Student Readiness Patterns in Taking on Digital Literacy Challenges in the Era of Industrial Revolution 4.0: Comparative Study

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Abstract
In today's rapidly evolving digital literacy skill system, it is imperative that Generation Z students keep pace with their ability to navigate in today's digital world. This research explores data related to digital literacy skills to understand the characteristics of SMA, SMK and MA students in utilizing the digital environment technology that passes by unstoppable progress. Through data analysis, this research aims to provide an overview of data related to how generation Z can navigate the digital world, consume information, think critically, security and utilize technology for the learning process. This research used mixed method with comparative study. The resulted of this study focus on the characteristics of students with various types of school backgrounds that made the ability to think critically and the ability to used technology as one of the basics in digital literacy. The strengths and weaknesses in digital literacy skills can be measured through 7 indicators and 28 items divided into indicators such as information and data digital literacy skills, communication, collaboration, personal security, device and technology security. The result showed that all of the above indicators have met the valid criteria and had a very high reliability estimate value of 0.730, so that the results of this study can provided a data distribution order to intervene to be right on target. Of the three types of schools, the most visible indicator of comparison is critical thinking and the ability to use technology, where Madrasah Aliyah (MA) was at a moderate level of ability.

Keywords: Digital, Literacy, Generation Z

Introduction

Digital natives today can be said to be generation Z people, where in Indonesia in the post-covid digital era, they are accustomed to technology from an early age.(Prensky, 2001). Photographed from the ability of basic skills such as how they use *smartphones*, operate computers and navigate the internet world as skills that tend to be self-taught. This tragedy is exactly the same as digital natives around the world, where they also grew up in the current digitalization era (Abrams et al., 2019; Antee, 2021; Arslantas & Gul, 2022; Cradduck et al., 2022; Dewi et al., 2021).

Each generation has its own challenges and uniqueness, so this characterization can help educators, parents and other stakeholders to be more effective and targeted in building communication and educating a sense of responsibility for what has become a choice and decision in the context of digital literacy. Some of the characteristics possessed by digital natives are (1) the ability to operate smartphones, tablets and computers, as well as various online applications and platforms, ranging from social media to software that are integrated with all their needs, (2) multitasking, where they are able to interact with technology simultaneously, such as when they listen to music while browsing the internet and sending messages at the same time. (3) this generation is more comfortable communicating through social media, instant messaging, telegram, twitter, instagram and other communication platforms than face-to-face, (4) the information obtained by them is more audio-visual oriented, such as videos on youtube, Instagram, tiktok and other audio-visual elements, (5) fast and efficient access to various information by using search engines or navigation, reading various journal articles on various official websites or watching videos in obtaining the information they need without being limited by space and time, (6) low ability to evaluate the accuracy of information data found online, thus requiring more holistic digital literacy education (Abrams et al., 2019; Evans & Midford, 2022; Rini et al., 2022; Savic, 2022; Turner et al., 2020).

In addition to these basic skills, Generation Z utilizes digital platforms to express themselves, where they are active in sharing content or posts on social media, so they are more comfortable with the concept of graphic design, video editing or digital art. Many directly post the content on vlogs and blogs describing their own hobbies, knowledge or opinions and more enthusiastically they target audiences and promote their content without the need for an academic learning process (Alakrash et al., 2022; Andersen et al., 2022; Chan, 2021; Nichols & LeBlanc, 2021). In today's education system, technology has become an integral part of the learning process, where skills are fundamentally required to be able to interact in modern learning, so this has an impact on various aspects of life from education to the world of work and society. Digital skills such as the ability to search, understand, evaluate and use Microsoft office, excel, power point, programming, data analysis and graphic design require strong digital literacy skills (Anthonysamy, 2023; Arafah & Hasyim, 2023; Maureen et al., 2020; Pala & Başıbüyük, 2023; Rice & Cun, 2021; Sukarno & Widdah, 2020; Syefrinando et al., 2022). Indonesia with a population of 278.69 million in mid-2023 experienced a growth of 1.05% (BPS, 2023) with 38 provinces spread from Sumatra to Papua. Based on this data, the number of people who fall into the 13-70 years age category, the majority of 51.5% have a digital literacy index score below the national average. This score is measured through four digital literacy index indicators according to Unesco, 2018, namely Digital Skills, Digital Ethics, Digital Safety, and Digital Culture.

