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### Challenges and Opportunities of Accelerated Digital Literacy during the COVID-19 Pandemic

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**Abstract:**

The outbreak of the COVID-19 pandemic has become an ongoing social crisis globally. Therefore, the current study aims to show how digital literacy competencies were accelerated during this pandemic. The study employed the mixed-method approach to gain in-depth information. A Scala-Likert close-ended questionnaire model was distributed to students, parents, teacher educators, and lecturers. The link was sent via a google form to the WhatsApp Group (WAG) while the rest were manually distributed, i.e., door to door. The results indicate that the accelerated use of digital literacy competencies during the physical distancing can be categorized under four labels: (a) pedagogical, (b) cognitive parenting, (c) civilization literacy, and (d) developing self-learning skills. The pedagogical aspect was highlighted by the understanding, using, and evaluating technology in the teaching process. Cognitive parenting was indicated by the parents' choice and utilization of internet resources to support their children's education. Furthermore, civilization literacy was demonstrated by societies' engagement with government socializing propaganda such as 'stay at home', 'stay safe and healthy', 'physical distancing', and 'always uses a mask'. Meanwhile, developing self-learning skills was proven by the teacher educators' ability to operate new software automatically.

**Keywords:** digital literacy, competencies, COVID-19 outbreak.

### 新冠肺炎大流行期间加速数字素养的挑战和机遇

**摘要:**

新冠肺炎大流行的爆发已成为全球持续的社会危机。因此，当前的研究旨在展示在这场大流行期间如何提高数字素养能力。该研究采用混合方法来获取深入信息。斯卡拉-李克特封闭式问卷模型分发给学生、家长、教师教育者和讲师。该链接通过谷歌表格发送到微信群（摇摆），而其余的则是手动分发的，即挨家挨户分发。结果表明，在身体疏远期间加速使用数字素养能力可以归类为四个标签：（一种）教学法，（乙）认知育儿，（c）文明素养，以及（d）发展自学技能。在教学过程中对技术的理解、使用和评估突出了教学方面。认知型育儿表现为父母选择和

利用互联网资源来支持孩子的教育。此外，文明素养体现在社会参与政府的社会化宣传中，例如“待在家里”、“保持安全和健康”、“保持身体距离”和“始终戴口罩”。同时，教师教育工作者自动操作新软件的能力证明了自学技能的发展。

**关键词:** 数字素养、能力、新冠肺炎爆发。

## 1. Introduction

The spread of the COVID-19 pandemic has become an ongoing social crisis, as stated by Van Lancker and Parolin (2020), Marinoni et al. (2020), which led to the closure of schools in 185 countries around the world (at the time this data was gathered). Furthermore, they explained that the outbreak caused a learning gap for students: a digital divide between students from economically secure families and low-income families. Extensively, they suggested that teachers and policymakers should immediately consider providing such learning material that does not depend on the internet and computer connections. Cluver et al. (2020) also stated that the outbreak caused a surge in the economic crisis and increased stress for parents. More profoundly, it impacted the psychology of students in China, as revealed by Cao et al. (2020). Referring to the investigation, 24% of students felt anxious due to the delayed academic activities. Another factor was the presence of family members that have been exposed to this pandemic.

Through the Governor of Papua Province on June 3, 2020, the Indonesian government announced that 862 individuals were positively confirmed to have the COVID-19 virus. This information indicates that the number of victims will continuously increase. Therefore, through the Rules of Government No 20 in 2020, the Indonesian government declared various efforts to reduce the number of victims and provide a crucial strategy to break down the chain of the spread of the virus. Examples of such efforts were the large-scale social restrictions, work from home, distance learning, social and physical distancing, limitation on the activities in houses of worship, and the prohibition of organizing parties. However, in the uncertain and urgent pandemic situation, an indispensable aspect was the learning process because the young generation will lose their right to education. The results of this study have contributed to accelerating distance learning competencies via digital literacy.

Cornell University (2009) defines digital literacy (DL) as a combination of the skills or competencies in finding, comprehending, evaluating, utilizing, sharing, and creating digital content using technology and the internet. This ability is not merely the mastery of computer technology and internet usage skills, which connotes making humans mere robotic figures. Thus, DL is interpreted as reading for knowledge, reading coherently, and thinking critically. Similarly, Belshaw (2012) explores the essential DL designed into eight parts: culture, cognition, construction, communication, self-confidence, creativity, criticism, and social responsibility. DL implies that a multi-dimensional

approach to the learning process in a community is needed for it to be digitally educated, technologically literate, intelligent, creative, and cultured. Despite the spread of information in digital media, digital literacy skills are strategic (Al-Shaher, 2019). Furthermore, the ability to find reliable sources of information is crucial amid today's digital technology acceleration. The keywords are returning to quality education, the right curriculum in schools, and comprehensive education that should be carried out by all components of the nation for a better Indonesia.

