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International Conference on Emerging Media & Communication**DIGITAL LITERACY AMONG Z GENERATION IN INDONESIA**

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Abstract

Generation Z is widely known as digital natives. They have been familiar with technology since their earlier age. Technology, especially the internet, cannot be separated from their daily life. However, there is controversy among scholars about their ability to utilize technology for a specific purpose. Therefore, some scholars argue that generation Z has low digital literacy skills. This research examines whether generation Z has low or high digital literacy skills and which categories with a high level of digital literacy skill. A survey was deployed in this research. The respondents were chosen by quota sampling (N=866). Moreover, respondents came from 18 cities across Indonesia. This survey utilized Japelidi's digital literacy framework in assessing digital literacy skills. The research found that most respondents have a low digital literacy score, particularly in participation and collaboration skills. However, the respondents got a high score on accessing and understanding skills. There are no significant differences among gender and internet usage duration towards digital literacy scores. Besides, the analysis found that generation Z could be categorized as functional consumption and critical presuming since they got a high score for those categories. These findings imply that even generation Z is fluent with the technologies, they still lack in digital literacy. Therefore, it is crucial for future digital literacy campaigns or programs to focus on advancing functional presuming and critical presuming among generation Z.

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1. Introduction

The number of internet users in the world continues to increase significantly. In 2021, the number of internet users reaches 4.66 billion globally. In addition, the increase is followed by the increasing number of social media users (4.2 billion users) that is equal to 53.6 percent of the world's total population (Kemp, 2021). Indonesia has 274.9 million populations, in which 73.7 percent of them utilize the internet and 170 million people are active social media users.

Young generation is the largest internet user around the globe, including Indonesia. Young generation ages between 13-24 years old accounts for 43.2% of internet users in Indonesia (APJII, 2017, 2019; Kemp, 2021). Based on the data, it can be seen that most of the internet users are generation Z who was born in 1996 through the late 2010s (Dimock, 2019; Turner, 2015). Generation Z is the first generation of the internet generation since they were born when the internet was accessible (Vo, 2013), while the previous generation was still undergoing a technology transition to the internet. Therefore, Generation Z was acknowledged as digital natives, which shows their familiarity and fluency in the technology usages, particularly the internet (Wang et al., 2012).

Numerous researches had studied generation Z, which provided some insights on their characteristics, such as they tend to expressive in vocalizing their experience whether it is good or bad (Sladek & Grabinger, 2014). The other characteristic is 'communaholic' or inclusive, which means they do not differentiate between friends they meet online and in the real world (Francis & Hoefel, 2018). In addition, they believe in the importance of dialogue and accept the different opinions with the institutions they participate in and with their own families. Generation Z, with the vast amount of information they have, is more pragmatic and analytical about their decisions than members of previous generations.

In terms of technology usage, generation Z is categorized as a digital native that refers to the first generation who grows up with the new technology (Evans & Robertson, 2020). The term digital native was first coined by Prensky (2001) after he observed his student regarding technology usage in learning. Prensky (2001) divided internet users into two major groups, namely digital natives and digital immigrants. Digital natives are the generation or those who were born after the technology was invented. They are the native speakers of technology who can use technology as naturally as breathing (Tapscott, 2013). Meanwhile, digital immigrants are the generation or people who were born before the technology was invented. They are the generation personified by the internet and at the same time adopt it in various aspects (Prensky, 2001).

Digital natives (DN) and digital immigrants (DI), in terms of their digital fluency, are sharply different due to their ages (Wang et al., 2012). However, some scholars argue that age is not the main factor that differentiates DN and DI. They claim that education is the primary factor that produces the differences while others has low contribution, such as the breadth of use and experience, gender, tribe, and earnings. Hence, digital skills among DN and DI tend to alike (Evans & Robertson, 2020).

As digital natives, Generation Z is considered as a generation that has good digital literacy compared to digital immigrants. However, prior research unveils distinct findings that digital natives and digital immigrants demonstrate a similar ability in identifying hoax, however, they have a high self-efficacy regarding digital literacy (Rahmawati et al., 2020). In addition, this research states that digital natives have

a difficulty in information processing and tend to less critical in consuming the information that looks like digital immigrants.

Based on the explanation above, this paper will examine whether Generation Z, the digital natives, in Indonesia have digital literacy or not. The digital literacy skills are assessed with Japelidi's digital literacy frameworks (Digital Literacy Researcher Network), which consists of 10 competencies. The research will contribute to provide baseline data for the digital literacy score among the digital native generation particularly in Indonesia which, then, can be used for designing future policies and programs regarding digital literacy.

