile phones. In remote areas, quite a number of students relied on internet access using a wifi network in public areas. In cases when there are not enough smartphones for all students in the family, distance learning outcomes have been poor. In the same survey, students mentioned that support in the form of an internet package and smartphones were the most pertinent needs for them. For students in remote areas, books and laptops also emerged as a need, particularly for those in elementary and secondary schools¹⁴².

¹⁴² *Survei Belajar dari Rumah Tahun Ajaran 2020/2021* (Survey on learning from home), August 2020.

In a research study conducted by Empatika, it was found that while over half of SMP students and above had their own smartphone, many children (particularly in Sekolah Dasar) shared smartphones with their siblings or parents which meant remote learning messages were sometimes missed. Some families also said they had invested in a smartphone since the start of the pandemic to try to keep up with the assignments and the increasing need to stay connected. Young children without smartphones relied on friends to share school assignments, leaving them further removed from teachers.

From the validation interviews, one young respondent from Jember in East Java shared that she had to wait until night time to use the mobile phone for her studying as the device was her older sisters. She had to wait for her sister to return home from work in order to access her mobile phone due to limited devices at home. She went on to share that often she had access to the mobile for 30 minutes, sometimes an hour, or sometimes even less – it all depended on when her sister did not need to use the mobile herself, she could then use it for her school work.

“Internet penetration rates are high but they do not reflect equity gaps and the digital divide as access to internet in Eastern Indonesia is very low and people do not have internet - except through their mobile.”

- Expert, Data Scientist, UNICEF

“I spend more time now learning at night time using mobile because I must wait for my older sister to go back home from working. I must see when my sister does not use her mobile. Sometimes I could use it for a half hour, sometime less, sometimes more than 1 hour. It just depends upon my sister's mobile availability”

- Student, 14, Jember City, East Java



Image : UNICEF Indonesia/2020/ljazah

These patterns of unequal access exacerbate inequalities in learning and opportunities for the future, especially for those in rural areas of the country

Compared to their peers, disadvantaged students in remote settings have the most inadequate access to learning resources to learn from home, which leaves them further behind in learning when they return to school. Data from Indonesia's Central Statistics Agency estimates that 21 per cent of people in low-income areas have access to the internet while the figure reached 93 per cent in high-income areas¹⁴³. The internet is widely used among high education respondents (84.3 per cent), almost double the rate of medium education respondents (43.3 per cent), while the use among low education respondents is only 7.1 per cent.

In addition to socio-economic status, learning practices are unequal on account of a host of infrastructure related issues. For instance, in many areas outside of Java Island, low ownership of smartphones or even reliable signal becomes the obstacle for students to remain present

¹⁴³ Agahari, Wirawan, 'Digital innovation in Indonesia: inequalities between the east and the west', The Conversation, 10 October 2018, <<https://theconversation.com/digital-innovation-in-indonesia-inequalities-between-the-east-and-the-west-95218>>

throughout the distance learning period. This hits hard particularly for those who live in areas like Papua where connection is weaker or not available. In these areas, teachers have to visit their students physically since they can hardly access or afford the internet¹⁴⁴. The additional cost of internet data also becomes an issue among poor groups in rural areas. In Papua, where coverage is the poorest, teachers stated that their worry that children were unable to learn and are at higher risk of dropping out¹⁴⁵.

In a Rapid Survey conducted by MoEC, 88 percent of students nationally (96 percent in 3T area), reported the challenge of not having the facilities for effective distance studying (like internet, electricity, technological devices) while 53 percent (56 percent in non-3T areas) reported being unable to optimize digital media for learning purposes.

“If we focus on developing and improving the existing network and connectivity, particularly in rural and remote areas, then we can promote more inclusive EdTech apps in education.”

- Expert, Ministry of Education and Culture, Government of Indonesia

“One of the biggest challenges is in the access and the infrastructure available. A majority of households probably do have access to smartphones, but if they have 3 kids and all are studying from home, it's not really optimal or conducive to digitally learn.”

- Expert, Ministry of Education and Culture, Government of Indonesia

¹⁴⁴ Alifia, U., et al., 'Learning from home: A portrait of teaching and learning inequalities in the times of the COVID-19 pandemic', Smeru Research Institute, July 2020.

¹⁴⁵ Erniss, D, 'Miss Me to Teacher', 2020. <<https://majalah.tempo.co/read/nasional/161153/tanpa-internet-dan-gawai-perjuangan-guru-dan-murid-belajar-saat-pandemic>>

HOW MIGHT WE....

- **Overcome an inhibitor:** *How might we ensure that even those burdened by poverty, are able to access the internet for their learning? How might we curate digital learning platforms and content to be easily accessible on a mobile phone for effective learning?*
- **Fill in a gap:** *How might we create more inclusive access to digital education by filling in the gaps of groups including primary and junior schools, rural and eastern areas of the country and individuals with lower levels of education? How might we improve access to an appropriate digital device for the adequate amount of time required for digital learning?*

4.3 The Government's efforts to provide free internet packages have faced limitations in design and implementation, limiting its uptake.

Quota systems for internet access put in place by the Government to incentivize digital learning have not been taken up as desired as they don't cover the main channels being used by students and teachers.

With the onset of the pandemic, the government has provided a series of distance learning benefits to students and teachers which includes free access to internet quotas. Unfortunately, despite the impetus, the government was unable to meet its target of reaching 58 million¹⁴⁶ educators and students in Indonesia, and managed to reach out to only 38.6 million numbers¹⁴⁷.

“I was supported with an internet quota and learning package from the government. The learning package I received was of 30 GB and internet quota is 5 GB for each month. The learning package was to access Google Classroom and Zoom, while the internet quota was for accessing WhatsApp and Instagram. For December, I received 10 GB internet quota and 60 GB for the learning package, active until 2021.”

- Student, 13, Jember, East Java

¹⁴⁶BeritaSatu, P2G: Target Bantuan Kuota Internet Tahap Terakhir Meleset, November 30, 2020, <www.beritasatu.com/nasional/704487/p2g-target-bantuan-kuota-internet-tahap-terakhir-meleset>.

¹⁴⁷Kemendikbud, Ministry of Education and Culture Distributes Internet Data Quota Assistance to 27 Million Mobile Numbers in September, 29 September, 2020, <pusdatin.kemdikbud.go.id/kemendikbud-salurkan-bantuan-kuota-data-internet-ke-27-juta-nomor-ponsel-di-bulan-september/>.

However, from the research it emerges that students are less likely to opt for internet quota schemes as they do not include more than 5 GB for access to social media platforms like WhatsApp for socializing and entertainment. Many online learners rely on WhatsApp for school work, which falls under the general quota and have limited data availability. Empatika during their research study, reported that in the interviews with young people, one student from Central Lombok said he received 10 GB from 'from the government', but only for official educational platforms, and not WhatsApp or Youtube, even though they were being used by his school.

The government is trying to incentivize the use of EdTech as earlier the cheaper internet quotas allowed for use of social media like WhatsApp, so people could not afford to spend on anything else. The government tried to reverse this through quota schemes for EdTech which limited social media use but young people and teachers seem to be familiar and comfortable with use of WhatsApp and are reluctant to switch to other platforms.

In addition to design, limitations in the information and distribution of government internet quota schemes have also limited their uptake.

Students, parents, and teachers have reported difficulties in availing of government internet quota schemes due to ineffective distribution and inadequate information on usage. In research with young people and teachers, early evidence points to the fact that the quota scheme might

have limitations on account of poor information on usage or poor or unequal administration in its distribution.

“I have been receiving an internet quota since October that I think is from school because my teacher used to make a list of students’ phone numbers. In October and November, I received 30 GB for the learning package and 5 GB internet quota respectively. While in December, I got a 60 GB learning package and 10 GB internet quota, which last until February 2021. The internet quota is able to access TikTok, WhatsApp, Google, and Google Classroom. When the internet quota is fully used, the learning package can’t access those applications”

- Student, 18, North Timor Tengah District, East Nusa Tenggara

In remote areas, teachers report that the bandwidth of the internet is often poor and they are unable to upload student data. When they are able to do so, uneven distribution or provision for all students from the backend limits the implementation. In a KPAI Report survey titled, ‘Persepsi Dan Evaluasi Guru Terhadap Pelaksanaan Pembelajaran Jarak Jauh’ (Teachers’ Perceptions and Evaluations of the Implementation of Distance Learning) of the 602 private and public school teachers less than 25 per cent reported their school provided support in terms of training and giving incentives (providing hotspots and internet quota) to conduct distance learning more effectively.¹⁴⁸ Also, the proportion of teachers in private schools receiving aid from their school is relatively greater than that in public schools.¹⁴⁹

¹⁴⁸ KPAI Report, *Persepsi Dan Evaluasi Guru Terhadap Pelaksanaan Pembelajaran Jarak Jauh*, 16-20 April 2020.

¹⁴⁹ Alifia, U. et al., *Learning from Home- A Portrait of Teaching and Learning in times of the COVID-19 Pandemic*, Smeru Research Institute, Rep. No. 1/2020, 2020, pp. 1-8.

“My daughter received no support in terms of free devices, subsidy, internet plans from the government for her school for digital learning.”

- Parent, 47, Jember City, East Java

“The internet signal is so weak. I have not even been able to upload students’ phone numbers to the central database to allow them to obtain quota.”

- Teacher, 44, Duren Sawit, East Jakarta

“As a teacher coordinator, I collected phone numbers of students to be registered and verified for monthly internet quota – unfortunately, the data seems mismatched which caused 30 percent of students to not get the internet quota from the government.”

- Teacher, 35, Lamongan District, East Java

HOW MIGHT WE....

- **Overcome an inhibitor:** *How might we create better and more affordable access to infrastructure for digital learning both inside and out of schools?*
- **Fill in a gap:** *How might we increase effectiveness of distribution and information around usage of government internet quotas?*

Pillar 3 : Digital skills

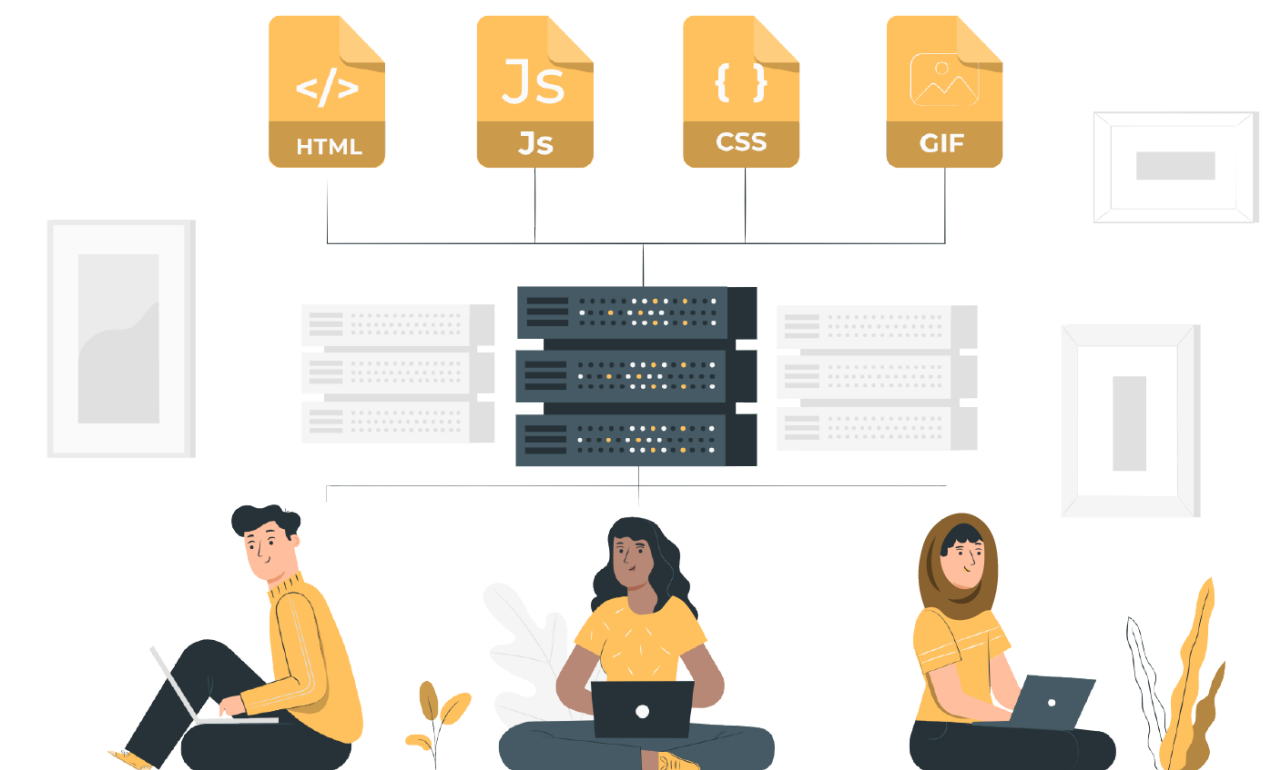


Illustration : Freepik

5. Pillar 3 : Digital Skills

Although daily internet usage is considerably high in Indonesia, the level of digital literacy remains to lag behind other countries in the Southeast Asia region¹⁵⁰. According to the IMD World Digital Competitiveness Ranking 2020¹⁵¹ Indonesia ranked last on knowledge indicating the amount of work yet to be done to build digital skills for the country. This is also reflected in the labour market as a chronic shortfall in skilled labour, human resources, and ICT specialists (programmers, developers, and engineers in particular) is frequently cited as one of the most long-standing constraints on the development of Indonesia's digital economy¹⁵². As per research conducted by the World Bank, Indonesia was facing a shortage of around nine million semi-skilled and skilled digital talent in a period of 15 years in 2016¹⁵³. More recent data from the Communications and Information Ministry in 2019, showed a deficit of around 600,000 talents in the tech sector. According to Vivek Lath, Associate Partner with the local arm of US consulting firm McKinsey & Company, there will be 10 million novel jobs

created in Indonesia by 2030¹⁵⁴. As global digitization continues, ICT skills will need to become more universal to young people. Education and curriculum must be updated to equip young people with relevant job and digital skills as well as soft skills such as logical thinking, creativity and communication skills for the 21st century economy¹⁵⁵. Not doing so, would lead to a significant skill gap and rampant youth unemployment.

As the world moves towards automation and digitisation, there is a need to better unpack what 'digital skills' or 'digital literacy' refers to. A 2019 APEC (Asia Pacific Economic Cooperation) survey¹⁵⁶ revealed that more than 50 per cent of the 3000 respondents across the APAC countries (including Indonesia) believed their governments and educational institutions had a 'weak understanding' of the digital skills landscape in their countries. More than half of survey respondents felt that educational institutions did not provide for their digital skill needs. This was, in particular, highlighted for specific digital skills that were deemed inadequate in the workforce.

At the same time, much of the past literature and existing understanding of 'digital skills' seems to place under a homogenous category. With digital technologies becoming ubiquitous in young people's everyday lives and their workplaces, a more granular understanding of digital skill needs

¹⁵⁰ Rumata, Vience Mutiara, and A.S Sastrosubroto. 'The Paradox of Indonesian Digital Economy Development', in *E-Business* edited by Dr. Robert Wu and Prof. Marinela Mircea, IntechOpen, 2019.

