Independent Learning in the Digital Era, The Relationship of Digital Literacy with Self-Directed Learning in High School Students

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Keywords	Abstract
_____ digital literacy, self directed learning, high school _____	Education has been shifted to a digital environment nowadays. Students must adapt to the implementation of distance learning. This online learning requires the activeness of students, especially to be independent in learning—self-directed learning. However, with many learning resources on the internet, digital literacy is also needed so that students can carry out their self-directed learning better. This study aims to determine whether there is a relationship between digital literacy and self-directed learning in high school students. This research method is quantitative with a correlational design. The sample for this study used a proportionate stratified random sampling technique and obtained as many as 259 1st and 2nd year students from SMAN 6 Semarang. The measuring instruments used are the digital literacy scale and the self-directed learning scale, with Cronbach's Alpha reliability scores of 0.827 and 0.851, respectively. The results of hypothesis testing are the acceptance of the working hypothesis, so it can be concluded that there is a relationship between digital literacy and self-directed learning. The correlation coefficient obtained is 0.217. In addition, descriptively, it is known that the subject's self-directed learning condition is in the medium category and the subject's digital literacy condition is also in the moderate category.

INTRODUCTION

It is undeniable that all aspects of life are changing, including the culture of teaching and learning. Teaching and learning have been developed to be inseparable from technology, or we can call it digital era learning or internet-based learning. Electronic books, learning websites, articles or blogs, electronic journals, and online libraries are today's products in the field of education that can be used as well as possible by everyone to learn. Scientists and educational practitioners have seen that digital-based learning will soon be implemented with all its advantages and disadvantages. According to Oncu & Cakir (2011), online learning or online learning environments (OLE) will be a necessity in the future, but still needs studies on its refinement.

The future is coming sooner than we think. As we understand it, digital learning, which is predicted to be a learning system in the future, now we have to go through with "forced" since 2020. "Pembelajaran Jarak Jauh"—Indonesian Distance Learning—is an internet-based learning program launched by the Indonesian government following the COVID-19 pandemic in the same year. The form of learning that is applied is synchronous or asynchronous, and then the application uses video conferencing techniques to hybrid. However, aspects such as costs, systems, digital device facilities, and human resources who have not mastered technology have become problems in implementing this digital-based learning. Putra (2020) stated that distance education in Indonesia during this pandemic was still lacking in equipment, resources, personnel, skills, and the quality of the parties involved.

This learning style requires the activeness of students, especially to be independent in learning. This form of learning will emphasize student-centered learning. Students must be empowered and independent to seek new knowledge without being directed by others. The independence of students in learning is referred to as self-directed learning. This ability is emphasized so that they can seek new experiences and construct them into knowledge and learning for themselves (Hanik, 2020). Another reason for the importance of self-directed learning is that students do not only seek knowledge on their own, but they also identify their own learning needs sustainably. Novanda (2019) says this system will make students independent in the classroom. Thus, students who develop good self-directed learning will be more independent in learning (empowered learners) and better prepared to face competition in the 21st century, which emphasizes creativity, speed, collaboration, independence, and so on.

To become an empowered learner is also concerned with information from digital sources or the internet. Online learning offers many learning resource options. On the other hand, students find it difficult to determine which sources are relevant (Durnalı, 2020). The internet has become a very broad source of information and continues to grow so that it can be understood as an "ocean of information" for learning. To achieve optimal self-directed learning, of course, it is necessary to have the ability to access and process this digital information (Dinata, 2021).

A propper digital literacy can help students find new information and knowledge that supports their education. With just a smart phone alone, it is very possible to carry out higher-level and modern learning (Masitoh, 2018). According to Dinata (2021), students may already have the ability to find information, but it is not yet effective and efficient. Therefore, digital literacy needs to be developed appropriately. The ability to search for information effectively will make it easier for students to get information according to their needs, while efficiency will make students able to get a lot of information they need to learn without costing so much time.

Based on previous research, the relationship between self-directed learning and digital literacy has been discussed several times, especially in the world of higher education, for example in Akbar & Anggaraeni's research (2017). The results of this study show that there is a significant relationship between digital literacy and self-directed learning in final students of the Faculty of Psychology, Universitas Sumatera Utara. Then Latifah (2018) conducted research on third-year students of IAIN Surakarta regarding digital literacy and self-directed learning. The result is that in implementing self-

directed learning, it needs to be balanced with digital literacy skills for more effective results. Then, in recent conditions, Hanik's research (2020) shows that the implementation of self-directed learning in the pandemic era requires digital literacy skills, for example, to access educational sites or educational applications in learning so that they can undergo learning well.

