# Student's digital literacy competence and its implications for the learning process

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## Article Info

## ABSTRACT

This study measures and compares the digital literacy index between general and vocational high school students. The aim is to determine each student's ability to understand and implement literacy skills in the digital space. The notes from the findings of this study are then related to the proper implementation of the learning process between the two groups of education levels. This study uses quantitative methods, with the research design as a survey. The population of this research is general and vocational high school students in Medan, Indonesia using a margin of error of 5%. The sampling technique in this study used the quota sampling method proportionally to 400 respondents, with 220 respondents coming from general high school education level and 180 respondents from vocational education level. The results of this study indicate that vocational high school students have a higher digital literacy index than general high school students.

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## 1. INTRODUCTION

Information communication technology (ICT) is growing and trying to provide a variety of information to help solve human problems [1]. Digital technologies provide more information, computing, communication, and connectivity, enabling new forms of collaboration among distributed networks of diverse actors [2]. Digital transformation seeks to increase productivity, value creation, and social welfare of various parties, from national governments, multilateral organizations, and industry associations to civil society, to produce strategic views studies to underlie long-term policies [3]. The development of these new technologies ultimately combines technology for industry and social activities, which gave birth to the concept of Society 5.0 [4].

Era society 5.0 focuses on the application of technology in constant development and innovation-driven for industry 4.0 to solve the problems of humankind, such as population aging, natural disasters, social inequality, security, and improving people's quality of life [5], [6]. Integrating technology with society is important because it is relevant for applying artificial intelligence, big data, and robotics technology for the benefit of humankind [7]. This digital era makes the internet of things (IoT) a solution that plays an essential role in the development of ICT, as well as information management in a digital context [8].

In the context of global education, technological developments support innovation in quality, fair, inclusive education services and provide lifelong learning opportunities for everyone [9]. Technology

procurement in the current era is also needed in various schools worldwide, besides teaching staff, teaching materials, and infrastructure [10]. New Jersey Minority Educational Development through the global education report 2022 through the results of international education research found that 15% of respondents from the student, teacher, and taxpayer backgrounds wanted more technology applications in education [11]. Even the "more technology" option is in the top 5 choices of students and taxpayers [11]. "More technology" in this survey means how to prepare students to be ready for the 21st-century knowledge-based global economy by regularly reviewing state technology investments for students in schools [12].

Talking about educational technology in Indonesia, it cannot be separated from the quality of its human resources in using technology. The institute for management development in 2021 placed Indonesia 53 of 64 countries with a score of 50.146 [13]. The ranking is the accumulation of Indonesia in terms of knowledge which ranked 60 of 64 countries; technology 49 of 64 countries; and future readiness 48 out of 64 countries [13]. The Portulans Institute, through the network readiness index 2021, also noted that Indonesia still has five weaknesses in preparing appropriate technology, some of which is the implementation of SDG4: quality education and ICT regulatory environment [14]. These two indicators are essential to pursuing digitization in the education field [14]. However, it is a pity that Indonesia is only ranked 70th with a score of 19.51 in improving the quality of education [14]. It is ranked 121 out of 130 countries in creating policies friendly to ICT development, with a score of 56.47 [14].

If we looked at Indonesia's results at PISA in 2018, the condition of ownership of digital devices in the form of computers by students does not reach half the student population [15]. In fact, at the same time, an average of 89% of students in all Organization of Economic Co-operation and Development (OECD) countries have computers to do schoolwork [15]. This digital divide is not just a matter of having or not having physical access to digital devices but about differences in how, when, and for what purposes technology is used, and then impacts students' literacy skills [16]. Concerning student literacy, it was found that literacy practice in Jakarta, the capital city of Indonesia, only focused on specific activities rather than the collective Penta-helix effort in developing students' literacy skills [17]. The education system that was built has implications for the level of learning that remains low; even when students have advanced grades, they still do not meet the national learning outcomes targets set by the government [18]. Notes from internal students are another reason the quality of education in Indonesia still requires much development. In general, students' motivation to pursue technical learning related to technology is still very lacking [19]. COVID-19 pandemic forced students to adapt to digitalization communication between friends and in the context of learning at school [20]. They are very fast in capturing the essence of digitization. However, many things still need to be further developed regarding the use of technology by this group of teenagers [21]–[23].