<https://www.intechopen.com/online-first/the-paradox-of-indonesian-digital-economy-development>

¹⁵¹ IMD World Competitiveness Center, 'IMD World Digital Competitiveness Ranking 2020'.
<https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2020/>

¹⁵² Azali, Kathleen. 'Indonesia's Divided Digital Economy', *Perspective*, ISSUE: 2017, No. 70, pp.1-12, ISEAS- Yusof Ishak Institute.
https://www.iseas.edu.sg/images/pdf/ISEAS_Perspective_2017_70.pdf

¹⁵³ Andarningtyas, Natisha and Aria Cin, 'Indonesia requires abundant digital talent pool to face Industry 4.0.', *Antara News*, November 03, 2020, Retrieved from
<https://en.antaranews.com/news/160404/indonesia-requires-abundant-digital-talent-pool-to-face-industry-40>

¹⁵⁴ Akhlas, Adrian Wail, 'Workers told to improve as digital tech steams ahead', *The Jakarta Post*, 6 December 2019.
<https://www.thejakartapost.com/news/2019/12/06/workers-told-to-improve-as-digital-tech-steams-ahead.html>

¹⁵⁵ International Telecommunication Union, 'Digital Skills Insights': Publication, Geneva, 2019.

¹⁵⁶ 'Unlocking APAC's Digital Potential: Changing Digital Skills Needs and Policy Approaches', AlphaBeta, pp. 1-100, 2021.

is eminent¹⁵⁷. This trend can also be seen in Indonesia as digital skills is used as an umbrella category to describe a myriad of technical as well as soft skills.

Currently all digital skills like – digital ethics and security, cloud computing, artificial intelligence, information and data literacy, digital problem solving, digital infrastructure, browsing the internet, using search engines, among many others, are understood as ‘digital skills’, without much nuance.¹⁵⁸

Multiple metrics to unpack ‘digital skills’ exist, for example, Cenfri’s (an independent African economic impact agency) four categories of ‘digital skills’¹⁵⁹ required for the digital economy, namely –

- **Consumer digital skills** - the capabilities that all individuals need to function socially, economically and politically in a digital society: using messaging or social media, making an online purchase, filling in an online application for a passport, navigating a search;
- **Productive digital skills** - the skills that individuals require to apply existing digital technologies for productive purposes: selling goods or services via a digital platform, using programs like Excel or Word for business purposes, and online advertising;
- **Developer digital skills** - the skills required to develop, customize or modify digital technologies and digital infrastructure: coding, data analytics and data science, creating and applying AI and IoT technology, cyber security, network administration;

- **e-leadership digital skills** - the skills required to conceive and execute business models to deliver public or private goods by utilizing digital technologies.

Another example is, the APAC Digital Skills Framework which lists eight digital skill competencies namely – device and software operations, information and data literacy, digital content or product creation, cloud computing competencies, digital communication and collaboration, digital problem solving, data security and ethics, and digital project management.

UNICEF, in its ‘Global Framework on Transferable Skills’¹⁶⁰ Report of 2019, defines digital skills as “those that build digital literacy enabling people to use and understand technology, search for and manage information, create and share content, collaborate, communicate, build knowledge, and solve problems safely, critically and ethically.”

Similarly, there is a need for Indonesia, perhaps at a central level, to better define their understanding of ‘digital skills’, so EdTech platforms can work to create adequate learning opportunities and young people know what skills they need to build to secure jobs required in the Indonesian market.



Illustration : Freepik

¹⁵⁷ APEC Human Resources Development Working Group, ‘Close the Digital Skills Gap by 2025 through Collaboration’, July, 2019. <https://www.apec.org/Press/News-Releases/2019/0719_Digital>

¹⁵⁸ Unlocking APAC’s Digital Potential: Changing Digital Skills Needs and Policy Approaches, AlphaBeta, commissioned by Amazon Web Services, 2021, pp. 1-100.

¹⁵⁹ Carboni, Isabelle and Annabel Schiff, ‘How do we develop work-ready youth in a digital age?’, *Cenfri*, 3 September, 2020. <<https://cenfri.org/articles/how-do-we-develop-work-ready-youth-in-a-digital-age/>>

¹⁶⁰ UNICEF, ‘Global Framework on Transferable Skills’, November, 2019.

The need for building digital skills has been highlighted even prior to the pandemic in response to Indonesia's poor PISA scores¹⁶¹. Indonesia ranked 70 out of 78 countries in science, 71 for mathematics, and 72 for reading.

The move to digital learning with the pandemic has brought to light this lack of digital skills among Indonesian students and teachers. Young people across the country are also increasingly aware of the need to build their digital skills. In a March 2019¹⁶² U -Report SurveyPoll: 'The Skills Young People Need To Succeed In The Future', 17 per cent of the 2,908 respondents mentioned that 'digital skills' were one of the three skills that they think they need to acquire the most for the future.

Initiatives by the government, private companies such as Intel, Microsoft, and Google have also contributed to increasing the capacity of teachers in order to increase the use of ICT for learning over the years. These are detailed below:

Intel Teach program: In 2007, Intel signed a collaboration with the MoEC to run the 'Intel Teach program'. The program was based on Intel's education transformation model that emphasizes a holistic approach to teaching covering five main components – policy reform, curriculum and assessment, professional teacher development, information communication technology, and research and evaluation. This program was delivered through public-private partnerships with government ministries and teacher education institutions around the world. It aimed to enable teachers to learn from the best practices of other teachers on how technology integration enhances student learning. Indonesia was the 45th country to be part of this program, which as of 2015 had trained 10 million teachers across 70 countries¹⁶³.

In 2009, DBE3 (Decentralized Basic Education 3) conducted an evaluation of the program¹⁶⁴ in order to assess how successful the program had been.

The evaluation concluded that the program achieved some notable success in terms of improving teachers ICT skills and increasing the use of ICT as a teaching tool but had been much less successful impact on improving the use of ICT in the classroom as a learning tool.

Microsoft Education: In 2013, Microsoft Education introduced online training for ICT in education as part of the Microsoft Innovative Educators, allowing teachers to learn independently and at their own pace. As of 2016, as many as 150,000 teachers had been trained by this program. This program ran until 2020¹⁶⁵. To support the government in increasing the capacity of educators in utilizing ICT to support distance learning, Microsoft and The Indonesian Teachers Association (PGRI) began the 'Training of Trainers' (TOT) program aimed at developing the competencies of students by improving the teaching methods of trainers. The TOT program also launched 'Gurulympics 2020' to encourage the enthusiasm for learning and innovation of teachers in Indonesia through the use of technology which in turn was expected to increase the skills of teachers and improve the quality of education starting with the teaching staff. The 'Gurulympics' and TOT programs hope to help teachers throughout Indonesia to increase creativity and strengthen collaboration with students.¹⁶⁶

¹⁶¹ Indonesia ranked 70 out of 78 countries on PISA in science, 71 for mathematics, and 72 for reading

¹⁶² UNICEF, UReport Survey, Poll: *The Skills Youth Need To Succeed In The Future*, 2019,

¹⁶³ Noor Il, Achmad Rouzni, 'Intel Latih 90 Ribu Guru di Indonesia' *Detikcom*, 29 November 2015. <<https://inet.detik.com/cyberlife/d-3083139/intel-latih-90-ribu-guru-di-indonesia>>

¹⁶⁴ Vota, Wayan, 'Evaluation of Intel Teach Getting Started Program in Indonesia', *ICT Works*, 6 May, 2011. <<https://www.ictworks.org/intel-teach-indonesia/#.YEj2H2gzZPZ>>

¹⁶⁵ Vishnum, 'Teknologi Dorong Perkembangan Sistem Pembelajaran Berbasis Digital' (Technology Encourages the Development of Digital-Based Learning Systems), *Microsoft Indonesia News Center*, 22 February 2016. <<https://news.microsoft.com/id-id/2016/02/22/teknologi-dorong-perkembangan-sistem-pembelajaran-berbasis-digital/>>

¹⁶⁶ 'Berdayakan Guru di Indonesia, PGRI & Microsoft Luncurkan Gurulympics 2020' (Empowering Teachers in Indonesia, PGRI & Microsoft Launch Gurulympics 2020), *Microsoft Indonesia News Center*, 9 October 2020. <<https://news.microsoft.com/id-id/2020/10/07/berdayakan-guru-di-indonesia-pgri-microsoft-luncurkan-gurulympics-2020/>>

Google for Education: Google began the 'Google for Education' program in 2014 to introduce and encourage the use of the G-Suite application for teacher and student productivity, learning, and in educational administration. While the program continues, it is not publicly known how many teachers have been trained by Google and its partners. In 2019, Google.org announced US \$ 1 million (Rp. 13.7 billion) in aid to the non-profit Bebras¹⁶⁷ Indonesia (an organization that aims to promote computer science and computational thinking among school students at all ages)¹⁶⁸. This was intended to assist the implementation of computational thinking skills training for 22 thousand teachers in 22 cities via offline and online training programs. The program hopes to impact as many as 2 million students¹⁶⁹.

The Women in STEM project¹⁷⁰: The International Labor Organisation in partnership with JP Morgan Chase launched the Women in STEM project in 2017. It aims to empower pre-employed female youth by providing them with relevant ICT technical skills and soft/core skills training as well as female employees by strengthening their soft/core skills training that are relevant for career development. The main activities of this program included skill gap identification, skill upgrading, job placement, and in-company development and mentorship. This program ran for three years till December 2020.

Starting Them Young program¹⁷¹: In 2018, the Open Data Lab Jakarta (a non-profit data innovation and research lab) partnered with Goethe-Institut Indonesien (Federal Republic of Germany's cultural institute) and PASCH (Partner Schools in Indonesia) on a project designed to

strengthen girls' and young women's digital literacy skills and use these to tackle social issues like dealing with gender-based violence online. In July 2018, the program held its first workshop and public forum with 22 female students to build up their skills in understanding, analysing, and visualising open data so they can better advocate for social issues.

Public awareness campaign on Online Safety¹⁷²:

In 2020, Go-Jek partnered with the Ministry of Communication and Information Technology and the University of Gadjah Mada to create a public awareness campaign titled #AmanBersamaGojek (Safe with Go-jek). The aim of this campaign is to enhance digital literacy in Indonesia and arm consumers with knowledge on protecting themselves against various types of online fraud. The education campaign is designed to take place in six cities and include public-service announcements and seminars conducted by the university. Go-jek attempts to increase education and instill good cybersecurity habits through in-app games.

Girls4Tech¹⁷³: Building on previous initiatives that attempt to bridge the digital skills divide between young girls and boys, YCAB Foundation (Yayasan Cinta Anak Bangsa, translates to Loving the Nation's Children Foundation) and Mastercard Center for Inclusive Growth, in partnership with the Ministry of Communication and Informatics and the Ministry of Education and Culture, launched the Girls4Tech program in 2020. This program hopes to build skills for 60,000 girls in STEM subjects (science, technology, engineering and mathematics) over the course of three years. It is organised as an online training program,

¹⁶⁷ Bebras <<https://www.bebas.org/>>

¹⁶⁸ Bebras is an organization that started in Lithuania in 2003 and has now expanded to 55 countries.

¹⁶⁹ Alfarizi, Moh Khory, 'Google.org Donasi Pelatihan Komputasi 22 Ribu Guru Rp 13,7 Miliar', *Tempo*, 18 February 2020. <https://tekno.tempo.co/read/1309085/google-org-donasi-pelatihan-komputasi-22-ribu-guru-rp-137-miliar>

¹⁷⁰ International Labour Organisation, 'Women in STEM workforce readiness and development program in Indonesia', pp. 1-2, 2020.

¹⁷¹ Open Data Labs, 'Digital Literacy and Young Girls in Indonesia: Bridging the Gap' 14 August 2018, <<https://labs.webfoundation.org/digital-literacy-and-young-girls-in-indonesia-bridging-the-gap/>>

¹⁷² Farveen, Farzanah, 'Gojek launches #AmanBersamaGojek to grow digital literacy in Indonesia' *Marketing*, 2 March 2020. <https://www.marketing-interactive.com/gojek-launches-aman-bersamagojek-campaign-to-enhance-digital-literacy>

¹⁷³ YCAB, 'STEM for Girls in Indonesia: Developing the Next Generation of Girls in Tech with YCAB Foundation, Mastercard, Ministry of Communication and Informatics, and Ministry of Education and Culture', 14 September 2020. <<https://www.ycabfoundation.org/news-highlights/news-updates/stem-for-girls-in-indonesia-developing-the-next-generation-of-girls-in-tech-with-ycab-foundation-mastercard-ministry-of-communication-and-informatics-and-ministry-of-education-and-culture/>>

supervised by teachers as mentors. Since its launch, more than 2,000 girls have registered for the program. The goal of this program is to inspire Indonesian girls aged 10 to 15 years old to pursue careers in STEM.

The government too, has launched multiple initiatives to build digital capacities.

Sekolah Penggerak (Pioneering Schools)

program: Initiated by the MoEC in 2021, the *Sekolah Penggerak* program focuses on developing student learning outcomes in a holistic manner that includes competence (literacy and numeracy) and character starting with superior human resources (school principals and teachers)¹⁷⁴. It aims to accelerate private and public schools across all conditions to realize the vision of an advanced Indonesia. The *Sekolah Penggerak* program consists of five types of integrated interventions to be carried out with assistance from regional governments, namely training and mentoring of school principals and teachers, learning with a new paradigm, data-based planning, and school digitization. In the times of the COVID-19 pandemic and shift to digital education, the *Sekolah Penggerak* program is focusing on developing the capacity of select schools, including poor schools, in online learning. This program allows for selected schools to serve as role models for good learning practices and a source of information for other schools in the area to learn from.

Pusat Studi Pendidikan dan Kebijakan (Center for Education and Policy Studies):

Pusat Studi Pendidikan dan Kebijakan (PSPK) is an independent non-profit foundation that focuses on strengthening pro-child learning policies. It creates simulations to capacitate teachers in the use of existing technology and aims to disseminate good practices in the field in Indonesia's education ecosystem.

¹⁷⁴ Ministry of Education and Culture, 'Activator School Program' (program Sekolah Penggerak. Kementerian Pendidikan dan Kebudayaan)
<<https://sekolah.penggerak.kemdikbud.go.id/programsekolah-penggerak/>>

"During the beginning of the lockdown we [PSPK] helped teachers use the most popular platform, WhatsApp, by making learning simulations on scenarios such as how to greet students on WhatsApp and use emoticons and voice notes."