Previous research has often focused on college because self-directed learning is full of adult learning culture. However, younger students, such as high school students, must be considered as to the condition of their self-directed learning, digital literacy, and the relationship between the two. Therefore, the researcher conducted this research entitled "The Relationship between Digital Literacy and Self-Directed Learning in High School Students".

METHODS

This study used a web-based survey design with quantitative-correlational analysis. The population in this study were students in grades 1 and 2 of SMAN 6 Semarang. A proportional stratified random sampling technique was used to collect the sample, and 259 students were taken. The independent variable in this study is digital literacy, and the dependent variable is self-directed learning. The operational definition of digital literacy in this study is the ability to use information and communication technology in the form of searching, sorting, evaluating, and reproducing the information that has been obtained. Meanwhile, self-directed learning is the ability of individuals to control themselves in terms of learning by setting goals, looking for appropriate learning strategies, monitoring and evaluating their learning activities.

The research data was collected using a digital literacy scale and a self-directed learning scale. Each has a Cronbach alpha reliability coefficient of 0.827 and 0.851. Data collection is done online via Google Form. The statistical technique that is used is Pearson correlation. The data will be analyzed using statistical processing software and will test the hypothesis that "There is a relationship between digital literacy and self-directed learning for students of SMAN 6 Semarang City."The hypothesis is accepted if the calculation results get a significance level (p 0.05).

RESULT AND DISCUSSION

Before we test the hypothesis, we need to do some assumption tests, which are normality tests and linearity tests. The normality test results can be seen in the following table.

Table 1. Result of Normality Test

	Digital Literacy	*Self Directed Learning*
Chi-Square	3,367	0,985
df	4	4
Asymp. Sig.	0,498	0,912

Based on the following table, the significance level is 0.498 for digital literacy and 0.912 for self-directed learning. Because the two results are greater than 0.05, it can be concluded that the distribution of the data has no difference with the expected data, so that the data is normally distributed. Then the results in linearity testing are as follows

Table 2. Result of Linearity Test

			Sum of Square	df	Mean Square	F	Sig
Y*X	Between Groups	(Combined)	3566,136	46	77,525	1,043	,408
		Linearity	913,468	1	913,468	12.286	,001
		Deviation from Linearity	2652,668	45	58,948	,793	,822
		Whitin Groups	15762,010	212	74,349		
		Total	19328,147	258			

Based on the following table, it is known that the X and Y variables have a significance of 0.822 (> 0.05), which is significant, and it can be concluded that there is a linear relationship between digital literacy and self-directed learning.

Since both assumptions have been met, it is possible to test the parametric hypothesis. The results of this research hypothesis testing are as follows:

Tabel 3. Hypothesis Test Result

		Digital Literacy	Self Directed Learning
Digital Literacy	Pearson Correlation	1	,217
	Sig (2-tailed)		,000
	N	259	259
Self Directed Learning	Pearson Correlation	,217	1
	Sig (2-tailed)	,000	
	N	259	259

Based on the table above, it is known that the correlation coefficient is 0.217 with a p-value of 0.001. Therefore, an alternative hypothesis state, "There is a relationship between digital literacy and self-directed learning for students at SMAN 6 Semarang City." was received. The findings indicate a positive relationship between the two. This means that the higher the students' digital literacy, the higher their self-directed learning.

An overview of digital literacy and self-directed learning of SMAN 6 Semarang students based on their categorization is shown in the following table.

Table 4. Descriptive Summary of Subject's Digital Literacy and Self Directed Learning

Variabel	Category		
	High	Medium	Low
Self Directed Learning	28%	70%	2%
Digital Literacy	32%	68%	0%

Based on the table, it is known that as many as 28% of students have high self-directed learning, 70% of students are in the medium category, and 2% of students are in the low category. Then, 32% of students' digital literacy is in the high category and 68% are in the medium category.