The urgency of this research is that the distribution of data on generation Z which is said to be digital literacy is not optimal, resulting in an imbalance in the intervention crisis, so that it will hamper government programs in promoting digital literacy awareness in generation Z today.

Research Usefulness

1. Provide information data related to digital literacy skills of high school, vocational and man students in Bengkulu City.
2. Provides information on the importance of digital education and ethics for students interacting in digital spaces.
3. Provide data information to assist school policies in formulating more effective and equitable models, approaches and strategies as well as technology implementation.
4. The data helps the independent curriculum program to make students think critically, creatively and learn independently.

Literature Review

The term *digital literacy skill* is a person's ability to use computer devices to access various information in the digital space (Paul Gilster, 1997). Meanwhile, according to Cassie Hague and Sarah Payton (2010), there are 8 components of digital literacy, namely: (1) *Functional skills and beyond*. Is a component of digital literacy related to the expertise of using information technology; (2) *Creativity*. It is a component of digital literacy related to creative thinking utilizing ICT in building knowledge; (3) *Collaboration.* Is a component of digital literacy related to building knowledge through the process of discussion and providing mutual input in the digital space; (4) *Communication*. It is a component of digital literacy related to the ability to listen, understand, and convey ideas; (5) The ability to find and select information; (6) Critical thinking and evaluation; (7) *Cultural and* social understanding; and (8) *E-safety.*

However, compared to other experts, it appears (Belshaw, 2012) stated that there are eight essential elements in developing digital literacy skills, namely; (1) Cultural is an individual's understanding of various user contexts in the digital world, (2) Cognitive is an individual's thinking power in assessing content, (3) Constructive is an individual's ability to build, repair, or improve something expert and actual, (4) Communicative is an individual's understanding of networking and communication in the digital world.

(5) Confident is the competent use of *digital literacy*, (6) Creative is an action carried out in new things and ways, (7) Critical is an individual's activity in conducting research and checking back on content that has been read, (8) *Civic* is a wise and ethical thing that individuals must have in the digital world.

According to Belshaw, digital literacy is the ability of individuals to master the knowledge and skills in using digital media, communication tools and networks, so that individuals are able to find, master, use, create and utilize information wisely, appropriately, healthily, intelligently and obey the law.

Research Methodology Research Design

This research used a mix method study comparative. The research was conducted to understand the phenomena faced by the research subject holistically by describing naturally occurring without any subject engineering (*Qualitative Inquiry And Research Design Choosing Among Five Approaches by John W. Creswell [z-Lib.Org]*, n.d.).

Participants

This study involved 219 students based on 3 schools with different characteristics, namely State Senior High School (SMA), Madrasah Aliyah School (MAN) and Vocational High School (SMK). In this case the research subjects are students who are exposed to the internet. This research instrument uses digital literacy skill indicators based on the exposure of Unesco, 2018. The general description of the characteristics of high school, MAN and SMK students in Indonesia is very diverse, namely:

Table 1: The general of the characteristic factors of SMA, MAN and SMK students in Indonesia

Description	SMA	MAN	SMK
Age	15-18 years	15-18 years	15-18 years
Study period	3 years	3 years	3 years
Subjects	General + optional	General + religion	General + optional
Education focus	Academic	Academic + religion	Vocational/practical
Destination	Higher Education	Higher education/religious	Employment field/college
Extracurricular	Many types of options (sports, arts, other academic sciences)	Diverse + religious	Related to majors/vocations
Environment	General	General with Islamic/religious nuances	Related to majors. vocational
Lesson Methods	Theoretical	Theoretical + religious learning	Theoretical + practical
Availability	Many options	Located in an area with a large Muslim population	Limited
Reception	General/academic test	General/academic + religious test	General/academic + vocational test

Source: Kemdikbudristek, 2023.