There are six necessary literacies: numerical, scientific, digital, financial, cultural, and civilizational (Kemdikbud, 2017). Digital literacy, in particular, is essential for students in higher education. For popularizing digital literacy, academicians as literacy activists are expected to become agents of digital literate success. As the distance learning system was still artificial, i.e., just for sending and receiving assignments via electronic mail (e-mail), before the pandemic (Cluver et al., 2020), the best and most effective solution was to extend this to online learning. Educators and students did not need real classrooms and face-to-face interaction. The online learning mode allowed teaching to be carried out anywhere and anytime based on mutual agreement between the students and the teacher. It is noteworthy that even before the pandemic, the government of Indonesia has been implementing the online learning process in the Ministry of Research, Technology, and Higher Education even though it was only a blended approach due to the limited human resources and inadequacy of facilities. On the other hand, internet-based distance learning requires compatible competence to use each feature provided, i.e., digital literacy.

Overall, the COVID-19 outbreak has hurt many sectors of human life. Some scholars such as Cao et al. (2020) and Cluver et al. (2020) investigated that the COVID-19 increased students and parents stress due to economic crisis. However, given the research context, this study carefully examines the opportunities and gives an in-depth understanding of digital literacy competencies to the students, educators, policymakers, and parents. In addition, this study explores ways to help people in the digital technology era and become not only digital natives but also critical digital users. To sum up, the current work explores digital literacy competencies that people obtained and can be studied during the pandemic. The study also reveals that distance learning during the pandemic still helps students, teachers, and parents have a deeper and great comprehension of digital literacy competencies. Briefly,

to give a better understanding of the digital literacy acceleration opportunities during the pandemic COVID-19, this study was underpinned by the following research questions:

1. How do digital literacies accelerate during the pandemic COVID-19?
2. What are the characteristics or labels of digital literacy acceleration during the pandemic COVID-19?

## 2. Literature Review

### 2.1. Digital Literacy

Digital literacy (DL) is competence or skills required for using digital technology, applications, or internet networks to search, consume, and transfer information wisely. The skill of receiving and sharing useful information is digital intellectual literacy (Shopova, 2014). Furthermore, it is the ability to use information and communication technology (ICT) cognitively. It is related to technical expertise and focuses on mental and social-emotional aspects in the digital world and environment (Blau et al., 2020). Developing DL has some principles such as understanding of how to extract ideas explicitly and implicitly from media sources; the interdependence of one media on another; the social factors which determine the long-term success of the media, shaping the organic ecosystem to search for, share, and store data and, ultimately, reshaping the media itself; the curation or the ability to judge the story and save it for reassessment (Alkali & Amichai-Hamburger, 2004). In addition, DL can be defined as the ability to use and integrate digital apparatus to make communication interesting while delivering new knowledge to the society or community. To be successful, DL also needs the participation of the society and its awareness in accessing and evaluating the information before sharing it with society (Eshet, 2004).

#### 2.1.1. Digital Literacy Competence

Indonesian DL's framework was designed around three dimensions: (a) protection: the need to create awareness of safety and comfort for internet users, i.e., the protection of personal data, online security, and individual privacy, with services encryption technology as one of the solutions provided; (b) rights: protected-freedom of expressing rights, intellectual property rights and rights to association and assembly and lastly (c) empowerment: the internet empowers the creation of productive work, citizen journalism, entrepreneurship and matters related to information ethics (Suwana, 2017).

Meanwhile, the implementation of DL needs some abilities:

- 1) Cultural: comprehension based on different contexts of DL;
- 2) Cognitive: the ability to evaluate digital content;
- 3) Construction: the creation of something experienced and factual;

4) Communicative: being understood to form networks in digital literacy;

5) Responsible: being creative and lastly, critical in responding to content (Blau et al., 2020).