Specifically, the description of self-directed learning and digital literacy based on each aspect is shown in the following figure:
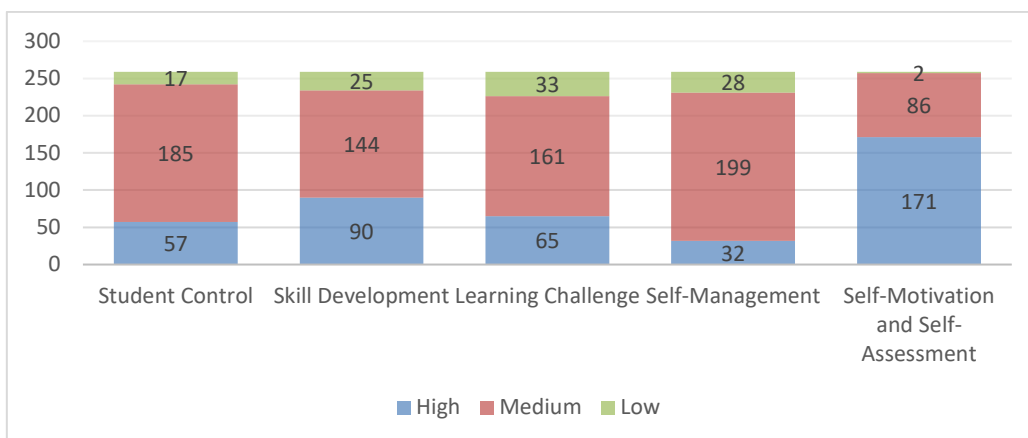
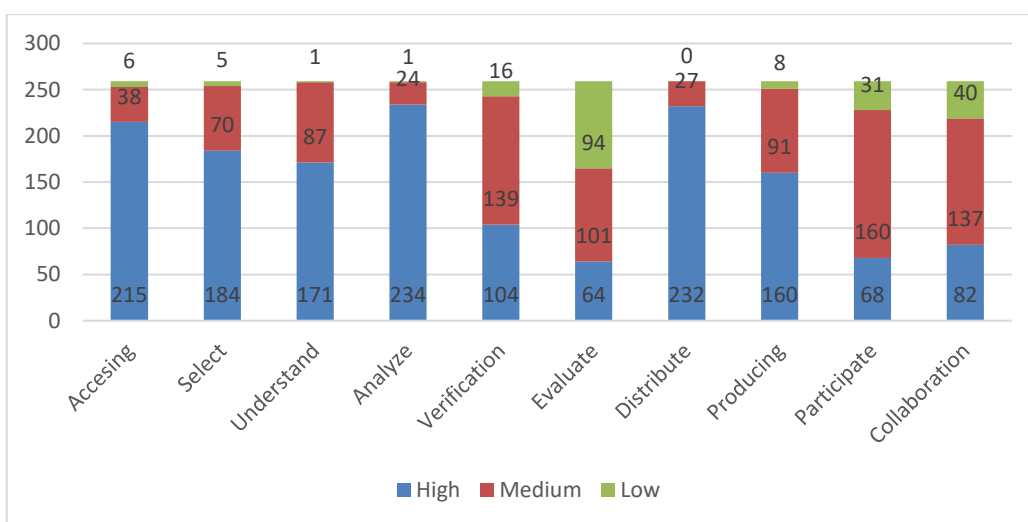Figure 1. Summary of Self-Directed Learning Based on Each Aspect

Figure 2. Summary of Digital Literacy Based on Each Aspect

These findings are in line with relevant research that has been done previously. Research by Rashid & Asghar (2016) was conducted on 761 students and examined the relationship between the use of digital technology and student engagement, self-directed learning, and academic performance. Based on the path analysis between the use of technology and self-directed learning, there are significant and positive results, and an indirect relationship between the use of technology and academic performance if it is through self-directed learning. This indicates that good digital literacy can provide useful abilities in independent study, and if good digital literacy skills are followed by good self-directed learning, it will improve student achievement. Digital literacy can have a positive impact on student learning outcomes where the ability and mastery of technology can prevent demotivation of feelings of inadequacy from continuous and rapid change.

Furthermore, research from Akbar & Anggaraeni (2017) tries to test whether there is a relationship between digital literacy and self-directed learning for students who are working on their thesis. From this study, it was found that digital literacy has a significant relationship with self-directed learning with a moderate level of relationship. Students who work on theses require initiative from themselves, considering that the thesis is an individual obligation. In doing their final project, students need various kinds of literature found on the internet, and they rely on their digital literacy skills to search for it and solve various problems. The problem-solving success they get from the internet increases their confidence and increases their initiative.