Research Process

Digital literacy skills were not only measured by the ability to use digital devices or access the internet. It is important to know the extent to which learners have broad competencies related to aspects of the ability to search, evaluate, use and create digital content ethically and effectively. Unesco in 2018 has detailed the components of digital literacy skills and researchers identified and classified them into sub-components based on the figure, as follows:

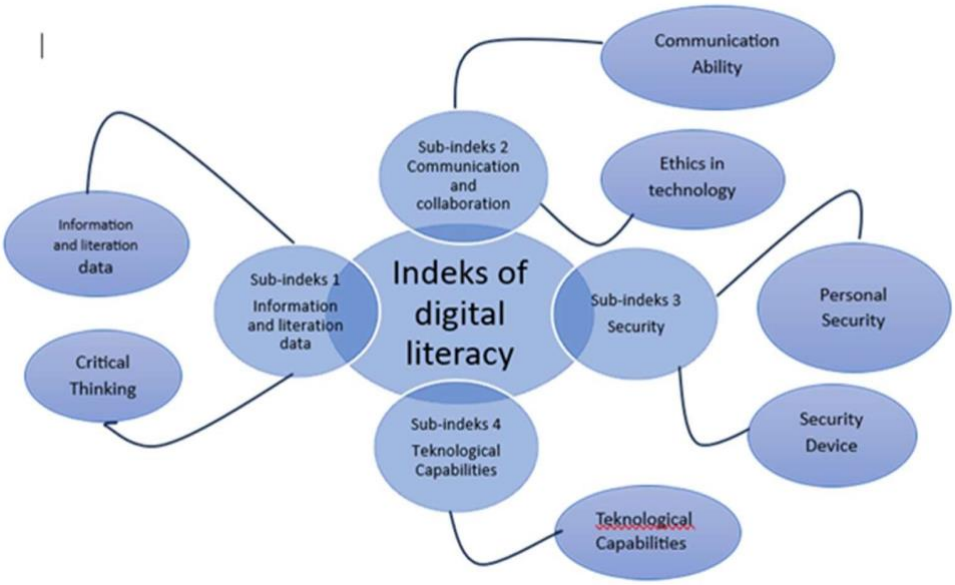

Figure 1: Conceptual framework (Unesco, 2018)

From the mapping picture, each sub-component of digital literacy skills can be described, after conducting content analysis based on the above indicators to explore the meaning of the pattern and complexity of the phenomenon under study, data analysis was then carried out using the SPSS 24 test by meeting the validity criteria of 0.730 with a high estimated value based on Cronbach's alpha coefficient. The researcher tabulated simple calculations and analyzed the percentage of respondents who gave answers, then the percentage results could describe each comparative indicator so that patterns of category identification could be found where the sample needed a lot of further attention.

Results and Discussion

Based on the data received that from 219 samples consisting of 88 males and 131 females with an age range of 15-18 years from various types of schools namely, Senior High School (SMA), Vocational High School (SMK) and Madrasah Aliyah School (MAN), it shows that;

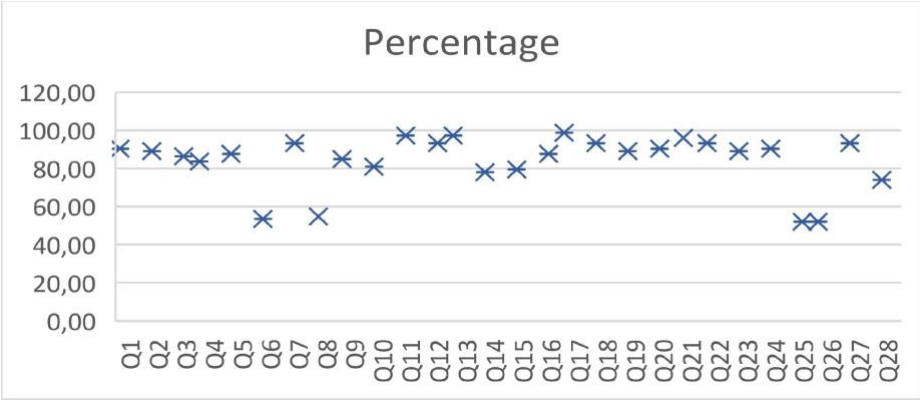

Figure 2: The data of students in Senior High School (SMA)

Senior High School (SMA) has a digital literacy competency index consisting of the **first indicator**, namely, information and data literacy which showed that students' statements (Q1) related to the ability to search and access information data and content in digital media are

in accordance with the needs with a total score of 66, achieving an index of 90.41% in the high category, students' statements (Q2) related to the ability to filter data, information and content as needed in digital media with a total score of 65, achieved an index of 89.04% in the high category, student statements (Q3) related to the ability to direct or organize in the search for data, content and information that suits student needs with a total score of 63, achieved an index of 86.30% in the high category, student statements (Q4) related to the ability to store information, data and content in digital media with a total score of 61, achieved an index of 83.56% in the high category.