Problems and opportunities in the digital world or the internet are wide open, along with the interaction of digital communities in cyberspace [24]. Each social group must get different methods regarding age, geography, and level of education [25]. Schools, as a means for students, are required to develop better digital literacy skills through subject matter provided by teachers [26]. Unfortunately, digitizing education in Indonesia continues to revolve around a Java-centric education policy, which widens the already enormous educational inequality in Indonesia [27]. Not only that but crucial regulations designed by the government are rarely heard by students [28]. For example, Medan City, the capital of the province of North Sumatra, is also the third largest metropolitan city in Indonesia, after Jakarta and Surabaya, which are incidentally located in the Java Island area. East Ventures, in 2022 noted that the number of digitally capable students in North Sumatra was ranked fifth highest in Indonesia, where 48 out of 100 students were competent in utilizing access to digital devices [29]. Nevertheless, unfortunately, this figure is not supported by the growth of digitally capable students who only scored 3.5 out of 100, while at the same time getting the lowest rank in Indonesia, which was ranked 30 [29].

It has also attracted the attention and interest of researchers to study and measure the distribution of digital literacy competencies of students at the high school level so that they can know the specifics of mapping based on education level; between general and vocational high schools. In addition, this research also wants to see important notes that need to be examined from the findings of this study, especially regarding the implementation of students' abilities in the city of Medan, which may be closely related to other regions outside Java. It is a reference for policymakers to be able to adapt good rules regarding the findings obtained through the comparative results of general and vocational high school students in Medan City, Indonesia. The authors' team uses several previous research references regarding digital literacy in Medan City [23], [25], [30]–[32], to support the writing of this article.

## 2.    RESEARCH METHOD

This study uses a quantitative approach that focuses on observing the measurement of a variable, with the research design using survey research [33]. The data collection technique used in this quantitative

research is using a questionnaire. The measurement scale used in this study is the Likert scale [34], [35]. The value representation of the Likert scale related to the score applied by Japelidi in translating the index acquisition for each competency is 1=very low; 2=low; 3=moderate; 4=high; and 5=very high [21]. Equation (1) is used to obtain the mean for each of the digital literacy abilities.

$$\text{The mean for each question item} = \frac{(\text{Score 1 x n})+(\text{Score 2 x n})+(\text{Score 3 x n})+(\text{Score 4 x n})+(\text{Score 5 x n})}{(\text{Total n})} \qquad (1)$$

Where, $n$ is number of samples.

Based on the question items compiled by the researcher, three items of ability questions will represent one competency. Equation (1) is then accumulated according to the three abilities contained in the competence, then divided by three as the total questions in each competence. Equation (2) is the formula for calculating these competencies.

$$\text{Competency Index} = \frac{\text{Mean item X1}+\text{Mean item X2 }+\text{Mean item X(n)}\ldots}{\text{Total X}} \qquad (2)$$

We conducted this research in 20 senior high schools in Medan City. Specifically targeted two levels of education, namely general and vocational high school, where the total number of senior high school students in Medan city were 128,928, consisting of 70,799 general high school students and 58,129 vocational students [36]. The determination of the sample in the study is based on the Yamane formula [37] with a sample error rate or sampling error of 5%, so the number of samples involved in this study was 400 respondents.

$$n = \frac{N}{1+N(e)^2}$$

$$n = \frac{125,483}{1+125,483(0.05)^2}$$

$$n = \frac{125,483}{314.7075} = 398.73 \approx 400 \text{ respondent}$$

Where, N is total population; n is sample; e is margin of error (sampling error); and 1 is constant.