Overall, the essential elements of DL are limited to mastery in the use of technology only. However, it should also include other critical aspects such as data awareness, data analysis skills, and the ability to focus (deep work). Firstly, the awareness of data while accessing the internet is crucial. Data is a vital component in every application system that interacts and transacts in the cyber world. Registering with a platform alone will allow our data to sync into the system automatically. For example, when synchronizing the WhatsApp application to Facebook, you must be aware that you have allowed all conversation data from your account to be accessed by the two social media platforms.

Secondly, simply understanding the consequences of the dissemination of digital data is not enough, but also understanding that the data that comes as is useful information. In the era of the internet, it becomes a challenge to digest incoming data with large volumes, speeds, and varieties (Martin & Grudziecki, 2006). In summary, this particular study focuses on four aspects of digital literacy competence, as mentioned earlier: pedagogical, cognitive parenting, civilization, and developing self-learning skills.

## 3. Research Method

### 3.1. Respondents

For generating accurate information regarding accelerated digital literacy caused by the COVID-19 pandemic, the respondents were randomly chosen from some urban and rural areas in Indonesia. They were clustered into four groups:

- 1) Students (Primary School through Higher Education);
- 2) Teachers;
- 3) Lecturers;
- 4) Parents (full-time housewives with no other profession).

The total number of respondents was 200, including 50 parents, 50 teachers, 50 lecturers, and 50 students. They were selected to ascertain the accelerated digital literacy competencies among parents in particular. Conversely, parents who were engaged in the professions of teachers or lecturers were not selected as respondents.

### 3.2. Research Instruments

The questionnaire was underpinned by the concept, design, and adaptive literature (Simons et al., 2017). It consisted of 35 items and was labeled into four digital literacy competencies. The four label dimensions brought into play are digital literacy pedagogy, cognitive parenting, civilization literacy, and developing self-learning skills. The items were listed on a 4 point Likert scale ranging from '1= Strongly

Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree'. For this reason, the analysis used the SPSS 21 version and decision-making through a simple linear regression with the variable X referring to the use of digital technology applications and Y representing the digital literacy competencies acceleration. For further analysis, it compared the significance value with the probability value of 0.05. The results were also seen by relying on the two following provisions:

1) When the significance value is < 0.05, it implies that the X variable affects the Y variable (null hypothesis called H0);

2) When the significance value is > 0.05, it implies that the X variable does affect the variable Y (alternative hypothesis called Ha).

### 4. Results and Discussion

Regarding the research question: How did the digital literacies accelerate during the pandemic COVID-19? Table 1 represents several digital technologies used by the group of respondents. Based on this table, the use of digital applications for teaching and learning was almost non-existent before the pandemic. Table 2 informs that the use of digital technology and particularly its spread in Indonesia significantly increased in the COVID-19 period. All the respondents tried to adapt to the learning crisis by following the government's declaration that all schools and higher education were to implement online learning (Adnan & Anwar, 2020; Butarbutar et al., 2020; Daniel, 2020).

Table 1. Preliminary overview of using digital technology pre-COVID-19 pandemic

Digital Technology Applications	Teachers	Lectures	Students	Parents
WhatsApp Group	8 (16%)	20 (40%)	20 (40%)	0 (0%)
Google Classroom	0 (0%)	15 (30%)	15 (30%)	0 (0%)
Google Meet	2 (4%)	5 (10%)	0 (0%)	0 (0%)
Zoom	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Others	5 (10%)	15 (30%)	15 (30%)	3 (6%)
Total:	15 (30%)	55 (110%)	50 (100%)	3 (6%)

Table 1 indicates that the use of digital technology before the COVID-19 pandemic in the learning process was almost non-existent. As illustrated, no respondent used either the Zoom Clouds Meeting or the Google Meet application. The evidence also shows that some of them did not have gadgets. On the other hand, Table 1 above informs that the learning process was being carried out off-line or face to face in the classroom, whereas the WhatsApp Group was used for chatting only.