The second indicator, namely, critical thinking, showed that student statements (Q5) related to the habit of finding out about the information found on the website is true or false with a total score of 64, achieving a digital literacy index of 87.67% in the high category, student statements (Q6) related to the habit of finding out about who the author of the information is as well as the author's track record with a total score of 39, achieving a digital literacy index of 53.42% in the medium category. student statements (Q7) related to the habit of comparing various sources of information to confirm the news is true or false, with a total of 68, achieving a digital literacy index of 93.15% in the high category. Student statement (Q8) related to students' curiosity about their interlocutors online, thus checking their identity, with a total score of 40, achieving a digital literacy index of 54.79% in the medium category.

The third indicator, namely, the ability to communicate, showed that student statements (Q9) related to the ability to interact with various digital technology communication devices, with a total score of 62, achieved a digital literacy index of 84.93% in the high category, student statements (Q10) related to sharing data and information with others through adapted technology, with a total score of 59, achieved a digital literacy index of 80.82% in the high category. student statement (Q11) related to considering and adjusting how to communicate with others, with a total score of 71, achieving a digital literacy index of 97.26% in the high category. student statement (Q12) related to considering and being aware of cultural, religious and age diversity when sharing information, with a total score of 68, achieving a digital literacy index of 93.15% in the high category.

The fourth indicator, namely personal safety, showed that student statements (Q13) related to writing opinions using polite language, with a total score of 71, achieved a digital literacy index of 97.26% in the high category, student statements (Q14) readiness to accept the consequences of what is written on the internet so that it can be accessed by many people, with a total score of 57, achieved a digital literacy index of 78,08% in the high category, student statements (Q15) related to always listing or asking permission from the creator of the work, whether writing, design, photos or images, with a total of 58, achieving a digital literacy index of 79.45% in the high category, student statements (Q16) related to not disseminating information containing hate speech, slander or hoaxes, with a total score of 64, achieving a digital literacy index of 87.67% in the high category.

The fifth indicator, namely personal safety, showed that student statements (Q17) related to students' ability to regulate who can see their posts on personal social media accounts, with a total score of 72, achieved a digital literacy index of 98.63%, in the high category, student statements (Q18) how to report social network abuse, if there is post content that harms me, with a total score of 68, achieved a digital literacy index of 93.15% in the high category, student statements (Q19) related to disabling the GPS option or other social media applications, with a total score of 64, achieved a digital literacy index of 87.67% in the high

category, student statements (Q20) related to not uploading personal data on social media, with a total score of 56, achieved a digital literacy index of 76.71% in the high category.

The sixth indicator, namely device security, showed that student statements (Q21) related to using software to find and remove viruses on mobile phones or computers, with a total score of 70, achieved a digital literacy index of 95.89% in the high category, student statements (Q22) the ability to distinguish emails containing spam, viruses or malware, with a total score of 68, achieved a digital literacy index of 93,15% in the high category, student statements (Q23) related to the habit of creating secure passwords with a combination of numbers, letters and punctuation marks, with a total score of 65, achieving a digital literacy index of 89.04% in the high category, student statements (Q24) related to backing up data in several places, with a total score of 66, achieving a digital literacy index of 90.41% in the high category.

The seventh indicator, namely the ability to use technology, showed that student statements (Q25) related to the ability to connect devices to wifi networks, with a total score of 38, achieved a digital literacy index of 52.05% in the medium category, student statements (Q26) related to the ability to download files or applications, with a total score of 38, achieved a digital literacy index of 52.05% in the medium category, student statements (Q27) related to the ability to upload files to the internet, with a total score of 68, achieved a digital literacy index of 93.15% in the high category, student statements (Q28) related to installing applications on the device with a total score of 54, achieved a digital literacy index of 73.97% in the medium category.