The study was conducted using quota sampling, part of the Nonprobability sampling [38]. In some instances, the non-probability sample can be applied in quantitative research under limited population characteristics [39]. The determination of respondents is determined according to (3).

$$n_x = \frac{N_x}{N_{total}} \; x \; n_{total} \qquad (3)$$

Where, $N_x$ is total population of one category; $n_x$ is sample of one category; $N_{total}$ is total population; and $n_{total}$ is sample determined in the study. Based on the (3), the proportional distribution of the regional sample is as (4) and (5).

$$n_{General\ High\ School} = \frac{70,799}{128,928} \; x \; 400 = 219.65 \; \approx 220 \qquad (4)$$

$$n_{Vocational\ High\ School} = \frac{58,129}{128,928} \; x \; 400 = 180.35 \; \approx 180 \qquad (5)$$

Thus, the number of general high school respondents in Medan City involved in this study was 220, while the number of vocational students was 180.

## 3. RESULTS AND DISCUSSION
### 3.1. Characteristics of respondents

Respondents' characteristics in this study became an indicator of how proportional the participants who participated in this study were. If we look at the research findings in the Table 1, the number of male and female respondents has a balanced percentage. In addition, in terms of age, the majority of senior high school students who became respondents were from the age of 17 years, with a rate of 38.75%; followed by the age of 16 years, 29.25% of the total respondents; then 15 years by 18.5%; and the least is the age group 18 years, with a percentage of 13.5% of the total respondents. Then at the level of education, respondents can be said to be proportional to the total population. It follows the composition of respondents on the results of the formulation of the sampling technique that the researcher had previously carried out. It noted that 55% of respondents from general high school became research respondents, followed by the vocational high school level of 45% of the total 400 respondents involved.

In terms of internet usage, Alvara Research Center divides internet usage into four levels, namely, less than 1 hour classified as light users, 1-3 hours classified as medium users, 4-6 hours classified as heavy users, and 7-10 hours and more than 10 hours as addicted users [40]. If we look at the internet usage habits of senior high school students in Medan City in general, their tendency is dominated by the addicted users' group (7-10 hours and>10 hours). It can be seen in the Table 1 that there is a total of 42% (accumulation between 7-10 hours and>10 hours). Meanwhile, another 33.25% are classified as heavy users, and another 21.25% are users with medium-level users. Meanwhile, in the light users' group, only a few teenagers are at this level of internet use, which is 3.5% of the total participating respondents.

Table 1. General characteristics of respondents based on gender, age, education level, and internet usage

|  | Information | Frequency | Percentage (%) |
|---|---|---|---|
| Gender | Male | 200 | 50.00 |
|  | Female | 200 | 50.00 |
|  | Total | 400 | 100 |
| Age | ≤15 years | 74 | 18.50 |
|  | 16 years | 117 | 29.25 |
|  | 17 years | 155 | 38.75 |
|  | ≥18 years | 54 | 13.50 |
|  | Total | 400 | 100 |
| Education level | General high school | 220 | 55.00 |
|  | Vocational high school | 180 | 45.00 |
|  | Total | 400 | 100 |
| Average internet usage duration | <1 hour | 14 | 3.5 |
|  | 1−3 hours | 85 | 21.25 |
|  | 4−6 hours | 133 | 33.25 |
|  | 7−10 hours | 99 | 24.75 |
|  | >10 hours | 69 | 17.25 |
|  | Total | 400 | 100 |

The use of social media is also inseparable from the characteristics of daily internet use. Social media certainly plays an essential role as a communication tool and a medium for gathering information, both for personal needs and the interests of students' school work. The six social media most widely used by Indonesians [41], WhatsApp is the application owned by almost all respondents. As shown in Table 2, at least 99% of students use students in Medan City, followed by Instagram at 90% and YouTube at 89%.