2. Problem Statement

Generation Z is the largest internet users in Indonesia. This generation grows up surrounded by digital technology at the early age. Hence, they are fluent in internet usage. Generation Z is acknowledged as the second digital native. Digital native is defined differently by various literatures including age category, internet use, media-richness, internet usage as a source of information, types of Internet use, multi-tasking, and others (Akçayir et al., 2016; Helsper & Eynon, 2010; Teo et al., 2016).

In general, the unique characteristics of digital natives are skills in using digital devices and high duration of use. These two characteristics make the digital native generation is believed to have good digital literacy skills. It is because they already have access and are proficient at using it. However, previous research has found that digital native status does not make them literate (Li & Ranieri, 2010). They only have good scores for accessing skill or operational skill (Van Deursen & Van Dijk, 2010). In fact, digital literacy does not only discuss about access or operational skills.

However, they must have digital literacy since they actively use the internet and dominate internet usage. The lack of digital literacy will make them vulnerable to computational propaganda, misinformation, and hate speech. Therefore, it is essential to map the digital literacy level in generation Z or commonly known as the second digital native to protect them from negative content so that they can wisely use the internet. Nevertheless, digital literacy among Generation Z in Indonesia is rarely studied. Scholars tend to focus on digital literacy among society without specifying the ages.

3. Research Questions

Based on the explanation above, there are three research questions which will be addressed in this research namely:

- What is the level of digital literacy in generation Z?
- Are there differences in digital literacy levels between the heavy internet user and light internet user categories?
- Are there differences in digital literacy levels by gender?

4. Purpose of the Study

The research objective is to map the level of digital literacy of generation Z in Indonesia. In addition, this study will also map the skill level of generation Z based on Japelidi's ten digital literacy skills. The skill

level will be compared based on gender and duration of internet usage. Besides, this research will identify functional consuming, critical consuming, functional processing, and critical processing skills in generation Z.

5. Research Methods

The survey was conducted in order to address research questions. This research design was employed to gain respondent perception about their ability in several skills in digital literacy. It was conducted in 18 cities and involved 45 universities across Indonesia which represent Japelidi's members. Respondent was chosen by quota sampling technique to obtain an ideal representation of each city; hence this research could not be generalized. The respondent was a Z generation born around 1997-2012 from 18 cities in Indonesia namely Bali, Denpasar, Banjarmasin, Bengkulu, Jakarta, Jayapura, Kendari, Kupang, Madiun, Makassar, Malang Raya, Manado, Medan, Samarinda, Semarang, Solo, Surabaya, and Yogyakarta (Dimock, 2019) (N= 892). The respondent consists of 41.9% men and 58.1% women with varies education level. However, most of them are senior high school students.

The questionnaire was utilized in gathering data from the respondent. The questionnaire applies ten digital literacy skills framework from Digital Literacy Researcher Network (Japelidi) since it is more suitable for the Indonesian context (Table 1) (Gelgel et al., 2021). It was measured with 46 questions that offer Likert scales as a response ($\alpha = .917$). In addition, the research employed Digital Literacy Framework from Der-Thaq "Victor" CHEN, which categorizes ten media literacy skills into two categories that range from consuming to prosuming media literacy (Chen et al., 2011). Consuming media literacy emphasizes individuals' ability to access and use media, while prosuming media literacy emphasizes the ability to produce media content and consume media simultaneously.

Table 1. Japelidi's digital literacy competencies

No	Skills	Definition
1	Access	A basic technical skill that is needed in interacting with new media.
2	Selection	A skill that is needed in choosing and sorting the information
3	Understanding	A skill to comprehend the literal meaning from new media's content
4	Analysis	Textual analysis on language, genre, code in various media
5	Verification	The ability to compare information from various media
6	Evaluation	The ability to doubt, critique, and assess the content credibility
7	Distribution	The ability to disseminate the information
8	Production	The ability to create new content based on prior information
9	Participation	The ability to actively and critically involve in new media
10	Collaboration	The ability to produce content based on critical thinking, social norm, and ideology besides this skill needs initiative from the individual

6. Findings

Descriptive analysis shows that most respondents, 93.6% men and 94.3% women, are heavy internet users, with the average duration of accessing the internet three hours a day ($M = 6.4$, $SD = 2.01$). In addition, respondents who have senior high school and below education level dominate heavy internet user categories. This finding aligns with prior research and survey, which found that average internet usage is above three hours per day (Kemp, 2019).