- Expert, PSPK, Government of Indonesia

Pustekkom (Center for Data and Information Technology) initiatives:

Over the years, the Center for Data and Information Technology of the MoEC has carried out several initiatives, some in partnership with the private sector, to enhance the digital skills of school and university teachers. Originally, it was focused on developing audiovisual materials for teaching and learning, meant for radio and TV distribution. Since the 2000s, the focus has been on developing web-based multimedia materials.¹⁷⁵ Since 2008, Pustekkom has conducted several training sessions on the use of ICT for learning for teachers and education personnel from elementary school to higher education levels under the *Training in Utilizing ICT for Master Trainer Teachers*. The purpose of this training is to improve the ability of teachers to develop teaching materials and use ICT more effectively in teaching. In its introductory phases the training reached 4,575 teachers from 33 provinces in Indonesia. Since 2008, similar training programs have been carried out and as of 2018, it had reached an estimated 5,000 teachers each year.¹⁷⁶

In 2018, Pustekkom began organizing a blended (mixed) training program for teachers called *PembaTIK* which stands for ICT-Based Learning. This program aims to motivate teachers in the application of innovative learning models and the development of ICT-based learning materials, in particular by using the *Rumah Belajar* application. The program targeted teachers from elementary to

¹⁷⁵ Omidyar Network, *Scaling Access & Impact Realizing the Power of EdTech*. Indonesia Country Report, 2019.
<https://omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact-Indonesia-Report_vFinal_r.pdf>

¹⁷⁶ Susilawati, E, 'DAMPAK program DIKLAT ONLINE TIK GURU PUSTEKKOM TERHADAP AKSESIBILITAS KONTEN PEMBELAJARAN PADA FITUR RUMAH BELAJAR'. *Jurnal Pendidikan*, 19(2), 84-103, 2018.
<<https://doi.org/10.33830/jp.v19i2.153.2018>>

high school levels from all provinces of Indonesia. With reference to the UNESCO ICT Competency Framework for Teachers, the PempaTIK program is implemented at four levels: ICT Literacy, ICT Implementation, ICT Creation, and ICT Sharing. The ICT Literacy Level and ICT Implementation are carried out online, while the ICT Creation and ICT Sharing are carried out face-to-face.

In the two years since its introduction, PempaTIK has been attended by over 70,000 teachers. This figure is an extraordinary achievement as well as an indicator that many teachers want to improve their ability to implement technology in their teaching instruction.

Digital Talent Scholarship (DTS): In 2018, the Ministry of Communication and Information Technology launched the *Digital Talent Scholarship* to prepare human resources to support digital transformation in Indonesia towards Industry 4.0 and the improvement of the digital economy. This scholarship is managed by the Human Resources Research and Development Agency of the Ministry of Communication and Information in collaboration with five state universities in Indonesia, as hosts and providers of teaching staff. This scholarship is administered by the Ministry of Communication and Informatics Research and Development Agency to reach 31 leading universities in Indonesia, 23 Polytechnics and four global technology companies including AWS, Cisco, Google and Microsoft.¹⁷⁷ Recipients of the scholarship get training on data analysis, artificial intelligence (AI), cloud computing and cybersecurity among other skills¹⁷⁸. The program aims to improve skills, competitiveness, productivity, professionalism of human resources in the information and communication

technology for Indonesia's young workforce, the general public, and the country's civil servants. The DTS program is designed to create a balanced ecosystem in maximizing the role of the government, community, higher education institutions, the business world, and the media for young people to become facilitators and accelerators to support the digital economy¹⁷⁹.

Digital Training System for Young Workers: In 2019, the Ministry of Manpower and Plan International Indonesia signed a collective agreement to develop a competency-based, inclusive digital training system for young workers and reduce unemployment. The program¹⁸⁰ was initiated in Jakarta, Semarang and Lombok and will gradually be expanded to all regions of Indonesia¹⁸¹. This initiative intended to bring together industry representatives, policy makers, academia, vocational schools and training centres to map local labour market needs, available training and vacancies. The objective of such centres is to enhance coordination among different actors to tackle labour market issues, facilitating matching between labour demand and supply, enhance productivity and lower the share of jobseekers¹⁸².

The timeline below shows initiatives undertaken in Indonesia to build the digital capacities of teachers and young people.

¹⁷⁷ Kominfo, 'Indonesia Digital Talent Intensive Training Scholarship', September 2018. Retrieved from <https://kominfo.go.id/index.php/content/detail/14408/siaran-pers-no-223hmkominfo082018-tentang-beasiswa-pelatihan-intensif-digital-talent-indonesia/0/siaran_pers>

¹⁷⁸ Eloksari, Eisyia, 'Ministry offers scholarship program to address digital talent gap' *The Jakarta Post*, 16 June 2020. Retrieved from <<https://www.thejakartapost.com/news/2020/06/16/ministry-offers-scholarship-program-to-address-digital-talent-gap.html>>

¹⁷⁹ Digital Talent Scholarship, 'About us' <<https://digitalent.kominfo.go.id/about>>

¹⁸⁰ Lelono, Bambang Satrio, 'PREPARING INDONESIA'S WORKFORCE FOR INDUSTRY 4.0: Presentation', Siemens Digitalize Indonesia, slide 17, 31 October, 2019. <<https://assets.new.siemens.com/siemens/assets/api/uid:362cdcd2-3944-4b02-b24a-5e77b6751de1/digitalize-indonesia-2019-3-ministry-of-manpower-2.pdf>>

¹⁸¹ 'Kemnaker Kembangkan Sistem Pelatihan Digital bagi Tenaga', July 4, 2020. Retrieved from <<https://akurat.co/ekonomi/id-677102-read-kemnaker-kembangkan-sistem-pelatihan-digital-bagi-tenaga-kerja-muda>>

¹⁸² 'Fostering local approaches to skills in Indonesia', OECD library. <<https://www.oecd-ilibrary.org/sites/df6c4fbb-en/index.html?itemId=/content/component/df6c4fbb-en>>

Timeline of Digital Education Initiatives - Digital skills



The insights provided below provide an evaluation of these efforts in the landscape for digital skills in Indonesia.

5.1 Students have strong potential for digital learning as many of them are 'digital natives'. Despite this, they lack adequate 'digital skills' that would prepare them for the 'digital economy'.

Students seem to have more affinity towards digital learning than teachers, and therefore have managed to adapt to digital schooling more easily.



Illustration : Freepik

According to SUSENAS estimates, 77 per cent of Indonesian youth between the ages of 15 to 24 years old accessed the internet in the last three months of 2020, and this is projected to grow to 100 per cent by the year 2030¹⁸³. Young people are increasingly growing up in environments with some level of technological familiarity, and because of this, they have the capacity to learn and adapt to digital learning far more quickly than ever before¹⁸⁴.

¹⁸³ UNICEF-UNCT: Children and the digital divide, 2020.

¹⁸⁴ Expert interview with a Digital Learning Officer, INOVASI, 30th of November 2020.

“Previously it was dictate, dictate, dictate, but now children nowadays are more creative and interested in different approaches of learning.”

- Teacher, 28, Merauke City, Papua

“In contexts where children have access to technology and the internet, they can quickly learn and master the use of learning platforms according to teacher directions. They can adapt easily.”

- Expert, Digital Learning Officer, INOVASI

Teachers, on the other hand, have reportedly been struggling to make the transition from offline to online learning, as many of them are digital immigrants¹⁸⁵. As proclaimed by Marc Prensky, people who were not born in the digital era and later adopted the new technology are named as “digital immigrants” – and the way teachers understand digital literacy drives the way the teachers apply their digital literacy in the classroom, and thereby impacts the way students learn¹⁸⁶.

¹⁸⁵ Prensky, Marc., ‘Digital Natives, Digital Immigrants’, Working paper, No. 5 ed., Vol. 9, On the Horizon, MCB University Press., October 2001, pp. 1-6.

¹⁸⁶ Lase, Delipher, Sonny Zaluchu, Dorkas Daeli, et al. ‘Parents Perceptions of Distance Learning during COVID-19 Pandemic in Rural Indonesia’, EdArXiv, 2020, pp 1-16, 2020.

“There is a large gap in the ability of teachers’ proficiency to use technology. Currently it is estimated that only about 2.5 per cent (of teachers) have a good ability to use technology.”

- Expert, 21st Century Learning & Education, VOX Populi Institute Indonesia

As per the validation interviews, four out of five teachers mentioned struggling with the move to digital learning, most often citing that they did not feel they had the adequate digital skills or knowledge to effectively conduct their classes online using digital technology. Only one teacher from a private school, based in Merauke in Papua, mentioned that she felt confident about digital learning as her school had begun using digital technologies for teaching prior to the pandemic for Project Based Learning (PBL) and Inquiry Based Learning (IBL). PBL is a student-centered pedagogy that involves a dynamic classroom approach in which it is believed that students acquire a deeper knowledge through active exploration of real-world challenges and problems; IBL is a form of active learning that starts by posing questions, problems or scenarios. It contrasts with traditional education, which generally relies on the teacher presenting facts and their own knowledge about the subject. However, she went further to comment that her students were better able to navigate digital learning and managed to easily present in front of the camera and to use a video editing software for assignments.

“[Some of the] biggest challenges are that teachers have limited or no knowledge and skills on how to deliver material, and interact or communicate with their students online and they don't possess the technical knowledge of being familiar with the existing digital learning softwares and platforms.”

- Expert, Digital Learning Officer, INOVASI

“I don't have skills or experience to teach [my] students online.”

- Teacher, 45, Palu City, Central Sulawesi

Globally, there has been a recent trend to gamify learning experiences as ‘gaming environments’ are increasingly familiar to young people. This has been seen in Indonesia with initiatives such as Arsa Kids, Digikids, and Educa Studio which have all developed game-based learning for students. This new way of learning is based on the hypothesis that young people are increasingly spending more time online, often for recreational purposes, therefore by overlaying or including educational material within these ‘gaming’ settings would go a long way in children’s learning.

The popularity of such EdTech solutions that employed gamified experiences has been steadily increasing, as can be seen with Pahamify, a learning application that uses filmmaking, gamification, and visuals to encourage learning, (led by Shunwei Capital); Titik Pintar, a learning solution that gamifies elementary school curriculum (from Indonesia Women Empowerment Fund); and Arsa Kids that uses learning methods, visuals, animation, and voice feedback to motivate children to learn (from Discovery Nusantara Capital). These solutions have secured considerable funding in the last five years.

Young people are most often interacting with the internet and digital technologies in casual ways for recreation and entertainment.

Indonesia’s digital denizens are among the world’s most active, and the country has a vibrant start-up ecosystem. However, overall the country lags in embracing the benefits of modern

technology.¹⁸⁷ The level of digital literacy in Indonesia remains behind other countries in the Southeast Asia region. This indicates a low capacity and readiness to adopt and explore digital technologies for economic transformation in business, government and wider society¹⁸⁸.

Indonesia's social media usage is among the highest of any population in the world. Jakarta is considered the Twitter capital of the world, with the most number of active twitter users¹⁸⁹. In 2017, out of 143.3 million internet users in Indonesia, 89 per cent used the internet for instant messaging and 87 per cent for social media¹⁹⁰. Based on a 2020 Global Digital Report by Hootsuite and We are Social, the active social media users in Indonesia in 2020 was about 59 per cent of the total population¹⁹¹. The number of young people who access the internet in Indonesia is rapidly increasing. More recently, middle-class children in public schools, refugee children in private schools, or street children in shelters, all reported that they use smartphones¹⁹² to access applications for communication, entertainment and education. This trend indicates that many young people in Indonesia are growing up as 'digital natives'.

“Internet connectivity and penetration [in Indonesia] is extremely high. There are more mobile phone connections than people who have access to clean water and smartphone ownership is above the 60 per cent mark. The environment is ripe for digital interventions.”

- Expert, Data Scientist, UNICEF Indonesia

Young people's active internet usage is not translating into high levels of digital literacy. According to the IMD World Digital Competitiveness Ranking 2020¹⁹³, which ranks 63 economies globally on their digital competitiveness, Indonesia fares quite poorly and ranks 54th on readiness (54th). This was also reflected in the Report, *Unlocking APAC's Digital Potential: Changing Digital Skills Needs and Policy Approaches*, which found that only 19 per cent of Indonesia's workforce in 2020 applied overall digital skills and only a mere 6 per cent applied advanced digital skills¹⁹⁴. Even within the education sector, the most commonly applied digital skill was the ability to communicate via digital mediums.

This is felt by young people too who state that, they are increasingly understanding the importance of digital skills but realise that this may not be a skill they have developed adequately yet¹⁹⁵. According to a March 2019 U-Report Survey (with 2908 respondents) 'Poll: The Skills Young People Need To Succeed In The Future', young people responded that 'digital skills' were one of the three skills that they think they need most in the future.¹⁹⁶

¹⁸⁷ Das, Kaushik, Michael Gryseels, Priyanka Sudhir et al., 'Unlocking Indonesia's digital opportunity', McKinsey Indonesia Office, 2016, pp 1-28.

¹⁸⁸ IMD World Competitiveness Center, 'IMD World Digital Competitiveness Ranking 2020'.
<<https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2020/>>

¹⁸⁹ Das, Kaushik, Michael Gryseels, Priyanka Sudhir et al., 'Unlocking Indonesia's digital opportunity', McKinsey Indonesia Office, pp 1-28, 2016.

¹⁹⁰ Agahari, Wirawan, 'Digital innovation in Indonesia: inequalities between the east and the west', *The Conversation*, 10 October 2018.
<<https://theconversation.com/digital-innovation-in-indonesia-inequalities-between-the-east-and-the-west-95218>>

¹⁹¹ Kemp, Simon, 'Digital 2020: Indonesia - DataReportal - Global Digital Insights', 18 February 2020. Retrieved from
<<https://datareportal.com/reports/digital-2020-indonesia?qr=indonesia>>

¹⁹² UNICEF, 'Our Lives Online', 2020.

¹⁹³ IMD World Competitiveness Center, 'IMD World Digital Competitiveness Ranking 2020'.
<<https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2020/>>

¹⁹⁴ 'Unlocking APAC's Digital Potential: Changing Digital Skills Needs and Policy Approaches', AlphaBeta, pp. 1-100, 2021.

¹⁹⁵ ASEAN, *Key Takeaways*, 2020

¹⁹⁶ UNICEF, *UReport Survey, Poll: The Skills Youth Need To Succeed In The Future*, 2019.

“Most people in Indonesia still use internet-based technology for entertainment purposes only. In order to optimize the use of technology in education, it is necessary to change their mindset and understanding of the usage and benefits of technology, one of which is for education.”

- Expert, 21st Century Learning & Education, VOX Populi Institute Indonesia

Another challenge with digital engagement is that young people are more exposed to visuals or pictures on social media applications, limiting their ability to read and interpret readings¹⁹⁷. This further creates challenges while they undertake digital learning, or online tasks that require technical skills.



Illustration : Freepik

The ability to navigate social media applications versus being ‘digitally literate’ require diverse skill sets. Young people in Indonesia seem to possess the ability to browse and use social media, but lack the technical digital skills that would enhance their job opportunities and make them ready for the impending Industrial Revolution 4.0¹⁹⁸. The skills young people require include more

¹⁹⁷ UNDP Report, Quicksand findings, 2020.

¹⁹⁸ Agahari, Wirawan, ‘Digital innovation in Indonesia: inequalities between the east and the west’, The Conversation,

technical and formalised digital skills like coding, artificial intelligence, navigating search engines across the internet, being able to make transactions online, and using programs like Word or Excel, among others for productive use.