Table 2. Types of social media used by respondents

| Social media | Answer options | Frequency | Percentage (%) |
|---|---|---|---|
| Facebook | No | 167 | 41.75 |
|  | Yes | 233 | 58.25 |
|  | Total | 400 | 100 |
| Instagram | No | 40 | 10.00 |
|  | Yes | 360 | 90.00 |
|  | Total | 400 | 100 |
| WhatsApp | No | 4 | 1.00 |
|  | Yes | 396 | 99.00 |
|  | Total | 400 | 100 |
| YouTube | No | 44 | 11.00 |
|  | Yes | 356 | 89.00 |
|  | Total | 400 | 100 |
| Twitter | No | 286 | 71.50 |
|  | Yes | 114 | 28.50 |
|  | Total | 400 | 100 |
| TikTok | No | 126 | 31.50 |
|  | Yes | 274 | 68.50 |
|  | Total | 400 | 100 |

As we know, WhatsApp is a popular messaging application, which in the context of students will be very useful in maintaining communication with families and discussing matters related to school assignments. Meanwhile, Instagram and YouTube tend to be used to find innovations in helping with school assignments or being a medium of entertainment for them. Meanwhile, Twitter is the least-used application by senior high school students; only 28.5% of the respondents have the application. The characteristics of the respondents, by their socio-demographic conditions and the use of the internet and social media, have implications for their digital literacy skills. It cannot separate this condition from the concept of technological

determinism. The birth of this theory is based on the proposition that technology, including media, information, and communication modalities, is the main engine that drives economic growth, social change, democracy, and modernization in society [42].

### 3.2. Student's digital literacy competence

The digital literacy index used in this study is based on the 10 digital literacy competencies of Japelidi (Digital Literacy Activist Network or *Jaringan Pegiat Literasi Digital*). It consists of the competence in accessing, selecting, understanding, analyzing, verifying, evaluating, distributing, producing, participating, and collaborating [43]. The researchers set three indicators in measuring each of their competencies and determine the accumulated index of these competencies. Table 3 shows the student's digital literacy competence between general and vocational high school.

The digital literacy of these students begins with measuring how competent they are in accessing. This competency aims to see how digital media users display technical skills in operationalizing new media, be it ownership of access to new media (hardware or software), managing internet access through digital devices, and knowledge in recognizing and operating each digital platform. Based on the comparison between general high school and vocational high school students, we can see that the index is not much different between general high school and vocational high school students. The results of the competency parameters show that high school students excel on all parameters. When viewed from the index score, general high school students obtained an accumulated score of 4.31 out of 5.00, while vocational high school students got an index score of 4.22 out of 5.00. Although the general high school group is superior in scores, these two levels of education have the high category in this competency.

The measurement of competence in selecting becomes the following competency that wants to see how digital device users can select and sort information according to their needs and their ability to ignore, delete and block information that is not needed. The comparison results based on the survey findings in the two high school groups show an index that only differs in value by 0.01, where general high school students get a score of 4.12 out of 5.00, while vocational high school students score 4.11 out of 5.00. In this competency, general high school students excel in the ability to delete and block unwanted information. In contrast, vocational high school students slightly excel in the ability to ignore unwanted messages. However, these two groups scored the same in the ability to choose the information they needed. Although somewhat different, this group of students is at a high level of this competency.

Competence in understanding is a competency that wants to see how the user's competence to understand textually about new media content. Ranging from understanding programming languages to the practical use of new media; then ideas conveyed by the author of the message, grammar, and use of punctuation; to understanding the meaning and context of using symbols (emoticons), images and videos textually and contextually. The findings in this study indicate differences compared to previous competencies, where the competency index of vocational high school students is higher than general high school students, i.e., 4.11 from 5.00 to 4.00 from 5.00. If we look at the overall assessment parameters, the scores of vocational high school students also outperform the three indicators. However, the two groups of students were both at the level of capable competence.