Several factors cause high internet usage, namely generation Z, accustomed to technology from an early age (digital native) and the cost of internet access, which is more affordable than previous years. As a digital native, generation Z has been accustomed to the internet since childhood, so that more digital technology, especially the internet, cannot be separated in everyday life. Therefore, generation Z can be known as the first generation who does not know how to live without the internet (Seemiller & Grace, 2019).

Generation Z uses the internet for various needs such as instant messaging, internet calls, social networking, listening to music, et cetera. (Johson, 2020; Taipale, 2016). However, communicating on social media becomes the activity that is the most often carried out by generation Z. This study also found that social media is the favourite choice of the respondents, as evidenced by the ownership of accounts on various social media. Whatsapp ranks first with the most number of users, followed by Instagram and Youtube (Table 2).

Table 2. Social Media Account Users

Platform	Yes (Percentage)	No (Percentage)
Facebook	68.2	31.8
Instagram	92.2	7.8
Twitter	28.9	71
Youtube	92.7	7.3
Whatsapp	97.5	2.5
Line	59.4	40.5
Telegram	7.1	92.9
Skype	4.9	95
Messenger	44.1	55.9
Snapchat	28.3	71.6

The high levels of digital literacy do not accompany the high use of the internet and social media. The results showed that 62.3% of respondents were in a low category, and 37.7% were high. This finding further strengthens the previous literature, which reveals that generation Z, with its status as a digital native, does not necessarily mean that they have high digital literacy skills (Çoklar et al., 2017; Stanoevska-Slabeva et al., 2016).

Digital literacy levels do not differ significantly between male and female respondents. Despite this, women have a higher mean digital literacy score than men. This finding is not in line with digital literacy studies with a more diverse age range of respondents. The study found significant differences between genders, but women tend to have lower scores than men (Correa, 2016; Gelgel et al., 2021). The different study results indicate that the lower literacy rate of women compared to men is only found in women of various age categories. However, different scores were found for women from generation Z. The pre-assumption of this study is that women and men from generation Z have the same access to technology and the skills they have (Akçayir et al., 2016). It is interesting to test in future studies considering that the results encourage women to no longer be left behind in the context of digital skills.

The results also found no significant difference in digital literacy scores between heavy and light internet users. In addition, the study also found that heavy internet users tended to have higher digital literacy scores than light internet users. It means that the respondents with three hours of internet use are more likely to have higher literacy scores. Several other studies also found that duration plays a role in

increasing the literacy score, especially for older users (Hong et al., 2016). In addition, the high duration also plays a role in improving operational skills in digital skills (Van Deursen & Van Dijk, 2010).

Table 3. Ten Competencies of Digital Literacy

	M	SD
Access	12.68	2.6
Selection	11.93	2.7
Understanding	12.21	2.3
Distribution	11.38	3.6
Production	11.89	2.7
Analysis	11.00	3.1
Verification	10.8	2.9
Evaluation	11.32	2.6
Participation	9.4	3.3
Collaboration	9.2	3.5

Generation Z as a digital native, uses the internet with high duration. It is because they grow up surrounded by the rapid development of digital technology. It causes them to become accustomed and fluent in the use of digital technology, making digital literacy skills high, especially in access or operational skills (Wang et al., 2012).

Access holds the highest mean score among other skills (M = 12.68, SD = 2.6) (see Table 3). This high score is caused by the respondents who have had access to digital media since childhood. However, this access will vary depending on sociodemographic factors such as the frequency of internet use. The respondents with a high duration of internet use tend to have higher access scores. The score is significantly different from the respondents who are the light internet users ($t = -3.5, p = .001$). It is reasonable because, without good access, the respondents cannot use the internet for a long duration.

Meanwhile, there is no significant difference between men and women in the access skill, even though women tend to have higher scores. This finding is driven by the fact that men and women have relatively the same equipment so that there is no gap in access. Thus, in the end, they have the same access skills. Previous research also found no significant differences in access and operational skills (Gui & Argentin, 2011). However, the difference was only found in the level of theoretical knowledge related to digital technology.

Furthermore, the respondents also have high scores on understanding skills (M = 12.21, SD = 2.3). It is the respondent's skill in understanding the meaning of a message. There is a significant difference in the score of understanding skill between heavy and light internet users ($t = -2.4, p = .017$) with a medium effect size ($\eta^2 = .39$). The high frequency of internet use and more exposure to digital media content caused high scores on heavy internet users. The result is that they understand the meaning of the content on the internet. For example, the users can understand the meaning of an emoticon after finding it frequently and seeing the context in which it is used.