“I spend time watching videos on YouTube for entertainment, but I struggle to download applications for my digital learning (Google classroom and Zoom), I ask my father and brother to help me with this.”

- Student, 14, Jember City, East Java

There is a significant gap between the skills young people possess, versus skills they need to enter the workplace. EdTech interventions do not seem to be doing enough to fill this gap.

Indonesia is blessed with a demographic dividend, (economic growth brought about by a change in a country’s population, having more young people than old, resulting in the hypothesis of higher economic growth due to more years of productivity) but in order to reap the benefits of this 65 million young population, the youth of the country have to be aligned with the skills of the job-market – which is moving more towards automation and digitization.

According to the founder of a non-profit organization based in Jakarta, aimed at introducing young girls to STEM subjects, prior to this push into digital learning, the education system in Indonesia focused on teachers teaching from textbooks according to a syllabus set by the MoEC, for students to then regurgitate the information on test papers¹⁹⁹. It has not focused

10 October 2018. Retrieved from:

<https://theconversation.com/digital-innovation-in-indonesia-inequalities-between-the-east-and-the-west-95218>

¹⁹⁹ Quicksand findings, UNDP Report, 2020.

on building skills like critical thinking, leadership, and creativity, which are all important skills required by the job market.

“The biggest problem of Indonesia’s education sector is the complacency of the learning system. Judging that everything is sufficient and does not require any change. The process has lacked the integration of ‘appropriate’ methods for effective learning. It serves the function to transfer material but lacks a learning process for students.”

- Expert, *21st Century Learning & Education*, VOX Populi Institute Indonesia

The lack of such skills has also been felt by employers who have complained about the absence of transferable skills in graduates such the right attitude towards work, communication skills, diligence, and persistence²⁰⁰. Indonesian employers do not believe that the education system is producing quality graduates, and the issue is likely going to get worse as the world moves towards technological transformation and automation²⁰¹. Research by the Asian Development Bank in 2018, also highlighted that Indonesia is characterised by an oversupply of semi-skilled workers and the education system is not providing students or jobseekers with the skills needed to perform the jobs available in the country²⁰².

A lack of foundational knowledge and skills, impedes the ability for young people to acquire the relevant skills they need for the future, like soft skills, transferable skills, and digital skills. EdTech interventions are not doing enough to build these skills in young people. Most EdTech initiatives in Indonesia focus on building

technical skills or on test/exam preparations. There is a significant gap of EdTech offerings that concentrate on building soft skills and transferable skills, especially for a younger audience. A World Bank Report highlights that less than 15 per cent of the firms they surveyed for their study offered specific content focus on mathematics, science and reading. This also translates into Indonesia’s poor performance in the PISA rankings of 2018. Their findings concluded that the majority of EdTech firms in Indonesia are targeting a breadth of products and services, rather than offering fewer products and services with greater depth²⁰³.

“For us in Indonesia, foundational skills, like the ability to comprehend text, numbers, meaning, literacy and numeracy is still lacking, and at the same time we are pushed to teach kids advanced hard skills like coding, which can actually be self learned, if one has the foundational skills.”

- Expert, *Education*, CSO

HOW MIGHT WE....

- **Leverage an enabler:** *How might we leverage casual and recreational online activities (like gaming) for more conducive learning of students?*
- **Overcome an inhibitor:** *How might we change student’s attitudes towards the digital world so that they can see and utilise it as a serious learning environment?*

²⁰⁰ UNICEF, ‘Skills for the Future’, 2017.

²⁰¹ Indonesia Skills Development Project: program Information Document, *The World Bank*, pp 1-21, 2019.
[doi:http://documents1.worldbank.org/curated/en/594741563369992590/pdf/Concept-Stage-Program-Information-Documents-PID-Indonesia-Skills-Development-Project-P166693.pdf](http://documents1.worldbank.org/curated/en/594741563369992590/pdf/Concept-Stage-Program-Information-Documents-PID-Indonesia-Skills-Development-Project-P166693.pdf)

²⁰² ‘Indonesia: Enhancing Productivity through Quality Jobs, Asian Development Bank, Manila, Philippines’, *Asian Development Bank*, 2018.
<http://dx.doi.org/10.22617/tcs189213-2>.

²⁰³ ‘EdTech IN INDONESIA- READY FOR TAKE-OFF?’, *The World Bank Group*, 2020.
<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf>

5.2 Many students struggle to adjust to this new way of learning, and their parents lack the capacity to adequately support them.

The transition to digital learning has been overwhelming for many, especially young, vulnerable students, or those from marginalised communities who have limited digital skills.



Illustration : Freepik

In a KPAI survey titled, ‘*Survei Pelaksanaan Pembelajaran Jarak Jauh (PJJ) dan Sistem Penilaian Jarak Jauh*’ (Surveillance on the Implementation of Distance Learning and the Remote Assessment System) with 246 student respondents, 77.8 per cent reported difficulties doing their school work because teachers were giving too much work²⁰⁴. Moreover, in MoEC Rapid Survey conducted in April 2020 with 422 teachers, 60 per cent reported that they provided ‘uniform’ school work, not accounting for the diverse capabilities and

²⁰⁴ KPAI Report, *Survei Pelaksanaan Pembelajaran Jarak Jauh (PJJ) dan Sistem Penilaian Jarak Jauh Berbasis Pengaduan* KPAI, 2020.

technological facilities of students²⁰⁵. In Nielsen’s OMNIBUS Survey conducted in August of 2020²⁰⁶, 76 per cent of 2000 respondents (people between the ages of 15 to 65 years old) said they felt that distance learning is not successful and struggled with it.

“I am anxious about remote learning. I am afraid I can’t understand the lesson well and it’s harder to keep up with the lesson and assignments.”

- Student, 13, Jember City, East Java

However, the adjustment has been harder for some. Younger students and those from disadvantaged rural areas often require hand-holding and extra support from family members or friends to attend their lessons and complete assignments, owing to their limited familiarity with digital technology. This presents a compounded challenge if parents themselves struggle with digital technology and have competing demands on their time, balancing their job, household responsibilities, or other commitments. This leaves such students further behind when they return to school²⁰⁷.

²⁰⁵ Ministry of Education and Culture, *Rapid Survey Results: Key Findings, Indonesia*, 3-8 April 2020.

²⁰⁶ UNICEF: Nielsen OMNIBUS, *Public View on School Re - Opening & Distance Learning*, 2020.

²⁰⁷ Barasa, Arjuni Rahmi and Shintia Revina, ‘Home schooling exacerbates inequalities. More options are needed for reopening schools’, University of Melbourne: Indonesia at Melbourne, 2020. <<https://indonesiaatmelbourne.unimelb.edu.au/more-options-needed-for-reopening-schools-to-stop-disadvantaged-students-falling-further-behind/>>

“Many platforms focus on serving the learning process for students who can read, write, and respond to the learning process independently. Meanwhile, for the younger age group, the existing platform has not been able to assist digital literacy teaching nor has it been able to assist in providing appropriate guidance for this age group.”

- Expert, Digital Learning Officer, INOVASI

According to an INOVASI survey²⁰⁸, with 300 parents of elementary schools children across 18 districts and cities in the provinces of East Nusa Tenggara, West Nusa Tenggara, North Kalimantan, and East Java, 95 per cent of parents said their children's schools have implemented distance learning programs but only 28 per cent of the respondents commented that their kids are learning using online media platforms, while the rest still use books and worksheets, and complete their school work offline. Reasons for this were the lack of digital infrastructure access (internet and devices) and limited digital skills to navigate distance learning across the various online platforms..

“My students who live in the village have slow responses towards online learning.”

- Teacher, 25, Mamuju District, West Sulawesi



Illustration : Freepik

²⁰⁸ Mulia, Khamila, 'Long distance learning in Indonesia: How much can EdTech startups help?', KrAsia, 25 November 2020. <<https://kr-asia.com/long-distance-learning-in-indonesia-how-much-can-EdTech-startups-help>>

There is a slight gender imbalance in digital skills of men and women, especially in rural areas.

As per the 2020 World Wide Web's 'Women's Rights Online Report', a lack of digital skills is one of the biggest barriers to internet use, with an average of 78 per cent of non internet users citing skills as a barrier²⁰⁹. This barrier is felt even more so among women, as Indonesia has historically been marked with women having less access to asset and productive resources.

In 2014, in Indonesia out of the 82 million internet users²¹⁰, 56 percent were men and 44 percent were women²¹¹. This trend of unequal internet access is also seen globally. Research from the McKinsey Global Institute²¹² in (MGI) on financial and digital inclusion, reported that globally some 4.4 billion people, 52 percent of them women were offline as of 2013.

According to the Report, 'Women's Rights Online: Indonesia', in 2016 only 20 per cent of women had access to the internet, indicating that a majority of women were unfamiliar with digital technology and possessed limited digital skills²¹³. Reasons for

²⁰⁹ World Wide Web Foundation, 'Women's Rights Online: Closing the digital gender gap for a more equal world', pp. 1-31, 2020.

²¹⁰ Kominfo, Kementerian Komunikasi Informasi dan Teknologi Republik Indonesia Kemkominfo: Pengguna Internet di Indonesia Capai 82 Juta [Indonesian ministry of communication and information: internet users in Indonesia reached 82 million], 2014. Retrieved from <http://kominfo.go.id/index.php/content/detail/3980/Kemkominfo%3A+Pengguna+Internet+di+Indonesia+Capai+82+Juta/0/berita_satker>

²¹¹ 'Southeast Asia digital future in focus 2013', Comscore: White Paper, 2013. Retrieved from http://www.comscore.com/Insights/Presentations_and_Whitepapers/2013/2013_Southeast_Asia_Digital_Future_in_Focus

²¹² McKinsey Global Institute report, 'The power of parity: How advancing women's equality can add \$12 trillion to global growth', 2015. <<http://www.mckinsey.com/global-themes/employment-and-growth/how-advancing-womens-equality-can-add-12-trillion-to-global-growth>>

²¹³ World Wide Web Foundation, 'Women's Rights Online Report Card Indonesia', 2016. http://webfoundation.org/docs/2016/09/WF_GR_Indonesia.pdf

this perpetuating gender divide has been the unequal use of computers or digital media limiting their opportunities to join in ICT communities compared to men²¹⁴. This may be attributed to societal biases which believe in the unequal power between female and male members, hindering access to technology for girls and women from an early age²¹⁵. This is further reinforced by societal perceptions that claim women are technophobic, lack interest, and lack technological capabilities.

In Indonesia, no ICT policy nor the national broadband plan, specifically mention gender or the promotion of women's access to the internet and ICT. The roads to utilize the potential of ICT to the highest potential are still very long for girls and women of low-income residents in the city.

According to UNICEF's 'Skills for the Future Report' of 2017, there is also a slight gender division on digital skills, with more female than male adolescents identifying that their digital skills were lacking²¹⁶. Further, the World Bank found that in ICT companies, programers are mainly male with the ratio around one female to nine males²¹⁷ signifying the gender disparity in digital specialization roles. This is also reflected in the BPS 2017²¹⁸, which reveals that only 30 per cent of the workforce in the STEM sector is female. UNICEF, 'Learning from Home Survey' found that in Indonesia 68 per cent of school age girls are studying only two hours or less a day when they are learning from home, and 30% of them didn't receive any support from the school such as learning.

The gender imbalance trend was not observed in any of our validation interviews. No student, teacher, or parent mentioned an explicit gender imbalance between young girls and boys digital skills.

UNICEF's GirlForce Skills, Education and Training for Girls Report²¹⁹ in 2018 revealed a gender imbalance in the percentage of youths aged 15 to 24 years old 'Not in Education, Employment, or Training' (NEET), with 81 per cent females versus 45 per cent males respectively. With this exclusion of young girls from formal institutions, it is likely that their digital skills are minimal and the COVID-19 situation would have exacerbated their circumstances, putting them further behind in the digital economy. This runs the risk of young girls continuing to be economically inactive and unlikely to enter the workforce.

Global study indicators and available data (as well as our limited validation interviews) reflect only slight gender differences when it comes to the digital divide. These findings seem to be at odds with reality, as most of these statistics do not account for access, affordability and persisting gendered social norms. There is a need to address this information gap that exists, to better understand the lived realities of young girls, especially from 3T and off-grid communities.

²¹⁴ McLean, 'Alliance For Women in Media Foundation Special report on digital literacy for women and girls', ITU, 2011. <<https://www.itu.int/en/ITU-D/Digital-Inclusion/Women-and-Girls/Documents/ReportsModules/Special%20report%20on%20digital%20literacy%20for%20Women%20Girls.pdf>>

²¹⁵ Lestaria, A. P., and Sunarto, S., 'Digital Gender Gap Pattern in Indonesia' E3S Web of Conferences, Vol 73, 2018, pp 1-3.

²¹⁶ UNICEF, *Skills for the Future*, 2017

²¹⁷ 'Preparing ICT Skills for Digital Economy: Indonesia within the ASEAN context' the World Bank, March, 2018. <https://blogs.worldbank.org/sites/default/files/preparing_ict_skills_for_digital_economy-revised_7mar2018.pdf>

²¹⁸ Wibowo, A.M. and Prihatin, T., 'The Diffusion Innovation of Madrasa Ibtidaiya Inclusion from Regular School to Inclusive'. *Advances in Social Science, Education and Humanities Research*, volume 443. Atlantis Press, 2019.

²¹⁹ UNICEF, 'GirlForce Skills, Education and Training for Girls Now', 1-22, 2018. <https://www.unicef.org/sites/default/files/2018-10/Unicef_DayoftheGirl_Brochure_R7.pdf>

Parents are important stakeholders for the success of digital learning, as they can support their children’s learning outside classrooms – but they need better guidance on how to manage home-based learning.

Without teachers being able to physically oversee their students to monitor their study from home scenarios, parents must share some of these responsibilities, even more so the case in areas outside of Java that have poor internet connectivity where digital learning has often been erratic. In these areas, sometimes study from home involves parents having to pick up and drop assignments from school, communicating with teachers over SMS or phone calls, organising sessions when teachers visit their homes, assisting their children with technology devices and supporting students with their assignments.



Image : UNICEF Indonesia/2020/Wilander

“Need to have better communication between teachers and parents because they are shifting where usually the teachers can physically be present to teach and monitor the students whilst now parents need to participate in that role at home.”

- Expert, MoEC, Government of Indonesia

According to SMERU’s, ‘Learning from Home: A Portrait of Teaching and Learning Inequalities in Times of the COVID-19 Pandemic’ Report²²⁰, students with above-average performance in class are likely to have a supportive home environment for distance learning. They most often live in urban areas, with better access to facilities during remote learning. Their parents tend to be well-educated and actively participate in guiding their learning from home, as well as, communicating with their teachers regularly. While, on the other hand, children with poorly educated parents, and who live in rural areas, tend to spend most of their time playing rather than studying. Their parents are usually unaware of their children’s education and they are less likely to participate in children’s learning because they do not know how to fill that role. These findings confirm that children from lower socio-economic backgrounds suffer a proportionally greater loss due to COVID-19 school closures.