This research is also in line with Novanda's (2019) research, which examines the relationship of each aspect of digital literacy with self-directed learning in students from poor areas in Sumatra. In this study, it was found that the ability to identify information is related to the ability to manage oneself. Then the ability to evaluate information sources also has a relationship with independent thinking. Digital literacy, especially the ability to identify and evaluate information, is a very important ability and requires critical thinking skills. By thinking critically, students can carry out learning activities effectively, including being able to plan (and manage) academic activities well. Digital literacy is also the ability to take advantage of existing facilities. Digital facilities such as learning applications are certainly more practical and efficient so that their use will greatly assist the learning process.

Digital literacy for students can also help them be more confident and feel capable (efficacy) in carrying out academic tasks in online learning. This is reinforced by the opinion of Giovanni & Komariah (2020), who say digital literacy is useful for saving time, energy, and money and can train yourself in decision-making. Kara (2022) explains that digital literacy also makes students more comfortable while practicing self-directed learning psychologically.

Digital literacy skills are understood not to be the key to successful learning. Digital literacy focuses on a person's ability to operate digital devices and understand digital culture, not the direction in which this ability is used. so that high digital literacy is not always used for educational purposes. However, in the era of digital learning like now, without digital literacy skills, students will be left behind their friends. Those who do not develop digital literacy will suffer significant losses because they will be unable to fully enjoy the benefits of the internet.

Based on the findings of this study and previous research, it can be understood that the relationship between digital literacy and self-directed learning can be considered even though it is not very strong. Therefore, in preparing students to become the nation's successors who will compete in the 21st century, improving their self-directed learning skills can be done by paying attention to their digital literacy, especially in the context of education.

This research shows that the self-directed learning conditions of SMAN 6 Semarang students are generally in the moderate category. 70% of the samples taken are in the medium category, followed by 28% who are in the high category, and the rest are in the low category. This shows that the students of SMAN 6 Semarang already have a fairly good activity in finding information or subject matter by themselves. They already have the motivation and awareness of the importance of finding their own teaching materials through the internet. However, they are still not good enough at evaluating information they get.

Munasinghe et al. (2020) explain that good self-directed learning will bring students to a higher level of learning where authority, level of discipline, self-reflection, and self-evaluation are well developed. Good self-directed learning abilities help students take advantage of existing opportunities and resources to shape their learning process personally and meaningfully Rashid & Asghar (2016).

Students of SMAN 6 Semarang have been able to identify and take the initiative to find their own teaching materials on the internet, although they are still in an intermediate stage and still need to be stimulated through assignments, homework, and exams held at school. This condition is good enough and can be developed again so that students of SMAN 6 Semarang can have independent learning abilities and can meet the demands of competition in the 21st century.

Specifically, students at SMAN 6 Semarang have a fairly good or moderate student control condition. This indicates that the students of SMAN 6 Semarang are able to control themselves to carry out learning activities, although sometimes they still need stimulation. Students with good student control aspects are also shown by their independent decision making regarding when, where, and how they study. This has been shown by most of the students who were the subjects in this study. This ability is an ability that encourages students to adapt and solve complex problems and be able to

face new environments (Sukardjo & Salam, 2020). By making improvements, students of SMAN 6 Semarang can become independent individuals and have good self-control skills so that they can compete in the world of the 21st century.

Students at SMAN 6 Semarang also have moderate self-directed learning aspects of skill development. The awareness of the students to improve their learning abilities and capacity is quite good, but they still need a lot of practice and to streamline their spare time for more useful things. SMAN 6 Semarang students are able to identify their own targets and programs. The learning process that emphasizes student independence or self-directed learning will emphasize learning planning by students, which results in the development of skills to achieve achievement (Hanik, 2020).

Then in the learning challenge aspect, students of SMAN 6 Semarang are also included in the medium category. Subjects can gradually increase their learning portion while also challenging themselves to improve. Once the subject makes a target, they are quite capable of executing well and setting the target even higher. However, there are still many students of SMAN 6 Semarang who like to be in their comfort zone and are stagnant in their independent learning process. According to Rashid & Asghar (2016), students who have good self-directed learning are students who are used to facing challenges and adding to their learning experiences continuously.

In the aspect of self-management, students of SMAN 6 Semarang are in the medium category. This means that students of SMAN 6 Semarang already have the ability to manage everything needed for learning quite well. Students with moderate self-management mean that they are able to manage most of their resources, like energy, study materials, time, and other resources well, although they may not be fully optimal. By looking at this management aspect, it is known that the subject has the ability to manage their resources to maintain a good and organized level of productivity. Zhu et al. (2020) explain that self-management of self-directed learning enables students to be able to control activities that affect learning activities constantly and effectively.