The measurement of competence in analyzing wants to see how the ability of digital media users to dissect and read content in new media more comprehensively from many points of view. The things reviewed in this competency start from the packaging of information, sources of information, the purpose of the information maker, the language used, to the meaning behind the media representation. This competency usually uses a semiotic way of thinking that the signifier has a meaning. Based on the research findings, the results obtained that these two levels of education are at a moderate level of competence in analyzing. Even though they are at the same level, vocational high school students are far superior, with a score of 3.76 out of 5.00, compared to general high school students, who get a score of 3.65 out of 5.00. Based on these three competency assessment parameters, vocational high school students look higher than general high school students.

The subsequent measurement of the 10 digital literacy competencies is competence in verifying. This competency wants to see how the ability of digital media users to perform a meta-analysis and search for information to obtain a synthesis. At a higher level, media users can map out sources of information based on the categorization that has been determined, and carry out fact-checking procedures, to map disinformation. Comparing general and vocational high school students on this competency found a significant difference between these two groups. Table 3 shows that vocational high school students are far superior in index scores, where they get 3.85 out of 5.00, while general high school students get an index score of 3.76 out of 5.00. The two education groups are also moderate, although one has a higher index of competence in verifying.

Table 3. Student's digital literacy competence between general and vocational high school

| Competency | Parameter of competency | Index parameter based on education | |
|---|---|---|---|
| | | General high school | Vocational high school |
| Competence in accessing | Internet access using digital devices | 4.20 | 4.02 |
| | Use of search engines to find information | 4.43 | 4.36 |
| | Information search through social media applications | 4.31 | 4.27 |
| Average of competency index | | 4.31 | 4.22 |
| Competence in selecting | Choose information as needed | 4.27 | 4.27 |
| | Ignore information that is not needed | 4.05 | 4.06 |
| | Delete information or block sources of information that are not needed | 4.04 | 3.99 |
| Average of competency index | | 4.12 | 4.11 |
| Competence in understanding | Understand written information by the language used | 4.04 | 4.11 |
| | Understand the symbols used | 3.96 | 4.12 |
| | Understand the meaning of a video or picture | 4.01 | 4.11 |
| Average of competency index | | 4.00 | 4.11 |
| Competence in analyzing | Understand the implied purpose of the information obtained | 3.58 | 3.71 |
| | Linking the linkages of information to the purpose of the message maker | 3.66 | 3.77 |
| | Identify ambiguity in interpreting information | 3.70 | 3.82 |
| Average of competency index | | 3.65 | 3.76 |
| Competence in verifying | Provide categorization of an information | 3.53 | 3.66 |
| | Identify wrong/ unbelievable information | 3.85 | 3.90 |
| | Decide on the truth of an information | 3.90 | 3.98 |
| Average of competency index | | 3.76 | 3.85 |
| Competence in evaluating | Determine the source of information or media that can be trusted | 3.97 | 3.99 |
| | Provide an assessment of the quality of information | 3.90 | 3.91 |
| | Determine the credibility of the information written by the author | 3.69 | 3.71 |
| Average of competency index | | 3.85 | 3.87 |
| Competence in distributing | Spread content or information through the appropriate application | 3.85 | 4.03 |
| | Adjust the dissemination of information to the right message target | 3.63 | 3.78 |
| | Spread information according to the nature of the message | 3.66 | 3.82 |
| Average of competency index | | 3.71 | 3.88 |
| Competence in producing | Create messages or information in writing through digital devices | 3.82 | 3.98 |
| | Editing in a visual form or image using a digital device | 3.31 | 3.58 |
| | Editing in the form of audiovisual or video using digital devices | 3.34 | 3.55 |
| Average of competency index | | 3.49 | 3.70 |
| Competence in participating | Involve in an online group that suits the needs | 2.82 | 3.07 |
| | Actively participating in online group activities | 3.53 | 3.51 |
| | Contribution to online groups or chat groups for a month | 2.20 | 2.52 |
| Average of competency index | | 2.85 | 3.03 |
| Competence in collaborating | Create online groups or chat groups on social media | 2.09 | 2.55 |
| | Act as a manager or become an admin of the online group or chat group on social media | 1.85 | 2.38 |
| | Manage topics in online groups or chat groups on social media | 2.01 | 2.31 |
| Average of competency index | | 1.98 | 2.41 |