Table 2. The number respondents of using digital technology post COVID-19 pandemic

Digital Technology Applications	Teachers	Lectures	Students	Parents
WhatsApp Group	50 (100%)	50 (100%)	50 (100%)	40 (80%)
Google Classroom	10 (20%)	35 (70%)	35 (70%)	10 (20%)
Google Meet	25 (50%)	50 (100%)	50 (100%)	25 (50%)
Zoom	50 (100%)	50 (100%)	50 (100%)	30 (60%)
Others	5 (10)	15 (30%)	15 (30%)	3 (6%)
Total :	140 (270%)	200 (400%)	200 (400%)	105 (216%)

Table 2 illustrates the significant enhancement and different use of digital technology between the pre and post COVID-19 periods. This occurred due to the provision of free internet access by the Indonesian government to support online learning. All the stakeholders (learners, teachers, parents) were compelled to learn the use of all the applications and their features. Furthermore, knowledge of DL was accelerated with more educators attending workshops, conferences, or webinars (Hoq, 2020; Korkmaz & Toraman, 2020). Scholars have also spoken out supporting the continuity of the existing schools and higher education in this crisis, so the online learning domain has emerged as the best solution (Reimers et al., 2020). Besides, policymakers, principles, stakeholders, companies, and communities have also used the online process to facilitate their administrative affairs. Their use of digital applications can be seen in Table 2 (Mishra et al., 2020).

Regarding the first research question, it was shown that digital literacy competencies accelerated due to the crisis of the COVID-19 pandemic. The analysis used the SPSS 21 version and decision-making through a simple linear regression.

The results show that the magnitude of the correlation value (R-value) was 0.535. The determination coefficient (R Square) was 0.485, which implies that the use of technology contributes by 48.5% to the increase of digital literacy competence. Tables 3 and 4 sum up the results.

Table 3. ANOVA results

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	114.007	1	114.007	188.506	.000 <sup>b</sup>
1 Residual	119.748	198	.605		
Total	233.755	199			

a. Dependent Variable: digital literacy competencies acceleration  
 b. Predictors: (Constant), using digital technology

Table 4. Model summary

Model	R	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
			R	F	df1df2	Sig. F
			Change	Change		Change
1	.698 <sup>a</sup>	.485	.778	.488	188.506	1 198.000

a. Predictors: (Constant), using digital technology

Regarding the second research question, the DL characteristics were labeled into four categories:

#### **4.1. Pedagogical Digital Literacy Acceleration**

Digital literacy integrates with pedagogical knowledge. Herliani and Wahyudin (2018), Blau et al. (2020) point out that pedagogical knowledge can add several technological tools into the learning process to gain potential outcomes. A point often overlooked is that during this crisis, teachers have limited their use of technology to four mainstream applications: WhatsApp Group (WAG), Google Classroom, Google Meet, and Zoom application for delivering materials, doing project work, maintaining attendance lists, and providing student feedback.

#### **4.2. Parenting Cognitive Digital Literacy Acceleration (Adaptive Learning)**

In extension to the second research question above, DL acceleration indicated parents have also progressed cognitively in terms of choosing and utilizing internet resources to support their children's learning (Iivari et al., 2020; Zhou et al., 2020; Iannizzotto et al., 2020; Lin et al., 2020; Hoyt & O'Sullivan, 2020). In this regard, it was observed that some parents adopted both their parenting roles and did homeschooling. Indeed, some of them used technology to attend a seminar or webinar, which they had never done before the pandemic. Therefore, the lockdown situation has indirectly forced parents to look for additional information about this pandemic and compelled them to subscribe to news channels. Parents are currently required to understand fundamental developments in the online world, such as parental safety settings, parental control functions, and filters of malicious content. Applications that can be used for this purpose are Custodio, Zoodles, Kakadu, and Norton family.

Some scholars have stated recently that the COVID-19 pandemic society has 'forced' parents to online learning (Eshet, 2004). On the other hand, the parents also felt that virtual or online learning is an adaptable educational tool in the current crisis, as discovered by Almarzooq et al. (2020).

#### **4.3. Civilization Literacy**

The outbreak of COVID-19 and its spread opened up Indonesian society to literacy awareness specific to these times (Liu et al., 2020). The government propagates this awareness to put safety measures in place such as 'stay at home', 'stay safe', 'social distancing', and the constant use of masks. Meanwhile, Westoby and Harris (2020) suggest that the COVID-19 community can develop digital literacy by creating worthy slogans or hashtags #stayhome, #staysafe & healthy, #fight COVID-19, #Indonesia-arise, etc. All these slogans are shared by various digital media, i.e., Facebook, Instagram, Twitter, Line, and others, to develop social awareness to support policymakers to prevent the spread of COVID-19 in Indonesia. Similarly, other studies have noted that

students in higher education voluntarily agreed to use masks and maintain safe socializing habits during the lockdown. Hence, community involvement is recognized as the maturity of civilization in digital literacy (Blau et al., 2020; Tejedor et al., 2020; Westoby & Harris, 2020).