“I have never interacted with school or teachers or any parties for digital learning.”

- Parent, 59, Alor Kecil District, East Nusa Tenggara

Monitoring and supervision by parents is also more important for younger children who may not have their own digital devices or be unable to independently use digital devices. While parents are required to assume the responsibility of monitoring and supervising their children, they do not have the same teaching capacities or time as teachers do to fulfill this responsibility. Different levels of supervision by different parents also poses a challenge to giving all children equal opportunities to learn and perform well. This new way of learning has resulted in parents having to balance a number of responsibilities like household chores, taking care of the family, their own jobs/professions. This is especially challenging for parents who have multiple children studying from home at the same time.

²²⁰Alifia, U., et al., ‘Learning from home: A portrait of teaching and learning inequalities in the times of the COVID-19 pandemic’, Smeru Research Institute, July 2020, Rep. No. 1/2020, pp 1-8.



Image : UNICEF/2020/Dinda Veska

“This new learning arrangement doesn’t only involve the student, but also the whole family to assist with some aspects. Sometimes when my daughter needs help, the family can’t help with her assignment because they have work online too. Sometimes there’s a sudden task for my daughter to take part in a kind of seminar online. It turns out that it requires the student to install an app and create an account on it. That’s something difficult for my daughter so I help her out with that. Although it’s the students’ need in searching about how to operate the new learning apps, it leads the parents to learn about that too so they will be able to assist the student.”

- Parent, 47, Jember City, East Java

The validation interviews conducted in the research revealed that none of the parents spoken to had received any guidance or training in how to navigate and support their children in this new learning environment. Two out of three parents mentioned that they had to take a more active role in their children’s learning, while one parent remained distanced from his children’s schooling experience, as he had to manage his own work and other family commitments.

HOW MIGHT WE..

- **Overcome an inhibitor:** *How might we create a digital learning system that takes into account the digital limitations that students who are younger and from vulnerable communities have?*
- **Fill a gap:** *How might we integrate parents into the digital learning ecosystem to effectively support their children with their schooling?*

5.3 Inadequate support for teachers to transition to digital learning has posed challenges for them to adapt. This is accentuated by their poor formative training and limited pre-existing digital skills.

Limited guidelines, support, and training for teachers for digital learning has presented issues while transitioning to digital teaching. This has included them having to formulate their own teaching schedules and not knowing how to effectively interact with students.

The unexpected shift to digital learning has been tumultuous and challenging for teachers due to the absence of formalised support and training for them to conduct teaching online. They lack guidelines to reach specific targets and achieve learning outcomes. The fact that many of them do not have the digital skills required for online education makes the process even more challenging. From the validation interviews, teachers reported that they received limited formative training even before the sudden shift into digital learning caused by the COVID-19 pandemic, and are not confident about their foundational digital skills to meet up to challenges in their daily work.

“I do not think I have the skills or experience to teach my students online.”

- Teacher, 45, Palu City, Central Sulawesi

“Teachers have limited or no knowledge and skills on how to deliver material and interact/engage or even to communicate with their students online.”

- Expert, Digital Learning Officer, INOVASI

Teachers have reported that their schools have provided limited support resulting in the burden of customizing learning plans to online learning solely falling on them, without any external support. In an INOVASI survey with 221 teachers conducted in April 2020, 64 per cent of teachers reported heavier workloads with 46 per cent unsure whether studying from home is being delivered well by them²²¹. Further an expert²²² who works closely with teacher training programs shared that many teachers reported feeling ‘overworked’ as the line between work and home had blurred.

“There has been no specific direction for teachers to conduct online learning. It has caused wide variation in learning outcomes. This condition was intensified by the gap of teachers’ proficiency to use technology. Currently it is estimated that only about 2.5 per cent have a good ability to use technology.”

- Expert, 21st Century Learning & Education, VOX Populi Institute Indonesia

²²¹ INOVASI, Teacher Survey, Indonesia, 13-14 April, 2020.

²²² Expert interview with a representative from Zenius Education on 9 December, 2020.

“Biggest challenge is here - asking teachers to do a simple google keyword search, it's surprising that many of them don't know how to do even that - that's not a tech challenge that's a literacy challenge.”

- Expert, Design and Research Advisor, Wartek

According to an MoEC survey conducted with mostly Public School (PNS) and High School (SMA) teachers, 83 per cent of teachers, including those with relatively 'well-off' conditions, still used social media messaging platforms to conduct distance learning for their students²²³. This reduced their ability to monitor students and is likely to have reduced learning outcomes²²⁴. Though teachers have adopted their own ways of managing their classes, all were characterised by low levels of student-teacher interaction - shifting much of the burden of teaching from teachers to students and their parents.

“In the beginning of online learning, I myself, could see how the teacher was struggling with the learning app and had to be assisted by the school operator”.

- Parent, 47, Jember City, East Java

Due to the absence of guidelines for teachers to follow, they have taken to creating their own teaching schedules characterised by irregular class timings and frequency, sudden assignment of tasks or even switching between multiple online platforms - all of which have had a negative effect on students who feel overwhelmed by the constantly changing schedule of their classes and excessive workload. This was mostly the case for schools outside Java where 50 per cent of teachers in schools outside Java and in rural areas reported not teaching everyday compared to

30 per cent of teachers in Java²²⁵ who did not teach everyday.

“The teacher sends the assignment through WhatsApp, sometimes there's a video call session through Google Classroom, and sometimes students work on paper or notebook and collect it at school.”

- Parent, 47, Jember City, East Java

“The teacher needs to inform us of the assignment, and not announce them suddenly. It's better to make it on schedule. In addition, give the student time to work on it at least 3 days for each subject. Having many assignments that need to be submitted in the same days is too much. Especially if they are difficult tasks and the students have no help. Some students might be ok with that, some might cry, like my daughter.”

- Parent, 47, Jember City, East Java

Some teachers even had to balance between teaching online, visiting houses in their communities to meet their students, and coordinate their own children's learning. Teachers were also found working late into the night to prepare learning materials, give feedback, and struggle to monitor students' learning progress²²⁶.

“Some of us teachers must divide attention into two works - preparing the teaching materials or assignment paper and also preparing the technical arrangement of the community visits, this gets challenging to manage.”

- Teacher, 45, Palu City, Central Sulawesi

²²³ Ministry of Education and Culture, KPAI Teacher Survey, Indonesia, 3-8 April 2020.

²²⁴ Ministry of Education and Culture, SD survey, Indonesia, 3-8 April 2020.

²²⁵ Ulfah, A, 'COVID-19 widening Indonesia's Education Gap', RISE program IN INDONESIA, 2020, <<http://rise.smeru.or.id/en/blog/COVID-19-widening-indonesia-per-centE2-per-cent80-per-cent99s-education-gap>>

²²⁶ Putri, Ratna, , et al., 'Impact of the COVID-19 Pandemic on Online Home Learning: An Explorative Study of Primary Schools in Indonesia', 2020, pp 4809-4818.

“I am spending more time during digital learning. Previously I would go home after school at around 3 or 4 PM daily. Now, even at night, I still need to make sure my students submit their assignments.”

- Teacher, 44, Duren Sawit District, East Jakarta

Despite the multiple teacher training initiatives undertaken by the government, as well as some private organisations, a lot more needs to be done to equip teachers during this new era of digital teaching.

Teachers who have an affinity towards embracing new technology and/or are creative and proactive are able to create opportunities for innovative teaching methods. This has been noticed among young teachers, while a majority of the older teachers seem to hold onto traditional methods of teaching like lectures and referencing textbooks.

It is important to acknowledge that teachers' response and reaction to distance teaching has not been homogenous. There have been notable differences among teachers, across ages and locations. These depended not only on their accessibility to digital technology but also their personal abilities to use these technologies. Attitudes and motivation towards adopting these new technologies was also a crucial factor. It is proven that the success of integrating technology in the classroom is reflected by the teachers' positive understanding about using technology²²⁷.

²²⁷ Sadaf, A. and B. Johnson, 'Teachers' Beliefs About Integrating Digital Literacy Into Classroom Practice: Teachers' Beliefs about

Therefore, a teacher's mindset and motivation has a significant impact on students' experience with digital learning. It is worth noting that teachers in urban areas, like Java, are better at using digital applications to deliver lessons or assignments than those from rural areas. This was due to a number of factors like their familiarity with digital technologies, their internet and phone connectivity, and their skills and knowledge to effectively use these technologies to deliver their teaching. We heard this both from experts as well as teachers and parents from the validation interviews.



Image : UNICEF Indonesia/2020/Wilander

“There are active teachers and there are non-active teachers. Active teachers send us materials daily. In the beginning of the semester, all teachers were active, after that some teachers continued to send material, some send once a week, some once a month and some even stopped sending anything at all.”

- Student, 16, Garut District, West Java

An interesting observation from research was that there are significant differences between how young and old teachers respond to online learning. Young teachers tend to be more creative and adapt to the online learning system faster.²²⁸ They are familiar with ICT material and can often find their own solution to carry out online learning. They are also more willing to explore and innovate

Integrating Digital Literacy Into Classroom Practice: An Investigation Based on the Theory of Planned Behavior, August, 2017.

²²⁸ Expert interview with a representative from PSPK, Government of Indonesia, 3 December, 2020.

using digital learning platforms. On the other hand, older teachers rely on the traditional education methods of using textbooks and are often found to be not experimenting with learning material from diverse sources. Traditionally, the education system in Indonesia has focused on teachers referring to textbooks and following a fixed syllabus set by the MoEC, with little room for explorative methods of teaching and learning. As a result, the ability to create and adopt a curriculum that includes content across multiple platforms has been challenging for older, more traditional teachers.

“It’s been difficult for older teachers above the age of 40 to keep up. They even struggle with simple tasks like checking the phone capacity or memory on their phones.”

- Teacher, 28, Merauke City, Papua

Research from the 2017 study, ‘Teacher reform in Indonesia: can offshore programs create lasting pedagogical shift?’²²⁹ involving 80 teachers and principals from Eastern Indonesia highlighted that most educators were not familiar with collaborative teaching styles and tended to focus solely on textbooks. This distinction has also been understood as teachers either being ‘adaptive’ or ‘non-adaptive’²³⁰. The former being younger teachers who are fairly comfortable with online teaching methods and are willing to try new alternatives to the traditional methods of learning and the latter are mostly above the age of 40 years old and have limited knowledge or experience with digital learning and prefer to focus on offline learning using traditional teaching practices.

²²⁹ Allen, William, Mervyn Hyde, Robert Whannel, et. al., ‘Teacher reform in Indonesia: can offshore programs create lasting pedagogical shift?’, *Asia-Pacific Journal of Teacher Education*, 2018, pp 22-37.

²³⁰ Expert interview with an official from the Ministry of Education and Culture, Government of Indonesia, 3 December, 2020.

“In July, the headmaster actually proposed that we should think about using Zoom or Google-Meets for online class. However, the idea was just suddenly dropped because all teachers declined doing so.”

- Teacher, 45, Palu city, Central Sulawesi



Image : UNICEF Indonesia/2020/Wilander

“There are a high number of senior (older) teachers in the Indonesian education system who have limited online teaching skills. Even if non-adaptive teachers were trained with online teaching methods, they would choose to stick to offline teaching methods like referencing school textbooks and sharing images with students. Even when conducting video conferencing on tools like Zoom, the teacher still uses the same lecture method, without much interaction between students and teachers.”

- Expert, Ministry of Education and Culture, Government of Indonesia

As per data from qualitative research conducted by SMERU with 31 teachers, some teachers opined that technology mastery would allow them to make their online teaching and learning more effective. In the same survey, the “technologically challenged” teachers, generally the senior ones, found it hard to facilitate their students in learning from home activities²³¹. Despite there

²³¹ Alifia, U., et al., ‘Learning from home: A portrait of teaching and learning inequalities in the times of the COVID-19 pandemic’, *Smeru Research Institute*, July 2020, Rep. No. 1/2020, pp 1-8.

being multiple content platforms and materials, both private and public to choose from, teachers prefer to rely on using textbooks. Therefore, this new method of teaching which requires choosing learning material from multiple sources has been difficult for them.

“So far, teachers have to find their own educational material or content that matches what they want to teach. This requires time and cognitive skills from the teacher. Teachers rely on the tradition that has existed for a long time where they are used to using textbooks and not used to choose learning material from multiple sources, so choosing their own learning curriculum has been difficult .”

- Expert, PSPK, Government of Indonesia

The abilities, motivations, and mindset of the teachers have to be supported with the technical support and skills for them to effectively teach their students online. However, the journey begins with them being open to the idea of teaching their students outside traditional methods and exploring new, modern avenues like digital technologies. There is a need for older teachers to ‘unlearn’ conventional, traditional styles of teaching to bring about meaningful change in this time of crisis²³².

“The challenge comes from teachers' lack of confidence to do something that they are not familiar with, like using technology applications. This is a hard mindset to change. They acknowledge that the apps are good, but they feel nervous that they are too old to learn new technology.”

- Expert, Design and Research Advisor, Wartek

“I am not familiar with all the new technology for teaching and struggle with using it. The headmaster introduced Google classroom to us. I tried to open it once using my friend’s laptop, but I was confused and did not know how to operate it.”

- Teacher, 45, Palu City, Central Sulawesi

From the validations interviews, all five students shared that all their lessons or school work took place via WhatsApp or Zoom. The method of digital learning is most often dictated by the teachers. All students mentioned sending their assignments over WhatsApp, and two even mentioned physically dropping them off at school a few times a week. None of the students’ teachers had recommended that they use curated resources material available online.

HOW MIGHT WE...

- **Overcome an inhibitor:** *How might we support older teachers to overcome traditional mindsets towards education and adopt the creative and proactive attitudes required to flourish in the currently changing education sector?*
- **Leverage an enabler:** *How might we enable young teachers that are adopting innovative new teaching techniques to be ‘torch bearers’ or ‘champions’ for inspiration for other teachers to learn from?*
- **Fill in a gap:** *How might we ensure that the teachers who require training and capacity building for digital teaching, are able to access these resources?*

²³²Luciana, ‘For online teaching to succeed, train educators to embrace uncertainty in learning’, *The Conversation*, 8 June 2020. <<https://theconversation.com/for-online-teaching-to-succeed-train-educators-to-embrace-uncertainty-in-learning-135570>>

5.4 Government interventions focussed on teachers, have thus far been top-down in their approach and largely failed to include teachers in their design and formulation.

Majority of private sector initiatives prioritise their focus on building the digital capacities and skills of students, not teachers.

The Indonesian market is also in sync with the global trends of the private sectors largely driving the use of ICT for education²³³. Thus far, private sector initiatives seem to focus more on student-centric content. Almost 90 per cent of EdTech firms target their products and services to students²³⁴, whilst leaving a gap in materials and content that cater to teachers. A government representative who works closely with the MoEC shared that a possible reason for this is because there is more money to be made in focusing content and material on students. The number of private sector players that focus on student-centric products far outweigh those targeted to teachers as private players probably see this offering as more viable.

Private EdTech companies such as Ruangguru, Zenius, and Quipper provide self e-learning content, interactive learning platforms and study tools that help K-12 students to expedite the

learning process. These are supplemented with interactive online services that help students with their assignments and test preparation.