Based on this data, the average value of digital literacy skills of high school students reaches 83.85, it can be concluded that in terms of information and data literacy statements, communication skills, technology ethics, individual security and device security fall into the excellent category, this is due to a curriculum that is oriented towards general learning related to various types of information and communication technology that supports their learning process followed by facilities and resources that are easily accessible to students and they are more directed to be guided to continue to higher education where digital skills are currently needed. (Polizzi, 2020; Promoting Digital Literacy Skills for Students through Improved School Curriculum, n.d.).. Currently, the curriculum has begun to be adapted by some teachers to be used as a guide in developing learning tools in improving digital literacy skills and not least abroad have successfully designed and implemented their curriculum into subjects, but in reality in the category of critical thinking has not been optimally owned by high school students, this is due to the low habit of students to find out about the author of information and the track record of the author and their low curiosity about their interlocutors online. This can be caused by the limited formal education in providing sufficient lessons related to how to find out and evaluate the credibility of the information they read and the students' not optimal ability.

to use technological devices caused by the lack of sufficient training or guidance related to the use of the latest technological devices and applications, so that their low experience leads to hampering the ongoing learning process.

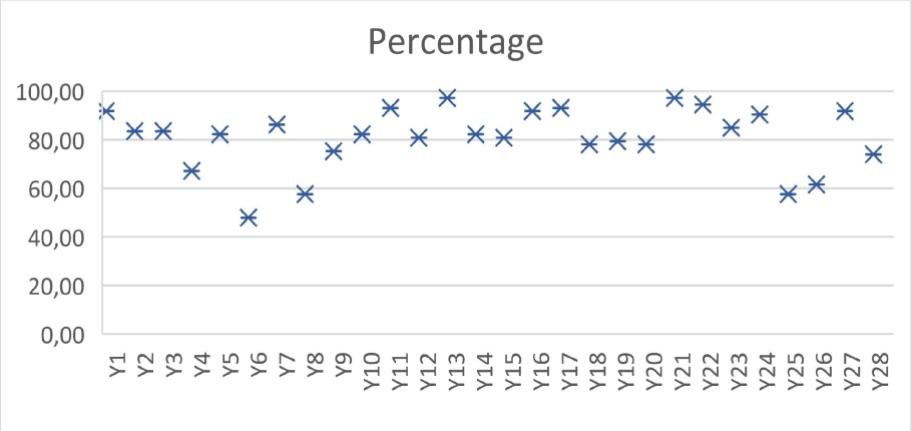

Figure 3: The data of students in Vocational School (SMK)

Vocational School (SMK) has a digital literacy competency index consisting of the **first indicator**, namely, information and data literacy which showed that student statements (R1) related to the ability to search and access information data and content in digital media are in accordance with the needs with a total score of 67, achieving an index of 91.78% in the high category, student statements (R2) related to the ability to filter data, information and content as needed in digital media with a total score of 61, reaching an index of 83.56% in the high category, student statements (R3) related to the ability to direct or organize in the search for data, content and information according to student needs with a total score of 61, reaching an index of 83.56% in the high category, student statements (R4) related to the ability to store information, data and content in digital media with a total score of 49, reaching an index of 67.12% in the medium category.

The second indicator, namely, critical thinking, showed that student statements (R5) related to the habit of finding out about the information found on the website are true or false with a total score of 60, achieving a digital literacy index of 82.19% in the high category, student statements (R6) related to the habit of finding out about who the author of the information fiber track record of the author with a total score of 35, achieving a digital literacy index of 47.94% in the low category. Student statement (R7) related to the habit of comparing various sources of information to confirm the news is true or false, with a total score of 63, achieving a digital literacy index of 86.30% in the high category, student statement (R8) related to students' curiosity about their interlocutors online, thus checking their identity, with a total score of 42, achieving a digital literacy index of 57.73% in the medium category.

The third indicator, namely, the ability to communicate, showed that student statements (R9) related to the ability to interact with various digital technology communication devices, with a total score of 55, achieved a digital literacy index of 75.34% in the high category, student statements (R10) related to sharing data and information with others through adapted technology, with a total score of 60, achieved a digital literacy index of 82.19% in the high category. student statement (R11) related to considering and adjusting how to communicate with others, with a total score of 68, achieving a digital literacy index of 93.15% in the high category. student statement (R12) related to considering and being aware of cultural, religious and age diversity when sharing information, with a total score of 59, achieving a digital literacy index of 80.82% in the high category.