In the last aspect, namely self-motivation and self-assessment, students of SMAN 6 Semarang are already in the high category. These results indicate that the ability to maintain internal motivation of SMAN 6 Semarang students is good and they are metacognitively able to understand the importance of doing independent learning. They can also do reinforcement or provide feedback on their own efforts when carrying out self-directed learning. Zhu et al. (2020) state that this motivation includes everything that encourages students' efforts to learn and monitors whether the learning strategies that have been carried out are going well or not. In general, the majority of SMAN 6 Semarang students have been able to maintain their learning strategies and evaluate and provide feedback to themselves that supports the implementation of independent learning in distance learning activities.

The conditions for the development of self-directed learning, especially during the digital era, cannot be separated from the availability of learning materials. Learning materials that have been spread in the world of the internet should be a driving force for increasing student learning independence. However, it turns out that even though there are many available, not all students can access and capture learning available in the digital realm, so that good digital literacy skills can help increase students' enthusiasm to find their own subject matter (self-study).

The digital literacy of SMAN 6 Semarang students is in a moderate condition, where the majority, or about 68%, of students have moderate digital literacy, and the remaining 32% of students are in the high category. This marks the condition of the ability of the students of SMAN 6 Semarang, which is quite good and only requires improvement in certain aspects.

A student in the current era is required to have skills in the digital world, especially with regard to the use of information media that are very abundant on the internet. The subjects in general have the ability to interact in the digital world, in content production, in online groups, or by collaborating in a larger digital forum. This is quite reasonable considering the subjects are Generation Z, who are

already digital natives. This is in accordance with the opinion of Putri & Supriansyah (2021), who stated that generation Z is expected to be a digitally capable generation because it was born in an age of good technology.

If examined based on its aspects, the digital literacy of SMAN 6 Semarang students is already good in terms of accessing and selecting information on the internet. They are able to carry out procedures to find the information they need using various platforms (software) and various devices (hardware). Students who have the ability to search for information and select effectively and efficiently will help them to be successful in learning (Dinata, 2021). Based on the data that has been obtained, students are not only able to access the information needs limited to the subject matter, but also other information they need in their daily lives.

Students of SMAN 6 Semarang also have the ability to understand and analyze the information they have obtained well. After sorting out relevant and irrelevant information, the subjects were able to understand the message and the purpose of writing from the information they got. They are able to recognize the purpose of both express and implied information spread on the internet quite well.

Kurnia et al. (2020) explain that high analytical skills make a person able to recognize whether information is accurate (convincing) or not. Analytical skills are very important for students so that they can find information about the lesson appropriately and avoid misinformation. Subjects have understood that in searching for subject matter, they will look for trusted web pages even though this ability is not evenly distributed or well mastered. This is indicated by the digital literacy data on the verification and evaluation aspects, which are in moderate condition. Verification capability is also carried out by comparing information from one source to another and seeing its coherence (Subekti, 2020). The ability of verification and evaluation is also carried out by students of SMAN 6 Semarang by relying on reliable data sources such as recommendations from teachers and other students.

Students at SMAN 6 Semarang have high distribution and production aspects. This shows that they have the ability to manage the information they get and redistribute it. They can also create new content on their social media and are able to identify who will see their content. Students can customize what they will post with the appropriate context for the recipients of their content.

In terms of participation and collaboration, students at SMAN 6 Semarang are in moderate condition. Even though students of SMAN 6 Semarang are inseparable in the online community, their ability to participate and collaborate is still not high enough. This is because not all students have become active people and are more likely to be passive members of a forum. However, the intention of the subjects to join groups that have the same interest (community) is already high.

This study has limitations, namely data retrieval that cannot be done directly, so that researchers cannot meet face to-face with the respondents. This is because research data collection is carried out when the school is in a state of distance learning. This study also does not pay attention to demographic aspects, especially in terms of economic welfare, gender, and so on, which may have an influence on the research results.

CONCLUSION

Based on the results of the study, it can be concluded that digital literacy has a positive relationship with the self-directed learning of students at SMAN 6 Semarang. This indicates that the higher the digital literacy of students, the higher their self-directed learning will be. Based on the descriptive analysis, the subject has digital literacy and self-directed learning in the medium category. Schools can be given suggestions to provide training or socialization on the use of digital literacy in the context of learning. Thus, students will be more proficient in using technology in the interest of learning and to help improve their self-directed learning. The suggestion for further researchers is to

try to add several other variables as a consideration of both demographic conditions and variables that might affect students' self-directed learning.

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