Companies such as Arsa Kids, Digikids and Educa Studio develop game-based and blended learning experiences, including interactive storybooks and educational mobile apps²³⁵.

“There is urgency to develop a curriculum that can help teachers adapt to online learning. Efforts should be made immediately to increase the capacity of teachers in adapting to technology.”
- Expert, Digital Learning Officer, INOVASI

Through the validation interviews, it was found that none of the teachers had used any private EdTech platform for their digital teaching routines or for their own digital literacy upskilling. If at all they received guidance or support for their digital teaching, it was done informally via their school headmaster or administration. According to the MoEC’s Rapid Survey 68 per cent of the 422 teacher respondents said they were learning how to utilize the online distance learning tools or platforms either on their own or through community groups (with family or fellow teachers)²³⁶.

²³³World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf> >

²³⁴World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf> >

²³⁵World Bank Group, *EdTech IN INDONESIA- READY FOR TAKE-OFF?*, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf> >

²³⁶Ministry of Education and Culture, *Rapid Survey Results: Key Findings, Indonesia*, 3-8 April 2020.

The government has made efforts to equip teachers for the move towards digital education and ensure that EdTech interventions are strategically designed to support, rather than replace teachers. However, there is a need to further invest in the capacities of teachers to effectively teach using ICT.

Representatives working closely with the MoEC shared that the government is focussing on increasing teacher capacity and developing more comprehensive online learning concepts and programs at national level to ensure their digital skills and capabilities are built. However, currently, most teachers are not familiar with online teaching methods and many of them use an internet-based platform to simply distribute materials and assignments. They have not yet been able to effectively integrate their learning to digital technology.



Image : UNICEF Indonesia/2020/Wilander

In a UNESCO presentation²³⁷ about teacher training programs in Indonesia made by the Secretary Director Nizam Ari Santoso in 2013, it

²³⁷ UNESCO, 'Indonesia: OER Initiatives & ICT in Teachers' Training, Paris: UNESCO Follow Up Meeting, 2013, pp. 1-73. http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/news/indonesia_oer_initiatives.pdf

was mentioned that despite the hundreds of teachers trained by Pustekkom or other private partnerships, these trainings have been focused mostly on how to use ICT, and not how to teach using ICT. Learning how to use digital tools is very different from learning how to teach using digital tools - this is where the teacher's struggles have been.

“The existence of the tool is one thing but the use of the tool is another.”

- Expert, PSPK, Government of Indonesia

The lack of teacher skills in integrating technology in the learning process is challenging and requires serious attention from the government. It has been found that teacher training on using ICT is still limited or is confined to urban, private schools²³⁸. Government initiatives like Rumah Belajar, PUSDATIN's Pembatik (ICT Based Learning), or partnerships with private collaborators like Microsoft or Google to encourage teacher training via webinars have all focused their efforts on upskilling teachers with relevant and appropriate digital skills to adequately host digital teaching. Besides this, Wartek is also currently working on a number of innovations targeting teachers, including a teacher application and an online training system for teachers, providing personal competency and need-based training.

However, despite the government's multiple efforts they are not reaching enough teachers, especially those in rural parts of the country, or in off-grid communities. This was noticed further in the validation interviews where five out of five teachers did not mention any of the government assistance or independent school-run programs when asked about the support they received to upskill their digital capacities. None of the teachers had included any of the government's material made available online in their teaching and continued to rely on school textbooks.

²³⁸ World Wide Web Foundation, Women's Rights Online Report Card Indonesia, 2016. http://webfoundation.org/docs/2016/09/WF_GR_Indonesia.pdf

“Wartek does not intend to replace the role of teachers, but provide technology innovations to enhance the role of teachers, educators, principals, for them to be able to deliver more student-centered learning.”

- Expert, Design and Research Advisor, Wartek

Though the multiple government initiatives are a step in the right direction, a lot more needs to be done in terms of getting the right resources to teachers for delivering digital learning.



Illustration : Freepik

Teachers should be more involved in identifying and co-creating teaching material and training programs to ensure that they are addressed to suit their needs and capacities.

The MoEC Rapid Survey revealed that the MoEC's official 'Guidance for Distance Learning' itself was very 'conceptual' and somewhat 'lacked clarity or concrete steps' for teachers and educators to follow²³⁹.

²³⁹Ministry of Education and Culture, *Rapid Survey Results: Key Findings, Indonesia*, 3-8 April 2020.

“Despite the government’s efforts to facilitate teachers’ capacity building through programs like Rumah Belajar and Guru Berbagi, the teachers have not yet integrated these into their learning process and rarely access it. Consequently, we have not seen any significant improvement on their quality of teaching.”

- Expert, Ministry of Education and Culture, Government of Indonesia

The creation of the teacher-training material, content, and platforms seems to take place in a top-down manner with the government not including teachers, especially those from rural and remote areas in the process. According to an expert²⁴⁰ affiliated with an education think tank that works closely with the MoEC, there is a general lack of trust towards teachers from the education office, resulting in a system where the officials direct and oversee every step of the digital teaching process. Consequently, this has adversely impacted teachers because they are used to following directives from officials instead of innovating.

“Limited knowledge on the platforms that are compatible with teaching and learning processes, is worsened by not having or knowing the source that provides this information.”

- Expert, Digital Learning Officer, INOVASI

There is an opportunity for the government to work closely with local teacher communities who are working in unique ways to support teachers in this time of digital teaching like the 'Learning Teacher Community'. This community has networks in various regions and has created the 'School Against Corona' movement to help teachers with their distance learning challenges²⁴¹. Many community networks provide training for teachers such as how to use tablets for learning,

²⁴⁰ Expert interview with an official from PSPK, on 6 December, 2020.

²⁴¹ Expert interview with a representative from Zenius Education on 9 December, 2020.

making quizzes among others. Such local communities have taken an active role and been more responsive and flexible to support teachers in the time of the pandemic.

“The community has a very real role in this time of this pandemic. The communities are responsive because the government is limited by bureaucracy. For example, if the government wants to conduct online training for teachers it will require a long process. They have to prepare resources, budget, then think about who will prepare etc. Whereas in the local networks and communities, if they want to hold training, they can immediately hold it.”

- Expert, PSPK, Government of Indonesia

HOW MIGHT WE...

- **Leverage an enabler:** *How might we leverage informal teacher communities for more effective uptake of government capacity building programs?*
- **Fill in a gap:** *How might we address the gaps in digital skills of teachers in the Indonesian education system?*



Illustration : Freepik

6. Recommendations

This research aims to present a perspective on digital learning in Indonesia in light of the school closures caused by the COVID -19 pandemic. In order to effectively evaluate the digital learning ecosystem, the research focuses on analysing multiple variables that influence it – learning and teaching environments, attitude of students and teachers towards digital learning, the interactivity between students and teachers, the devices they use, their supporting infrastructure, their existing skills to navigate the digital learning among others²⁴². All these factors come together as part of a larger ecosystem – to determine the efficacy and the effectiveness of the digital learning system. For instance, access to technology does not guarantee its use, which in turn does not guarantee learning, unless the technology and pedagogical approaches are effective in increasing student learning outcomes²⁴³. There are a myriad of factors that impact learning, even more so during this time dominated by online learning.

Students have struggled to effectively adapt to the digital switch for multiple reasons, not only because they have not been able to access technology. Many students learning remotely struggled to understand the materials being taught because they lacked individual attention and could not ask questions. A few used WhatsApp to ask questions and found delays in response time challenging. Students struggled to complete assignments on their own, as they would have done normally. Many students lacked basic infrastructure to even access digital

learning solutions²⁴⁴.

“It is problematic to say students participating in digital learning results in their performance getting worse. There is not enough evidence to make this assertion because many things affect students' performance score. We need to evaluate the whole ecosystem, not only the digital platform.”

- Expert, Design and Research advisor, Wartek

When fully realised, digital learning can provide access to education for many more students as well as enhance the quality of learning every student receives. However, the move to digital learning has been fairly recent and it is too soon to map them against long-term learning outcomes. Due to the sudden and unexpected move to digital learning, countries all over the world struggled to make the transition from offline to online learning – this was the case in Indonesia as well. For many, it was the first time they had to use their mobile devices for teaching or learning, use the internet for their lessons, and experience a whole new way of schooling. But as time passed, improvements were observed among teachers and students. However, there has not been a large-scale study that has effectively mapped the pre-COVID and post-COVID learning outcomes in Indonesia, and there is limited evidence to declare the transition as a success or a failure during this short span of time.

²⁴² ASEAN Takeaways, 2020.

²⁴³ World Bank Group, EdTech IN INDONESIA- READY FOR TAKE-OFF?, World Bank Group and Australian Government, May 2020, <<http://documents1.worldbank.org/curated/en/535881589465343528/pdf/EdTech-in-Indonesia-Ready-for-Take-off.pdf>>.

²⁴⁴ Empatika, Remote Insights Gathering study into People's Experiences of the COVID-19 Pandemic across Indonesia, Indonesia, 2020.

“Not much information is available on changes in test results or learning outcomes post pandemic shift that measures digital learning.”

- Expert, Design and Research advisor, Wartek

Although private and public EdTech interventions have access to data on platform and content usage, this information cannot demonstrate whether the products are effectively and meaningfully improving student learning. To better map the long-term successes and possible opportunities from digital learning innovations across the country, there is a need²⁴⁵ to roll out a large scale evaluation study that would effectively map the gaps, challenges, and successes of this system, as well as better guide the various stakeholders of their roles and interventions.

In the attempt to analyse the ecosystem of digital learning, this research makes recommendations for some measures to mitigate the impact of COVID-19 on distant learning as well as support digital learning in Indonesia.

DIGITAL LEARNING, CONTENT, & PLATFORMS

- 1. Facilitate inclusive and sustainable digital skill development and education, with provisions for differentiated learning:**
Teachers need to apply differentiated teaching approaches based on their students' needs, and not employ a 'one-size-fits-all' approach. This is particularly important for special needs students and those poor and off-grid communities who are underserved by existing EdTech solutions. Students and teachers have different digital capacities and learning/teaching needs and abilities and in order to fill this gap, the government can:

²⁴⁵ Pouezevara, Sarah, et al., *Scaling Access & Impact Realizing the Power of EdTech*, Indonesia Country Report, RTI International and Omidyar Network, 2019, <https://omidyar.com/wp-content/uploads/2020/09/Scaling-Access-and-Impact-Indonesia-Report_vFinal_r.pdf>

- Make provisions for personalized and differentiated learning by creating assessment tools to continuously assess the learning needs and avail a repository of various materials that suit the learning progress of each student and ensure they are integrated in EdTech Platforms . This is to cater to the diverse digital and learning/teaching needs and abilities of different teachers and students, especially special needs and talented students.
- Form partnerships with CSOs that work in the space of education, special needs, and serving poor and off-grid communities for enhancing outreach and reaching the last mile.
- Create guidance on children with disabilities (and wider inclusion) and provide financial incentives to benefit underserved communities. This can act to encourage the private sector to cater to the needs of teachers, special needs students, poor and off-grid communities.
- Improve support for parenting in a digital age through evidence-based parenting programs catered to differing levels of digital literacy and access among female and male caregivers.
- Ensure learning platforms are optimised for mobile phone use. Mobile phones are the most widely used devices for internet access, and the device most young people have access to. Digital learning solutions should be easily usable on these devices with appropriate user interface and user experience
- Mandate minimum requirements on EdTech platforms catering to the needs of students with disabilities.
- Optimise overall learning outcomes through the use of blended learning tools that maximise the benefits of in-person and technology based approaches to learning. Create guidelines for a gradual shift to adoption of digital learning among students- especially in places with limited digital skills
- Gain a better understanding of what content young people require and what are best ways to get that content to them.

- Co-create digital learning approaches and content with young people to ensure they are aligned to their needs and contexts they are learning in.

2. Educators and EdTech platforms should develop learning content and lesson plans to increase opportunities for active learning and human interaction:

The research indicates that online learning is likely to reduce student's interaction with their teachers and peers, which was found to have a negative effect on their mental health and reduce their opportunities for active learning. To overcome this, digital learning should explore a wide variety of solutions catered to the needs of various students. For this, educators should:

- Encourage social interactions through group based interdisciplinary projects that stimulate creative thinking and problem solving while building social emotional learning. These are also likely to further digital and transferable skills in young people preparing them for the future of work.
- Schedule online challenges and hackathons to develop and practice ICT skills in a way that would also require them to exercise transferable skills and prepare them for the future of work.
- Promote active learning through a daily question hour with various teachers; monthly seminars with local entrepreneurs on problem solving and critical thinking.
- Create more private-public partnerships to create more interactive and attractive learning modules for young people like game-based apps

3. Schools should create digital learning assessment frameworks with accompanying systems to monitor and evaluate teacher and student performance:

Digital learning is faced with the challenge of monitoring and fair assessment of both learning and teaching performances. In the research, it emerged that building an

assessment framework implemented through a balanced appropriation of deploying teacher and technology based approaches may be essential to improve effective learning. In order to address this, public authorities should encourage schools to:

- Develop assessment frameworks to assess teaching and learning performance.
- Deploy digital tools to conduct continuous assessment and effectiveness of online learning material for students and teachers. These can take the form of short quizzes, exercises, based on competency and critical thinking and not subject mastery alone. The continuous assessment could greatly help with monitoring of each individual student's or teacher's progress, based on which personalized/differentiated learning could be facilitated.
- Create mechanisms in EdTech platforms to monitor teacher and student performances using time-based activities and critical thinking techniques (as opposed to rote memorization) for assessment such that students cannot resort to cheating by searching for assignment answers online. Private sectors players must be incentivised to do this.
- Define and comply with minimum infrastructure standards (number of computers per head; connectivity speed; teacher qualifications) for appropriate digital learning in schools and at home.
- Define roles, responsibilities, expectations as guidelines for teachers, students and parents to adopt during distance and digital learning at home and in school.
- Create guidelines for teachers to conduct assessments using a combination of digital assessment tools complemented with periodic conversation based feedback with groups of students from time to time.
- Organize check-ins and periodic assessment with district education agencies and schools through phone or in person to keep children engaged in learning and troubleshoot access issues.

- Create peer to peer reviews among teachers and encourage student committees to give feedback on digital learning processes.

4. Periodically assess and improve the quality of digital learning materials available through public sources:

A pertinent issue that reduces uptake is the absence of standards to monitor the quality and quantity of content on digital learning platforms. To address this, governments can:

- Define minimum standards of learning, content, and interactivity as guidelines or a checklist for content creators and contributors to ensure basic standards.
- Create review panels of education authorities to periodically monitor and improve the quality of content on both public and private platforms on parameters like utility, quality, interactivity, novelty, user friendliness among others.
- Ensure there are mechanisms for public platforms like Rumah Belajar to regularly receive feedback from their target audience to ensure their product is addressing their needs effectively.
- Partner with private EdTech firms and academia to establish standards for performance and cost-effectiveness, and transparently and rigorously evaluate current leading products.
- Extend assessment to private sector players and effectively engage and encourage private firms to better understand the needs of teachers, schools and parents to support their product development.