The fourth indicator, namely personal safety, showed that student statements (R13) related to writing opinions using polite language, with a total score of 71, achieving a digital literacy

index of 97.26% in the high category, student statements (R14) readiness to accept the consequences of what is written on the internet so that it can be accessed by many people, with a total score of 60, achieving a digital literacy index of 82.19% in the high category, student statements (R15) related to always listing or asking permission from the creator of the work, whether writing, design, photos or images, with a total score of 59, achieving a digital literacy index of 80.82% in the high category. student statement (R16) related to not spreading information that contains hate speech, slander or hoaxes, with a total score of 67, achieving a digital literacy index of 91.78% in the high category.

The fifth indicator, namely personal safety, showed that student statements (R17) related to students' ability to regulate who can see their posts on personal social media accounts, with a total score of 68, achieved a digital literacy index of 93.15% in the high category, student statements (R18) how to report social network abuse, if there is post content that harms me, with a total score of 57, achieved a digital literacy index of 78.08% in the high category, student statements (R19) related to disabling the GPS option or other social media applications, with a total score of 58, achieved a digital literacy index of 79.45% in the high category, student statements (R20) related to not uploading personal data on social media, with a total score of 57, achieved a digital literacy index of 78.08% in the high category.

The sixth indicator, namely device security, showed that student statements (R21) related to using software to find and remove viruses on mobile phones or computers, with a total score of 71, achieved a digital literacy index of 97.26% in the high category, student statements (R22) the ability to distinguish emails containing spam, viruses or malware, with a total score of 69, achieved a digital literacy index of 94,52% in the high category, student statements (R23) related to the habit of creating secure passwords with a combination of numbers, letters and punctuation marks, with a total score of 62, achieving a digital literacy index of 84.93% in the high category, student statements (R24) related to backing up data in several places, with a total score of 66, achieving a digital literacy index of 90.41% in the high category.

The seventh indicator, namely the ability to use technology, showed that student statements (R25) related to the ability to connect devices to wifi networks, with a total score of 42, achieved a digital literacy index of 57.53% in the medium category, student statements (R26) related to the ability to download files or applications, with a total score of 45, achieved a digital literacy index of 61.64% in the medium category, student statements (R27) related to the ability to upload files to the internet, with a total score of 67, achieved a digital literacy index of 91.78% in the high category, student statements (R28) related to installing applications on devices with a total score of 54, achieved a digital literacy index of 73.97% in the medium category.

Based on this data, the average value of digital literacy skills of SMK students reached 80.86, including 23 statements in the high digital literacy category and 5 statements in the medium category, it can be concluded that in terms of information and data literacy statements, critical thinking, communication skills, technology ethics, individual security, device security and the ability to use technology fall into the excellent category, this is because the SMK curriculum is designed to develop skills and focus on hands-on practical experience through job training, internships or projects and work teams. In addition, Kemenkominfo provides training to SMK students and collaborates with digital pandu. Digital pandu is tasked with providing assistance in an effort to improve digital literacy in the education, tourism, MSMEs and farmers and fishermen sectors, learning experiences in the form of training, internships and

project-based learning are important in improving vocational student skills (Andresen et al., n.d.; Brott, 2006; Wiek et al., 2014).