#### **4.4. Developing Self-Learning Skills (Learning by Doing)**

Teachers have shown their ability to operate new software and its features automatically (learning by doing) in this pandemic. To support distance learning in work from home situations, the Indonesian government provided eight free web applications to students, educators, parents, and whoever wanted to search and share online learning materials, such as Rumah Belajar, Google G Suites for Education, Kelas Pintar, Microsoft Office 365, Quipper School, *Sekolah Online Ruang Guru*, *Sekolahmu*, and Genius. On the other hand, video conferences are used to support virtual face-to-face events synchronously from different places, available via Skype, Cisco Webex Meetings, Microsoft Teams, Google Meet or Google Hangouts Meet, and Zoom Clouds meetings. Internet-based long-distance interaction services require each user to adapt to the functions and features provided (Almarzooq et al., 2020). The effect of the pandemic is that employees, educators, students, and society, in general, seem to be forced to adjust to digital technology. Teachers have become more creative in arranging online learning content and interacting with digital technology; students have become accustomed to using smartphones or computers to access online learning, and employees have become accustomed to using video conferencing services and the like (Mishra et al., 2020). Consequently, the global COVID-19 pandemic has brought the wisdom and knowledge that has increased digital literacy literally.

## **5. Conclusion**

This research aimed to inform the community or society of the challenges and opportunities during the spread of the pandemic COVID-19 in Indonesia. The results of this research suggest two crucial things: first, advanced investigation needs to be conducted in-depth to explore the various competencies of digital literacy; secondly, the government needs to extend continuous support to facilitate students and educators from elementary up to the higher education level, with access to free and unlimited internet resources to enhance digital literacy among the Indonesian people. Overall, the work discovered Challenges and Opportunities Towards Accelerated Digital Literacy During Outbreaks of Covid-19 Pandemic. On that basis, the work has the following virtues:

The accelerated increasingly digital literacy competencies during physical distancing can be understood from four labels: (1) pedagogical, (2) parenting cognitive, (3) civilization, and (4) developing self-learning skills. The pedagogical label is highlighted by the understanding, using, and evaluating technology

in the teaching process. Thus, parenting cognitive label is indicated by choosing and utilizing internet resources to support their children's education. Furthermore, civilization literacy is showed up by societies' engagement in socializing government propaganda such as staying at home, safe and healthy, physical distancing, and using masks. Meanwhile, developing self-learning skills is proven by teacher educators' ability to operate new software automatically, as confirmed by Butarbutar et al. (2021). The study recommends its implication for policymakers, stakeholders, and internet providers giving unlimited free access internet.

Last but not least, the COVID-19 pandemic has caused learning from home regulations. Situations like this certainly require parents to be more involved in assisting children in studying at home. In addition, parents become more intense in communicating with teachers to report their children's progress. Thus, rules for learning from home can constitute the nature of children's education in the family. For this reason, the researchers claim it is a benefit for parenting cognitive digital literacy.

## 6. Limitations and Further Study

There were certain limitations of this study. Firstly, the data collection techniques were insufficient as the research depended on the questionnaire alone. It could be supported with semi-structured interviews to gain more detailed information. Secondly, the sample size was too small, which means that the findings could not be generalized. A larger sample would have yielded more valid results. The study has implications for teachers, lecturers, students, and parents for surviving and even existing in the current crisis. Digital literacy competence acceleration was investigated mainly for its benefits to society or the community. Consequently, it has included more features of digital literacy competencies in contrast to previous research. Moreover, while the previous research examined digital literacy competencies in groups of homogenous respondents, this study may prove valuable to teachers, lecturers, and policymakers who can use this information as a guiding concept for future policies and determine the allocation of funds to support students' assessment.

## Authors' Contributions

Ranta Butarbutar is a Senior Lecturer at the Faculty of Teacher Training and education, Department of English Education. Her contribution to the research is collecting, analyzing, and reviewing data.

Angla F. Sauhenda is a Senior Lecturer at the Faculty of Teacher Training and Education, Department of Indonesian Language. She involves in analyzing and revising data.

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Hanova is a Senior Lecturer at the Faculty of Teacher Training and Education, Department of Indonesian Language. She involves in collecting data.

Wahyuniar is a Senior Lecturer at the Faculty of Teacher Training and Education, Department of Indonesian Language. She involves in analyzing and revising research instruments.

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