5. Create safeguarding mechanisms and support ecosystems for the online safety of students²⁴⁶:

Given the rising incidents of cyber crime and concerns around online safety and the subsequent adverse effects on young people, it is essential to build awareness, grievance redressal, and referral mechanisms for the safety and mental health

of students. To address this, governments should:

- Set standards for data privacy and security related to EdTech products and strengthen national preparedness and response to address the issue of Child Online Protection.
- Make online platforms safe for children. Governments and the tech industry should integrate safety into their products according to “safety by design” principles. This should ensure creation of integrated mechanisms for reporting abuse and creating referral mechanisms on social media and digital learning platforms frequented by adolescents and young people. Detection and reporting of Child Sexual Abuse Material (CSAM) on educational platforms should also be mandatory.
- Ensure that EdTech platforms have in-built mechanisms for the redressal of any risk or safety incident reported on their platforms.
- Empower young people with information and tools for online safety (including raising awareness about how to report and respond to harmful content and abuse) by making cyber security a part of the curriculum for students. This should be supported with opportunities that increase digital skills and soft skills (communication, conflict resolution, and self-efficacy) such that young people are more likely to make appropriate choices when using social media and are better equipped to navigate harmful content and conflict that they may encounter online. This information can be provided as simple, relatable bite-sized information on social media, through means that would appeal to young people like memes and posts made by social media influencers.
- Conduct capacity building of teachers and social workers to understand and coach students on the safe use of the internet.
- Train teachers to monitor the safety of students along with law enforcement officers on how to identify and address issues of online safety.
- Encourage guidance for teachers, social workers, parents and adults on evidence-based approaches that equip

²⁴⁶ UNICEF, ‘Keeping children safe online during the COVID-19 pandemic’, April 17 2020, <www.unicef.org/laos/stories/keeping-children-safe-online-during-COVID-19-pandemic>.

children with the skills and behaviours required to keep themselves safe online and promote appropriate and positive decision-making.

- Carry out a large-scale campaign to increase awareness of the child safety helpline so the resources that are already in place reach their intended audience.
- Encourage social media companies to make adolescent profiles private by default such that content shared from outside networks is blocked and such online learning experiences are “safe” from the start. Explore parental consent mechanisms for those joining social media below the age of 17 years old.
- Ensure easy access to mental health professionals through digital learning platforms, while actively encouraging students to seek access to these resources if they feel unsafe and lonely when online.

INTERNET, INFRASTRUCTURE, AND DEVICES

- 6. Increase equitable access to the internet through private sector collaboration for infrastructure improvements to underserved areas:** While public-private partnerships involving online learning platforms have proliferated in recent years, Indonesia has yet to overcome its digital divide. To address issues in inequitable access to digital education and learning for underserved communities like in rural and Eastern parts of the country, the government must:
- Explore opportunities to optimise use of “Palapa Ring Project” with the private sector like telecommunication and hardware providers to equip all schools, especially those in rural areas with Internet connection, ICT facilities and skill development programs for teachers. Creativity and cooperation formats could include guarantees by the ministries on minimum mobile data uptake

or entering into bulk lease agreements for ICT equipment. ICT training for teachers could become part of the agreements with the vendors²⁴⁷.

- Combine private and public funding and establish partnerships to cover connectivity infrastructure and operation costs to offer a more holistic approach to financing of school connectivity – especially in the underserved areas.
- Develop bottom-up cost models that use school locations and user profiles to determine school bandwidth needs to develop targeted and more structured investment and business models. Explore concepts like cost sharing of network deployment to the extent possible for the last mile to help strengthen the business case and ensure inclusion of underserved populations²⁴⁸.
- Leverage public sector funding to subsidize the creation of fast-growing connectivity markets that enable private investors to achieve outsized returns comparable to those of typical private sector infrastructure financing projects²⁴⁹.
- Evaluate the feasibility of public-private partnerships for procurement of infrastructure and provision of discounted quota plans to support digital /distance learning in areas of low connectivity and penetration.
- Increase consumer demand by exploring private venture capital to cover community empowerment related costs that could contribute to the development of local entrepreneurship ecosystems and increase demand for digital infrastructure.

²⁴⁷ CIPS Indonesia, ‘Policy Brief: Addressing Distance Learning Barriers in Indonesia Amid the COVID-19 Pandemic’, 22 November 2020. <www.cips-indonesia.org/post/addressing-distance-learning-barriers-in-indonesia-amid-the-covid-19-pandemic>.

²⁴⁸ International Telecommunication Union, United Nations Educational, Scientific and Cultural Organization and United Nations Children’s Fund, *The Digital Transformation of Education: Connecting Schools, Empowering Learners*, Broadband Commission for Sustainable Development, September 2020.

²⁴⁹ International Telecommunication Union, United Nations Educational, Scientific and Cultural Organization and United Nations Children’s Fund, *The Digital Transformation of Education: Connecting Schools, Empowering Learners, Broadband Commission for Sustainable Development*, September 2020.

- Support private sector/EdTech startups with assistance plans to help build potential users' trust in new learning and teaching tools and, as a result, their willingness to pay.
- In the long run, Indonesia should emphasise a systemic, phased and comprehensive approach on increasing connectivity and training teachers to deliver more effective and equitable access to online learning. This would entail creating disaster resilient infrastructure through investments in online teaching capacities and data. For example, every sub-district should have schools equipped with laptops/smartphones, internet, electricity, water, and sanitation facilities, as well as a library with printed learning materials for self-learning²⁵⁰. The infrastructure development should be informed from lessons in the past and other systemic shocks like COVID-19. The development of infrastructure should be done through real time feedback such that it allows for course correction.

7. Enable localised implementation of school infrastructure programs for effective implementation suited to local needs and for improved outreach²⁵¹: 'One-size-fits-all'

- policies often fail to address problems because the situation varies for every location and teachers, students and parents. The MoEC should consider improved implementation by creating frameworks and mechanisms that provide for context specific implementation of programs. For this, the Government should
- Provide autonomy and empower schools for effective utilisation of funds like BOS for digital learning. For this, the MoEC should develop a framework to implement and

monitor that BOS funds are used for the most pressing areas of assistance. The implementation frameworks of these programs should be accompanied with mechanisms that allow school teachers and principals to take decisions based on their needs. For instance, during the time from learning from home, schools were provided autonomy to provide more credit, teacher training or providing parental guidelines to adapt to the new learning environment. It is imperative that school leaders are able to identify short term and long-term strategies for the holistic development of students like investing in digital learning or infrastructure. Programs like Freedom of Learning Policy (Merdeka Belajar) by the Ministry of Education and Culture that aims to provide independence for each unit of education to innovate as per local needs (and not through standard frameworks) are a great initiative in this direction. In order to roll out such initiatives it will be essential to further upgrade leadership and financial management skills among school principals and teachers with support of digital innovations.

- Work with local governments to provide additional assistance to support digital learning initiatives. Local governments should work in complementarity with MoEC initiatives by establishing local task forces that can review digital infrastructure of schools and provide additional aid to those with the least resources like low cost private schools that provide education to the urban poor. For instance, local governments could also provide subsidies for accessing digital equipment through programs like Smart Indonesia Program (Program Indonesia Pintar) which aim to provide cash transfers to lowest income students to undertake learning²⁵².

²⁵⁰ Gupta, Deepali and Khairina, Noviandri N., 'COVID-19 and the learning inequities in Indonesia: Four ways to bridge the gap. *World Bank*', 21 August 2020, <<https://blogs.worldbank.org/eastasiapacific/COVID-19-and-learning-inequities-indonesia-four-ways-bridge-gap>>

²⁵¹ CIPS Indonesia, 'Policy Brief: Addressing Distance Learning Barriers in Indonesia Amid the COVID-19 Pandemic', 22 November 2020, <www.cips-indonesia.org/post/addressing-distance-learning-barriers-in-indonesia-amid-the-COVID-19-pandemic>.

²⁵² Yarrow, Noah, Eema Masood and Rythia Afkar, *Estimated Impacts of COVID-19 on Learning and Earning in Indonesia: How to Turn the Tide*, The World Bank, Jakarta, 2020. <documents1.worldbank.org/curated/en/184651597383628008/pdf/Main-Report.pdf>.

- 8. Adjust digital and distance learning practices according to the conditions of specific regions:** Programs in regions with limited access and internet coverage should be supported with offline and alternate learning methods to promote digital learning. This should focus on the following:
- Encourage TV / radio programs to include education programs for foundational and literacy skills for primary graders drawing from experiences of Argentina and Fiji²⁵³.
 - Provide memory cards and pre-downloaded learning materials (offline) for teachers and students to use in their devices even with weak or no internet connection.
 - Cooperate with the postal services to help teachers distribute printed worksheets, coursework, modules for students, drawing from positive experiences in France²⁵⁴.
 - Provide guidance on how to conduct in person visits safely for teachers who are already making home visits to students. Governments should clarify that BOS funds can be utilized to pay for teacher transport²⁵⁵.

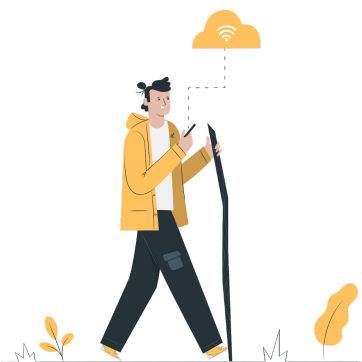


Illustration : Freepik

²⁵³ CIPS Indonesia, 'Policy Brief: Addressing Distance Learning Barriers in Indonesia Amid the COVID-19 Pandemic', 22 November 2020, <www.cips-indonesia.org/post/addressing-distance-learning-barriers-inindonesia-amid-the-COVID-19-pandemic>

²⁵⁴ ibid.

²⁵⁵ Yarrow, Noah, Eema Masood and Rythia Afkar, *Estimated Impacts of COVID-19 on Learning and Earning in Indonesia: How to Turn the Tide*, The World Bank, Jakarta, 2020. <documents1.worldbank.org/curated/en/184651597383628008/pdf/Main-Report.pdf>.

- 9. Explore pro-equity approaches to boost access to digital learning for those who face digital exclusion like those living in poor and remote areas and reaching the most marginalised (who may not live in rural/remote areas):** For those, who are digitally excluded, interventions should focus on reducing their asset poverty and focus on their return to school. Ensuring children are able to learn is an investment in Indonesia's human capital and recovery, as well as a more resilient education system for future crises. The Government must:
- Provide access to the internet in public spaces through setting up cyber cafes; e-commerce hubs in rural areas as internet access points and in public spaces like libraries, community centers in partnership with technology and telecommunication providers.
 - Increase access to learning equipment (computers) through creating computer sharing and rental services for students and teachers that cannot afford to buy computers; create financial innovations to buy computers by paying back in installments; set up crowdfunding and charity initiatives that reward young people with computers.
 - Increase the number of times that the learning channels and programs are on TV and radio and widen the scope of the TV channels and radio stations. A program schedule should be developed so people know what is on and where to learn from.
 - Share a how-to guide and instruction manual for students and families to study from home without access to the internet or TV. They could be visited by teachers and informed about radio programs and facilities that they can access from school
 - Map out the internet connectivity of schools besides government schools (currently being done by ITU) and make the data open access for the development of programs for more equitable access to the internet for different schools.
 - Map out students/parents with no access to any learning facility, including electricity, computers, connectivity, smartphones with

local governments to put in play ‘affirmative action’ especially to those most impacted by the COVID-19 crisis. They should ensure that they put in place programs and measures to avoid dropouts from low income families with information on school reopening. When schools reopen, efforts should be made to identify student learning gaps and extra support must be provided with different instruction based on their learning levels. These assessments can be a permanent part of improved teaching practices post-COVID-19.

- Invest in research evaluations to gather data that provide a microscopic view into the digital divide across Indonesia - especially those in Eastern Indonesia or the vulnerable or marginalized, who are likely to face compounded effects on account of a host of factors - ranging from infrastructure barriers to the lack of purchasing power - pushing them into a state of digital poverty for example young girls and children with disabilities from rural Indonesia. These evaluations should unpack the equity gaps that are not reflected in national average indicators and can help strategic action to remove barriers for those who remain digitally excluded.

- 10. Improve coordination among different ministries for effective delivery and implementation of ICT learning and quota delivery programs:** Ensure clearly delineated financial and resource responsibility with defined roles for every ministry involved in advancing digital education in Indonesia. Also, create spaces for collaborative working and knowledge sharing between ministries. Specific areas of action include:
- Align MoRA and MoEC activities for effective mapping and connectivity of schools across Indonesia.
 - Ensure mechanisms for coordinated and collaborative action for seamless delivery of schemes between the Ministry of Finance, Ministry of ICT, and MoEC that manage finance, infrastructure, and uptake respectively. This will reduce current limitations of working in silos to increase

knowledge and improved efficiencies of government programs.

DIGITAL SKILLS

- 11. There is a need to better align EdTech interventions with the requirements of the burgeoning digital economy, so as to equip young people with adequate digital skills:** As the economy moves towards automation and digitisation, there is a need for EdTech interventions to provide content that adequately trains/teaches young people with the skills they need, and required by the job market. For this, the government must
- Collaborate with private sector and young people themselves (as users) to create online portals to support vocational training and soft skills development
 - Create collaborations with prospective future employers through live projects, seminars, and visits to companies
 - Encourage EdTech platforms to integrate a career development section which encourages young people to explore the future of work. Section should also provide light on information, courses, and skills required.
- 12. Encourage greater awareness and uptake of digital learning and EdTech solutions:** While many innovative EdTech solutions exist, both by the private sector and free ones by the government, awareness and uptake of these have been limited, with digital learning being conducted mostly through social media and conferencing applications. Moreover, young people are mostly using the internet for entertainment and leisure, there is also a need for them to see online environments as serious spaces for learning. Teachers and students currently have many options to choose from for online and other distance-learning modalities, but have little information on which portal to access to maximise specific teaching and learning outcomes. Ways in which government can encourage awareness and uptake include:

- Make information available on the utility of various platforms and how they can be used in a synchronous and symbiotic manner to maximise learning outcomes and student performance. EdTech platforms, for instance, are not perfect substitutes for school based learning which is likely to happen over Google Classroom, but can be used for practicing or developing critical thinking skills.
- Disseminate comprehensive and clear information on how to access internet plans, quotas, and infrastructure made available through public infrastructure and schemes.
- Create and disseminate mass media campaigns and awareness drives on the potential of digital learning through schools, social media, and through teachers in partnership with big social media players (Facebook, Twitter) so young people can learn about the potential of digital learning, while on social media.
- Work with a diverse group of youth-based committees to effectively understand the learning needs, behaviours, and patterns of young people to design effective learning plans.
- Promote the use of online platforms for completing and submitting learning projects in schools/areas that have adequate internet connectivity so as to encourage students to start seeing online spaces and avenues for learning and knowledge building.
- Create a centralized and viewable database (perhaps on the website of MoEC) listing all EdTech services that students and teachers can benefit from, including mentioning their product specifications and price points.
- Encourage use and adoption of digital learning tools and technology that empower youth from a young age when they are likely to be more receptive of new technologies.