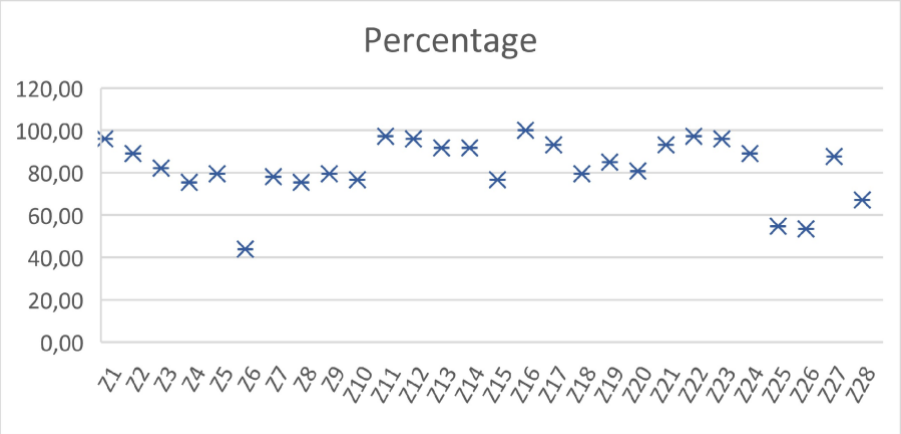

Figure 4: The data of students in Madrasah Aliyah School (MAN)

Madrasah Aliyah School (MAN) has a digital literacy competency index consisting of the **first indicator**, namely, information and data literacy which showed that student statements (S1) related to the ability to search and access information data and content in digital media are in accordance with the needs with a total score of 70, reaching an index of 95.89% in the high category, student statements (S2) related to the ability to filter data, information and content as needed in digital media with a total score of 65, reaching an index of 89.04% in the high category, student statements (S3) related to the ability to direct or organize in the search for data, content and information according to student needs with a total score of 60, reaching an index of 82.19% in the high category, student statements (S4) related to the ability to store information, data and content in digital media with a total score of 55, reaching an index of 75.34% in the medium category.

The second indicator, critical thinking, showed that student statements (S5) related to the habit of finding out about the information found on the website is true or false with a total score of 58, achieving a digital literacy index of 79.45% in the high category, student statements (S6) related to the habit of finding out about who the author of the information is as well as the author's track record with a total score of 32, achieving a digital literacy index of 43.84% in the low category. Student statement (S7) related to the habit of comparing various sources of information to confirm the news is true or false, with a total score of 57, achieving a digital literacy index of 78.08% in the high category, student statement (S8) related to students' curiosity about their interlocutors online, thus checking their identity, with a total score of 55, achieving a digital literacy index of 75.34% in the medium category.

The third indicator, namely, the ability to communicate, showed that student statements (S9) related to the ability to interact with various digital technology communication devices, with a total score of 58, achieved a digital literacy index of 79.45% in the high category, student statements (S10) related to sharing data and information with others through adapted technology, with a total score of 56, achieved a digital literacy index of 76.71% in the high category. Student statement (S11) related to considering and adjusting how to communicate with others, with a total score of 71, achieving a digital literacy index of 97.26% in the high category, student statement (S12) related to considering and being aware of cultural, religious

and age diversity when sharing information, with a total score of 70, achieving a digital literacy index of 95.89% in the high category.

The fourth indicator, namely personal safety, showed that student statements (S13) related to writing opinions using polite language, with a total score of 67, achieving a digital literacy index of 91.78% in the high category, student statements (S14) readiness to accept the consequences of what is written on the internet so that it can be accessed by many people, with a total score of 67, achieving a digital literacy index of 91.78% in the high category, student statements (S15) related to always listing or asking permission from the creator of the work, whether writing, design, photos or images, with a total score of 56, achieving a digital literacy index of 76.71% in the high category. student statement (S16) related to not spreading information that contains hate speech, slander or hoaxes, with a total score of 73, achieving a digital literacy index of 100% in the high category.

The fifth indicator, namely personal safety, showed that student statements (S17) related to students' ability to regulate who can see their posts on personal social media accounts, with a total score of 68, achieved a digital literacy index of 93.15% in the high category, student statements (S18) how to report social network abuse, if there is post content that harms me, with a total score of 58, achieved a digital literacy index of 79.45% in the high category, student statements (S19) related to disabling the GPS option or other social media applications, with a total score of 62, achieved a digital literacy index of 84.93% in the high category, student statements (S20) related to not uploading personal data on social media, with a total score of 59, achieved a digital literacy index of 80.42% in the high category.

The sixth indicator, namely device security, showed that student statements (S21) related to using software to find and remove viruses on mobile phones or computers, with a total score of 68, achieved a digital literacy index of 93.15% in the high category, student statements (S22) the ability to distinguish emails containing spam, viruses or malware, with a total score of 71, achieved a digital literacy index of 97,26% in the high category, student statements (S23) related to the habit of creating secure passwords with a combination of numbers, letters and punctuation marks, with a total score of 70, achieving a digital literacy index of 95.89% in the high category, student statements (S24) related to backing up data in several places, with a total score of 65, achieving a digital literacy index of 89.04% in the high category.