Table 4. The Difference of 10 Digital Literacy Skills

	Low	High	<i>t</i>	<i>p</i>	<i>Effect size (eta squared)</i>
Access	M= 10.98 SD= 3.7	M= 12.79 SD= 2.5	-3.5	.001	.57
Selection	M= 11.16 SD= 3.6	M= 11.98 SD= 2.7	-1.3	.109	.25
Understanding	M= 11.18 SD= 3.2	M= 12.27 SD= 2.3	-2.4	.017	.39
Distribution	M= 10.38 SD= 3.3	M= 11.44 SD= 3.6	-2.04	.041	.31
Production	M= 10.4 SD= 3.7	M= 11.99 SD= 2.6	-3.1	.003	.49
Analysis	M= 10.24 SD= 3.2	M= 11.05 SD= 3.1	-1.8	.069	.26
Verification	M= 10.42 SD= 3.2	M= 10.83 SD= 2.9	-.98	.327	.13
Evaluation	M= 10.64 SD= 3.2	M= 11.37 SD= 2.6	-1.9	.05	.25
Participation	M= 8.4 SD= 3.4	M= 9.4 SD= 3.2	-2.1	.032	.30
Collaboration	M= 8.3 SD= 3.7	M= 9.2 SD= 3.5	-1.9	.057	.25

Meanwhile, there was no significant difference between men and women in understanding skills. However, women tend to have higher understanding skills than men (M = 12.3, SD = 2.3). The absence of significant differences is driven by the same critical thinking skill of men and women (Bagheri & Ghanizadeh, 2016), so they can both understand the meaning of a message.

The respondents have a low average on skill of participation (M = 9.4, SD = 3.3) and collaboration (M = 9.2, SD = 3.5). Participation is a skill to engage interactively and critically in new media. Meanwhile, collaboration is a skill to produce content based on values and social culture. In other words, it is the content that is produced according to the audience. The low ability of participation and collaboration is also found in various digital literacy surveys in Indonesia. It is also found that, in general, people have low skills in the production and collaboration categories (Ministry of Communication and Informatics, 2020).

The participation skill differs significantly between heavy and light internet users ($t = -2.1, p = .03$) with medium effect size (eta squared = .3). The heavy internet users (M = 9.4, SD = 3.2) tend to have higher mean evaluation scores than the light internet users (M = 8.4, SD = 3.4). Meanwhile, there is no significant difference between men and women in the context of participation skills. Men (M = 9.6, SD = 3.3) have a higher mean score than women (M = 9.3, SD = 3.2). It is because women are active on social media only to share personal information, not to discuss a topic (Quicksprout, 2014; Vermeren, 2015). In fact, participation skill specifically emphasizes active and critical participation.

There is no significant difference between heavy and light internet users and between men and women in the context of collaboration skills. However, the heavy internet users (M = 9.2, SD = 3.5) have a higher score than the light internet users (M = 8.3, SD = 3.7). In addition, women (M = 9.3, SD = 3.6) have a higher score than men (M = 8.9, SD = 3.4). The high score obtained by women in collaboration

skills is because they tend to be more active on social media when there is activation and advocacy (Coffé & Bolzendahl, 2010).

The next analysis of this research is to classify ten components of digital literacy into four categories: functional consuming, critical consuming, functional processing, and critical presuming (Lee et al., 2015). In general, the respondents have a high score in the functional consumption (52.2%) and critical processing (56.2%) category. Functional Consuming (FC) is the ability to access media content and understand the meaning of that content (Koc & Barut, 2016). This high skill level is in line with the respondent's high level of access and understanding skills.

Table 4 shows that FC differs significantly between the heavy and light internet users. The heavy internet users (M = 37.1, SD = 6.1) have higher scores than the light internet users (M = 33.3, SD = 9.3). This difference is due to the heavy internet users who access the internet for a long period of time to become accustomed and fluent in using digital media. In addition, this skill differs significantly between men and women. Women (M = 37.2, SD = 6.3) have higher FC skills than men (M = 36.3, SD = 6.6). This analysis is in line with the findings above, stating that women have higher access skills and understanding messages than men.

Critical Consuming (CC) analyzes content from social, cultural, economic, and political aspects (Koc & Barut, 2016). Most of the respondents (51.6%) have high scores in CC skill. The results show no significant difference between heavy and light internet users in the context of CC skill. However, the light internet users (M = 31.31, SD = 8.9) have higher score than the heavy internet users (M = 22.3, SD = 7.5).