Competence in evaluating the aspect of digital literacy assessment by Japelidi wants to see how critical users are in seeing the packaging and credibility of information to assess media quality as a social institution. When referring to the comparative findings between general high school and vocational high school students, we can see that between these two groups, there is a slight difference, where vocational high school students get an index of 3.87 out of 5.00; while general high school students got an index of 3.85 out of 5.00. Table 3 shows that vocational high school students excel in all aspects of assessment in this competency. However, both are at a moderate level of competence in evaluating.

The following competency in measuring the digital literacy index released by Japelidi is competence in distributing. Measurement of this competency emphasizes the ability of digital media users to disseminate messages in new media, including sharing responses to media content and adapting message content to the recipients of the message (language issues, forms of information, and appropriate platforms). Table 3 shows that vocational high school students and general high school students have a very striking index difference, where vocational high school students are far superior with a score of 3.88 out of 5.00 compared to general high school students who get a lower index, while is 3.71 out of 5.00. A striking difference is also seen in one of the competency measurement parameters, which shows that vocational high school students are in the high category, while general high school students are at a moderate level. However, the accumulated index on competence in distributing obtained by these two groups is in moderate categorization.

The following competency is the competence in producing, where the benchmark in this competency is how the technical ability of digital media users to design a message to convey ideas and information according to the purpose and nature of the message, the expected target of the message as well as the proper media application, by media users. The process of packaging and uploading messages is applied in writing, visuals, or

audiovisuals. If the kit refers to the research findings between vocational high school students and general high school students, it is evident in the Table 3 that vocational high school students are far superior to general high school students. The accumulated index of the three parameters on competence in producing vocational high school students got a score of 3.70 out of 5.00, higher than general high school students, who only got a 3.49 out of 5.00. The competency index obtained from the two groups of students is moderate.

Competence in participating is a competency that explicitly measures the intensity of involvement in new media ecosystems. In short, this competency requires new media users to be actively, interactively, and critically involved in the online community, followed by their contribution to the online community. The findings in the group of vocational high school students with general high school found that the participation rate of vocational high school students was much higher, with an index score of 3.03 out of 5.00, compared to general high school students who only got 2.85 out of 5.00. Referring to the parameters in the index assessment, vocational high school students excel in engagement and contribution in the form of material. In comparison, the general high school students were slightly superior in the activity level in the online group. The accumulated index of the three parameters on the competence to participate puts vocational high school students at a moderate level, while general high school students are low level.

Competence in collaborating becomes competence in measuring digital literacy initiated by Japelidi. This competency aims to see how the competence of digital media users in initiating an online movement that involves many parties for specific purposes (can be practical, pragmatic, or socially advocating) to the quantity of media users from managerial positions in online communities and the intensity of their management. The results of the survey of students showed that vocational high school students outperformed the three predetermined competency measurement parameters. It can also be seen from the accumulated index, where vocational high school students got 2.41 out of 5.00, and while general high school students only got an index score of 1.98 out of 5.00. Although the vocational high school group is superior, there is an important note where the two groups are still not optimal in implementing the collaboration movement in digital community spaces. This result, in particular, places general high school students in the very low category, while vocational high school students are at the low level as presented in Table 4.