13. Specialised training sessions to improve the basic digital skills of younger students, especially vulnerable and marginalised students including girls and students from rural areas: To build the capabilities of all

young people to function socially, economically and politically in a digital society, it is also critical to build productive and e-leadership skills for young people to operate effectively in the 21st century job market. Schools and education authorities should focus on gender responsive and differentiated skill development programs for boys and girls suit needs of various users – ranging from basic to advanced courses. For students, whose access and familiarity with digital technologies is limited, this is very critical as they have a longer journey to catch up. To do this, various ministries of the Government of Indonesia should come together to:

- Build a differentiated digital skills framework (from basic to advanced) and forge partnerships to provide training for vulnerable students to get acquainted with basic digital technologies and skills through schools and community centres. Information on these can be disseminated via television programs, radio broadcasts, or safely designed in-person sessions in partnership with private players (through their Corporate Social Responsibility initiatives, or CSO led initiatives) to ensure that young people (especially those from disadvantaged backgrounds) can afford and access these opportunities.
- Try out, evaluate and identify the best use of digital learning through implementation of mixed or blended learning methods that enable personalized and differentiated learning both in school and at home.
- Invest in programs focused exclusively on building the digital skills of young girls. These should be accessible, affordable, and available for girls in rural and urban settings. A special emphasis should be placed on their digital safety concerns and netiquette (a combination of the words network and etiquette, to imply a set of rules for acceptable online behavior) in addition to supporting their productive skills online. To ensure safety of girls online, adolescent boys should also be sensitised on adversities of bullying online.

- Engage young people in activities that increase their exposure to benefits of ICT using new media based immersive experiences like Virtual Reality, Augmented Reality, and 360 films
- Provide information on and encourage young people to explore careers choices in ICT that they may be unfamiliar with (like data management, coding, media, and AI). This is likely to increase their inclination and interest towards digital technologies and related skills in and outside of the classroom.
- Prioritize the delivery of these programs for vulnerable young people like those from rural and off-grid communities and young girls – who are all less likely to have access to digital devices and skills.

14. Create a parental (familial) guide to digital learning to ensure parents are aware of and sensitised to expectations from various new approaches²⁵⁶:

There is a need to provide proper guidance to parents, who are often the main source of assistance and support for their children during online learning or blended learning. To do this:

- Develop an audio, written, or visual guide for parents to understand how they can support their children’s digital or distance learning. Guidance may include, but not be limited to device usage, communication and conferencing application usage (WhatsApp, Google Meets, Zoom, Microsoft Office), internet quota management, EdTech platform onboarding and usage, online safety, etc – taking reference from examples like eSafety Commissioner’s ‘COVID-19 Global Online Safety Advice for Parents and Carers’²⁵⁷.
- Create a program for schools to hold regular meetings (in-person or virtually) between

- parents and school administrators for transparent, two-way communication regarding navigating online learning.
- Create a centralized portal which parents can access in case of questions, clarifications or assistance regarding online/distance learning.
- Create a program for schools to hold regular meetings (in-person or virtually) between parents and school administrators for transparent, two-way communication regarding navigating online learning



Illustration : Freepik

- 15. Equip teachers with mastery of teaching technology and provide skills to conduct distance and digital learning:** It is evident from the research that it is important to prioritise distance and digital learning skills in current and future teacher training programs. Strategic action by the government should include the following:
- Increase basic knowledge on the use of various digital devices and software, as well as, methods to deliver lessons using digital materials and programs both in face-to-face and distance learning set ups. This should be in addition to creating skills for use of ICT which is already included in curricula. This could include partnering with EdTech firms to improve teachers’ ability to deliver technology-focused content; conducting seminars to make educators aware of helpful, relevant, and easily accessible initiatives; creating an incentive program to help guide teachers to better engage with students over

²⁵⁶ Luxembourgish Safer Internet Centre, ‘New awareness campaign on the use of screens in the family’, March 25 2020, <www.betterinternetforkids.eu/practice/awareness/article?id=5822742>.

²⁵⁷ eSafety Commissioner, ‘COVID-19 Global Online Safety Advice for Parents and Carers’, 2020, <www.europol.europa.eu/publications-documents/COVID-19-global-online-safety-advice-for-parents-and-carers>.

digital technologies. There is a need to not only build the digital skills of teachers, but emphasise on the need for better teaching skills/practices over digital technologies.

- Support teachers in the transition for digital learning with allocated resource persons in each school who can relay relevant information and provide guidance and resources on how to manage digital and distance learning.
- Ensure newly-learned digital skills enable teachers to go beyond traditional teaching methods of just using technology to distribute assignments and communicating with students. They should be able to use digital technologies for their full potential. This can be done by –
 - i. Promoting the use of inquiry-based learning (i.e., posing questions instead of presenting facts) and use ICT tools in research, collaboration, and problem-solving;
 - ii. Deploying blended learning that uses online and offline models and integrates digital learning platforms into the curriculum;
 - iii. Creating awareness of asynchronous teaching styles such as brainstorming, group discussions, and supporting them with digital learning materials that can be watched, interacted with, downloaded, and printed if necessary;
 - iv. Enabling them to undertake differentiated and personalised learning to maximise each students learning outcomes.
- Invest in pre-service teacher preparation such that future teachers should be prepared to deliver digital learning in education emergencies or any change. This will involve teacher education reform, such as developing a specific curriculum for digital and distance learning, and handholding support for teaching using digital technology. This will include a massive, well-planned capacity building program in blended or fully online versions. Distance and digital learning should be integrated in the MoEC's long-term teacher education program - *program Pendidikan Profesi Guru*.

- Make young teachers flag-bearers of capacity development efforts in teaching new digital skills. There is a need to change teacher's knowledge, behaviour, and relationship to technology – especially amongst older, traditional teachers. Schools should create peer groups of older and younger teachers to come together to discuss ways that improve learning over digital platforms.
- Provide a space for teacher's reflection and collective learning on lesson planning using digital learning methods. It should create space for constructive feedback and sharing of good practices. This can be integrated into the MoEC website and be regularly updated

16. Engage teachers and students to co-create learning approaches that meet their needs:

It emerges from the research conducted that there seems to be limited involvement of teachers and students while creating learning/teaching solutions, resulting in initiatives or innovations that are not in sync to the end user. To do this, schools and education authorities should:

- Communicate with both formal and informal teacher communities across varying geographies to map the needs and specific requirements of teachers. This can be used as a mechanism to disseminate resources, tools, and guidelines that are contextual.
- Pilot a program that allows teachers a space to innovate in lesson planning, content, and methods. These innovations can be shared with other teachers in an easy-to-use way.
- Create a school-based roster to ensure all teachers are receiving adequate digital training and resources to effectively handle digital teaching.
- Expand and enhance the content on EdTech platforms that will encourage and enable teachers to focus on developing the transferable skills of students including project-based learning content.
- Ensure teachers work with students on determining learning plans that do not overburden them and also cater to the home environment.

- Encourage teachers to facilitate student engagement and feedback to improve learning methods and pay cognisance to their physical and mental health while developing work plans.

Annexures



1.

According to this national news back in May 2020²⁵⁸, there are at least 12 EdTech providers offer free services-

1. Rumah Belajar
2. Meja Kita
3. Icando
4. IndonesiaX
5. Google for Education
6. Kelas Pintar
7. Microsoft Office 365
8. RuangGuru
9. Zenius
10. Sekolahmu
11. Quipper
12. Cisco Webex

²⁵⁸ Adit, A., '12 Aplikasi Pembelajaran Daring Kerjasama Kemendikbud, Gratis!', 2020, <edukasi.kompas.com/read/2020/03/22/123204571/12-aplikasi-pembelajaran-daring-kerjasama-kemendikbud-gratis?page=all>.

2. Overview Of The Landscape Of Existing EdTech Platforms In Indonesia

	Who?	What?	Targets?	Government or Private?
1	Zenius Net	Students can access 80,000 videos for free from elementary to senior high school level	Students	<i>Private</i>
2	Rumah Belajar	Developed by the Education and Culture Ministry accessible to teachers and students from early childhood learning to senior high school and vocational schools	Students	<i>Government</i>
3	Quipper	Open access videos, modules and exercises for the national exam, computer-based exam and entrance test for state universities	Students	<i>Private</i>
4	Ruang Guru	All subjects from elementary to senior high school. Students can join live teaching sessions during the week, live-chats and discussions with other students. Also has "Pelatihan Guru Online" for teacher training	Students	<i>Private</i>
5	Sekolahmu	Blended learning modules - technology + school-like ecosystem	Students	<i>Private</i>
6	Guru Berbagi	Platform launched by the Education & Cultural Ministry for teachers to share teaching methods and materials	Teachers	<i>Government</i>
7	Google for Education	Helps students and teachers conduct remote classes in areas with limited internet access	Conferencing application	<i>Private</i>
8	Microsoft Teams	Helps students and teachers conduct classes and discussion sessions online	Conferencing application	<i>Private</i>
9	Kelas Pintar	Integrated platform for teachers, schools and parents in the student learning process, which uses a personal approach through the method of delivering material that is tailored to various student characters via visual, audio, or kinesthetic	Students and teachers	<i>Private</i>
10	I Can Do	Interactive game-based learning for young children	Students	<i>Private</i>
11	MejaKita	Free educational content for middle and high school students	Students	<i>Private</i>

12	Edukasi	Platform launched by the Ministry of Education and Culture to encourage student learning	Students	Private
13	Indonesia X	Open Online Courses for higher education and professional learning	Students	Private
14	Cisco Webex	To enable remote learning via video conferencing	Conferencing application	Private
15	Ganeca Digital	An application that is a digital library and a bookstore, that provides reading materials from various publishers	Students and teachers	Private
16	Whats App	For students and teachers to communicate and share images	Communication and sharing application	Private
17	Zoom	To enable remote learning via video conferencing	Conferencing application	Private
18	HarukaEdu	Provides easy solutions to enable universities to offer quality online education with minimum investment and risk	Students	Private
19	Kelase	A social networking and online learning environment for the education agencies, that aims to improve the education of Indonesia with the use of ICT.	Students	Private
20	Codemi	A web based learning management system, with features like gamification, discussion boards, user management, and training catalogues which enable schools to manage their working and teaching online.	Students	Private
21	Squline	It is an online learning platform created to reinvent the language learning experience.	Students	Private
22	Quintal	An integrated academic portal that helps the performance of teachers and schools in monitoring learning.	Teachers, school administrators	Private
23	Arkademi	A massive open online course (MOOC) platform that provides vocational training to help upskill the working-age population.	Students	Private
24	Pahamify	<i>Provides content to students via animated premium learning videos, quizzes, and summaries, combining learning science, filmmaking, gamification, and visuals.</i>	Students	Private
25	Gredu	<i>Tool that prioritizes communication & information transparency, school activities can run effectively and efficiently.</i>	Teachers, school administrators	Private

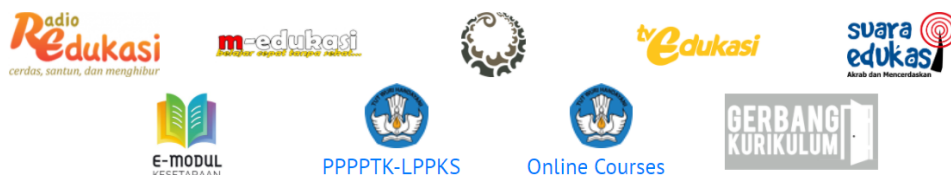
26	Skill Academy (by Ruangguru)	A platform for technical and soft skills dedicated to students, professionals and the general public	Students	Private
27	MauBelajarApa	An online marketplace platform that makes it easy for learners to find and register for vocational classes that have been created by teachers.	Students	Private
28	Vokraf	A platform for young people in the creative field with the skills and knowledge needed in the industry	Students	Private
29	Bahaso	A platform for people who want to learn foreign languages in a more effective, efficient and flexible way in terms of time.	General public	Private
30	Cakap	A language learning application	General public	Private
31	Titik Pintar	Gamified learning and remote micro lessons to Indonesian students	Elementary Students	Private
31	Arsa Kids	Educational games for children aged two to 12 years old	Students	Private
32	DigiKidz	To help children learn multimedia computers while studying using knowledge, software, and multimedia computers to produce 3d-dimensional craft, presentations, scrapbooks, articles, audiobooks, animation, graphic design, website design, videos.	Students	Private
33	Eduka	Courses to help tryout for UTBK (Indonesian college entrance exam computer-based)	High School/College Students	Private
34	ProSpark	A Comprehensive Learning and Training Solution	High School/College Students, Working Professionals	Private
35	Kiddo.id	Kiddo.id works with partners organizing children's activities (courses, workshops, support activities) to enrich the choice of quality activities for millions of Indonesian children, by making it easier for parents to choose activities according to their child's potential.	Young Children (ages 0-12)	Private

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3. Government Of Indonesia Digital Education Initiatives

Other Learning Resources



Source: Rumah Belajar. <https://belajar.kemdikbud.go.id/>

Initiative	Description
Radio Edukasi	A radio station owned by the Ministry of Education and Culture. Presents educational news, entertainment programs, and education. Broadcasts on a frequency of 1251 AM from 12:25 to 19:30 WIB.
tv edukasi	TV Edukasi is an Indonesian television station owned by the Ministry of Education and Culture. It serves to spread information to the education sector. The station was made official by the education minister Abdul Malik Fadjar on 12 October 2004.
suara edukasi	Another initiative of the Ministry of Education and Culture that provides educational podcasts through radio.
E-MODUL	This was developed for use by students, parents and teachers at the appropriate level in facilitating student learning during the COVID pandemic or other special conditions. It is also expected to be an inspiration for teachers to develop other teaching tools in an effort to facilitate students to learn in special conditions.
M-edukasi	Ministry of Education and Culture's Center for Educational and Cultural Multimedia Development. Includes virtual laboratories, AR content, educational mobile content and teacher aid's. Found at: https://m-edukasi.kemdikbud.go.id/medukasi/
Online Courses	Includes courses on Technical and Vocational skills, languages and digital skills. Found at: https://kursusdaring.kemdikbud.go.id/
GERBANG KURIKULUM	Provides e-modules based on the national curriculum. Available at: http://gerbangkurikulum.sma.kemdikbud.go.id/e-modul/

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5. List Of Experts

1. Expert, Ministry of Education and Culture, Government of Indonesia
2. Expert, Research and Development Agency of Indonesian Education and Culture Ministry
3. Expert, Ministry of Education and Culture, Government of Indonesia
4. Expert, Child Safety and Protection Expert, UNICEF
5. Expert, Internet Access & Connectivity, UNICEF
6. Employee, Sekolahmu
7. Expert, PSPK, MoEC
8. Education Consultant, 21st Century Learning Expert, VOX Populi Institute Indonesia
9. Employee, Zenius Education
10. Expert, WARTEK, Technical Adviser MoEC
11. Expert, Digital Learning Officer, INOVASI
12. Expert, Inclusive Education, UNICEF
13. Expert, Inclusive Education, UNICEF