The seventh indicator, namely the ability to use technology, showed that student statements (S25) related to the ability to connect devices to wifi networks, with a total score of 40, achieved a digital literacy index of 54.79% in the medium category, student statements (S26) related to the ability to download files or applications, with a total score of 39, achieved a digital literacy index of 53.42% in the medium category, student statements (S27) related to the ability to upload files to the internet, with a total of 64, achieved a digital literacy index of 87.67% in the high category, student statements (S28) related to installing applications on the device with a total score of 49, achieved a digital literacy index of 67.12% in the medium category.

Based on this data, the average value of digital literacy skills of MAN students reached 82.33, including 22 statements in the high digital literacy category, 5 statements in the medium category and 1 statement in the low category, it can be concluded that in terms of information and data literacy statements, critical thinking, communication skills, technology ethics, individual security, device security and ability to use technology fall into the excellent category, this is due to the MAN curriculum designed in combining general and religious

knowledge which prioritizes ethics and morals in using technology. Students' ability to think critically is still low, due to the lack of integration in each subject. (Santo Gitakarma, n.d.; Williams & Stockdale, 2003) the lack of learning approaches or models that optimize the empowerment of students' skills. (Lack of *Critical Thinking Models and Approaches*, n.d.; Mahanal et al., n.d., 2019). The data above describes the results of research conducted to measure digital literacy skills in high school, vocational and MAN students in Bengkulu province at the southern tip of Sumatra-Indonesia. The study used a quantitative approach and collected data with a sample of 219 students. The data was analyzed using Confirmatory Factor Analysis (CFA) techniques to verify the validity of the instrument and Cronbach's Alpha to estimate reliability. The results of this study show that the digital literacy instrument has met the good criteria and has a very high reliability estimate value of 0.730.

This study identified 7 indicators and 28 items divided into indicators such as information and data *digital literacy skills*, communication, collaboration, personal security, device and technology security. The results show that all of the above indicators have met the valid criteria. The data is used as a tool to measure digital literacy skills in high school, vocational and MAN students. These students are referred to as digital natives and currently can be said to be generation Z people, where in Indonesia in the post-covid digital era, they are accustomed to technology from an early age. However, what schools must continue to optimize is to hone critical thinking skills and the ability to use technology in learning, so that it will have a real impact when there is student interactivity with critical thinking and online material as a resource and one of them smart technology has a contribution to a positive impact (Kopotun et al., 2020; Saadé et al., 2012).

The pattern of readiness of SMA, SMK and MAN students in facing the challenges of current digital technology can be reflected in technical skills in using software and hardware needed in accessing and using various digital information, students were able to identify reliable sources and distinguish between accurate information or not, so students still need guidance from teachers, parents and society in building an understanding of digital ethics, including copyright, privacy, security and responsibility in using technology, and interacting in today's digital environment, critical thinking skills are still in the medium category for MAN students because guidance is needed for the ability to critically analyze and evaluate the truth of information received or assumptions about information encountered online. When students have good digital literacy skills, it is directly proportional to the level of their ability to think critically (Cintamulya et al., 2023; Kurniawan et al., 2023).

Conclusion

Based on the resulted of the study, it can be concluded that these patterns provide an overview of the extent to which they are ready to face the demands and opportunities offered by the increasingly digitized information society in this era. By understanding these patterns, educators and policy makers can design more effective educational strategies to improve the digital literacy skills of students in Indonesia, specifically the need to optimize students' abilities in the critical thinking sub index, due to their low curiosity in the ability to identify information biases and assumptions in the information they encounter online without finding out about the author of the information and the author's track record, so that students will be more vulnerable to receiving information that has not been properly verified or fake and can have an impact on potential targets for irresponsible parties. In the sub-index of the ability to use technology, it is not optimal because students are only consumers where they are used to

enjoying content rather than creating content or developing technology, so their abilities such as using productive applications are less desirable due to limitations in digital literacy skills.

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