Table 4. Comparison of student's digital literacy index between general and vocational high school

| Competency | Parameter of competency | Index parameter based on education | |
|---|---|---|---|
| | | General high school | Vocational high school |
| Digital literacy index | Competence in accessing | 4.31 | 4.22 |
| | Competence in selecting | 4.12 | 4.11 |
| | Competence in understanding | 4.00 | 4.11 |
| | Competence in analyzing | 3.65 | 3.76 |
| | Competence in verifying | 3.76 | 3.85 |
| | Competence in evaluating | 3.85 | 3.87 |
| | Competence in distributing | 3.71 | 3.88 |
| | Competence in producing | 3.49 | 3.70 |
| | Competence in participating | 2.85 | 3.03 |
| | Competence in collaborating | 1.98 | 2.41 |
| Average of competency index | | 3.57 | 3.69 |

Overall, the competencies tested in this study found that the digital literacy index of vocational high school students was higher than that of general high school students. Based on the measurement results in this study, vocational high school students obtained an index of 3.69 out of 5.00. Meanwhile, general high school students obtained an index score of 3.57 out of 5.00. Although both are at a moderate level of competence in measuring digital literacy, these findings confirm that the ability to apply the framework and concept of ability in digital literacy by vocational high school students is much better than general high school students.

### 3.3. Discussion

In the context of education in general, many students use internet access and social media to connect for learning purposes, discussions about school work, and many other things related to education [44]. When referring to the research findings can be an indication that although most of the students are classified as addicted users, the use of social media still has a positive value, especially those related to the realm of education. It is also seen in the dominance of the use of WhatsApp by high school students, where the primary use of the application is as a communication medium. It has the potential to create educational opportunities for discussion, either person-to-person or in the community.

However, suppose this opportunity is associated with the index competence in participating and collaborating obtained from the survey findings. In that case, students tend to be passive in applying the parameters to these two competencies. Researchers consider that this finding has implications for their

characteristics as teenagers still searching for identity [45]. So, there is a need for alignment where stakeholders in the education field provide opportunities and collaborative practices in the digital space, either in the form of instructions to create campaign assignments around the dangers of hoaxes or directives to organize online communities related to their talents and interests. Directions like this are a persuasive step to increase the competence to participate and collaborate in a positive direction in the digital space.

The role of technology in education is also significant in learning and extracting some basic knowledge needed by students [46]. Moreover, the percentage of ownership of digital devices by students, in general, is also very high [47]. Let us compare the research findings on groups of general high school students with vocational high school students. It can also be seen that the digital literacy index between these two groups is at a moderate level. However, technically, vocational high school students are far superior to general high school students. One indicator that might trigger the higher competence of vocational high school students compared to general high school students is that the Indonesian education system requires vocational high school students to understand practical matters better. It is because the outcomes demanded by the government for vocational high school students are ready to compete in the world of work. In contrast, general high school students only focus on learning theoretical lessons and must continue to college [48].

The findings in this study reveal various notes in efforts to increase the digital literacy index among students. The implementation of e-learning during the COVID-19 pandemic had a very high contribution to improving students' digital literacy skills [49]. To the concept of technological determinism theory, we as humans form the tools to communicate, and finally, the tools to communicate that we use to shape or influence our own lives [50], [51]; so that, to support the learning process during digital transformation, training and learning innovations relevant to the competence of digital mastering technology are needed [52].

Therefore, in the transition period of the COVID-19 pandemic, teachers, education providers, and the government also have an essential role in improving digital literacy skills. Several ways include applying and linking each subject with available information through online media and ensuring students can absorb the knowledge [53]. Here too, the school must assess the condition of the school and its students, then be able to implement appropriate ICT [54]. Thus, the quality of the learning process and students' technological literacy increases, especially in supporting their learning at school.

## 4. CONCLUSION

Research involving 220 general high school students and 180 vocational high school students found that the digital literacy index of vocational high school students was much higher than general high school students. The results of this study align with the primary education obtained between the two groups of students, where vocational high school students are much more likely to receive subjects in the usable form and are exposed to technology. In contrast, general high school students primarily receive theoretical learning. Even though both are at a moderate level of ability, there are typical notes that need to be considered to improve digital literacy between these two groups—from observing students' condition with the proper use of technology to aligning subjects with the use of technology. It can be a simple step for the school, the government, to the students to improve their digital literacy competencies.

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