The same thing is found in the gender category. There is no significant difference between men and women in CC skills. Women (M = 33.3, SD = 7.2) tend to have higher skills than men (M = 32.8, SD = 8.2). It is because women have self-monitoring skills that are useful in creating critical thinking skills (Bagheri & Ghanizadeh, 2016).

Table 5. The Differences in Digital Literacy Categories Based on Duration of Use and Gender

	High	Low	<i>t</i>	<i>P</i>	<i>Effect size (eta squared)</i>
Functional Consuming	M= 33.3 SD= 9.3	M= 37.1 SD= 6.1	-2.8	.006	.48
Functional Presuming	M= 20.8 SD= 6.8	M= 23.43 SD= 5.3	-2.8	.007	.44
Critical Consuming	M= 31.31 SD= 8.9	M= 22.3 SD= 7.5	-1.5	.124	.24
Critical Presuming	M= 16.7 SD= 6.5	M= 18.7 SD= 6.2	-2.2	.023	.33
	Men	Women	<i>t</i>	<i>P</i>	<i>Effect size (eta squared)</i>
Functional Consuming	M= 36.3 SD= 6.6	M= 37.2 SD= 6.3	-2.1	.03	.14
Functional Presuming	M= 23.0 SD= 5.6	M= 23.5 SD= 5.3	-1.2	.21	.009
Critical Consuming	M= 32.8 SD= 8.2	M= 33.3 SD= 7.2	-.96	.33	.003
Critical Presuming	M= 18.6 SD= 6.3	M= 18.7 SD= 6.2	-.25	.81	.01

Functional presuming is a skill that emphasizes the ability to produce media (Koc & Barut, 2016). Only 50.8% of the respondents have high a score in the family planning skill. This percentage is the lowest compared to FC, CC, and CP skills. FP visibility differs significantly between the heavy and light internet users ($t = -2.8$, $p = 0.007$) with moderate effect size ($\eta^2 = 0.44$). The heavy internet users ($M = 23.43$, $SD = 5.3$) have a higher score than the light internet users ($M = 20.8$, $SD = 6.8$). High FP score in heavy internet users is caused by the high technical mastery after the high frequency of use. The level of technical mastery plays a very important role in content production, especially for skilled content and entertainment (Blank, 2013).

Meanwhile, there is no significant difference between men and women in the context of FP skills. However, women ($M = 23.5$, $SD = 5.3$) tend to have higher FP skill than men ($M = 23.0$, $SD = 5.6$). Women tend to produce more content related to personal information such as family (Quicksprout, 2014; Wang et al., 2012).

Critical Presuming (CP) emphasizes applications to convey ideology through what is produced (Koc & Barut, 2016). Most of the large respondents (56.2%) have high scores on the CP skill. There is a significant difference between the heavy and light internet users on the CP skill (see Table 5). The heavy internet users ($M = 18.7$, $SD = 6.2$) have higher CP visibility than the light internet users ($M = 16.7$, $SD = 6.5$). Meanwhile, there is no significant difference in skill levels between genders. Women ($M = 18.7$, $SD = 6.2$) have a higher CP skill score than men ($M = 18.6$, $SD = 6.3$).

7. Conclusion

Generation Z as a digital native assumed to have high literacy rates in social media use, but current research has different argumentation. Generation Z is considered to have operational competence in digital literacy only. Therefore, the research is conducted to map the digital literacy level of Generation Z in Indonesia based on Japelidi's ten digital literacy skills and compare it based on gender and the duration of internet use.

The research unveils that WhatsApp is the most favourite social media followed by Instagram and YouTube. The high usage of the internet and social media is not followed by a high level of digital literacy, as evidenced by 62.3% of the respondents are in a low category and 37.7% are high category. Most respondents have a low digital literacy score especially in participation and collaboration skills. However, the respondents get a high score on access and understanding skills. There are no significant differences among gender and internet usage duration towards digital literacy scores. However, the heavy users get higher scores on participation, and women get higher scores than men on collaboration because they are more active in inactivation and advocacy online. Furthermore, this research argues that Generation Z can be categorized as functional consumption and critical presuming since they get a high score for those categories. These findings have some implications for future digital literacy programs and policies in Indonesia. First, the future digital literacy program should target Generation Z since they are the majority of internet users who can affect the social media environment. Second, the program should focus on developing participation and collaboration skills which are required in creating active citizen whose can catalyse healthy social media environment and civic engagement. Moreover, the digital literacy campaigns or programs should focus on advancing functional presuming and critical presuming. Lastly, the

government should encourage schools to adopt digital literacy's curriculum especially related to certain skills since currently the curriculum only concentrate on technical skills.

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