Research Article https://doi.org/10.12973/eu-jer.12.1.59

European Journal of Educational Research
Volume 12, Issue 1, 59 - 69.
ISSN: 2165-8714
http://www.eu-jer.com/

Analysis of the Effect of Social Skills and Disposition of Digital Literacy on Mathematical Literacy Ability

Busnawir Busnawir* Universitas Halu Oleo, INDONESIA

Kodirun Kodirun Universitas Halu Oleo, INDONESIA

Nana Sumarna Universitas Halu Oleo, INDONESIA

Zulham Alfari Universitas Halu Oleo, INDONESIA

Received: June 16, 2022 ▪ Revised: August 28, 2022 ▪ Accepted: November 7, 2022

Abstract: This study aims to analyze the characteristics of social skills, digital literacy disposition, and mathematical literacy abilities of 49 students; to analyze the theoretical model of the direct and indirect influence of digital literacy skills and social skills on mathematical literacy skills. The number of samples is 49 of the 12th-grade students at state high school #1 Southern Konawe. The research instruments consisted of a mathematical literacy ability test, a social skills questionnaire, and a digital literacy disposition questionnaire. The data were analyzed by descriptive statistics and structural equational models (SEM) with a Smart PLS 3.0 application. The results showed that students' mathematical literacy skills tended to be better on content and context indicators but they are weak on competency and process indicators. Students' social skills tend to be better on indicators of peer-relationship skills and self-management skills, but are also weak on indicators of academic skills and compliance skills. Mastery of the digital literacy disposition tends to be better on the internet searching, content evaluation, and information sharing indicators but is still weak on knowledge assembly. Furthermore, it was found that (a) social skills have a direct effect on digital literacy disposition but do not directly affect mathematical literacy skills; (b) the digital literacy disposition has a direct effect on mathematical literacy skills.

Keywords: *Digital literacy disposition, mathematical literacy, social skills.*

To cite this article: Busnawir, B., Kodirun, K., Sumarna, N., & Alfari, Z. (2023). Analysis of the effect of social skills and disposition of digital literacy on mathematical literacy ability. *European Journal of Educational Research*, *12*(1), 59-69. https://doi.org/10.12973/eu-jer.12.1.59

Introduction

Nowadays, the use of knowledge in everyday life is better known as literacy. Through literacy skills, communication between humans develops to a higher level. The content and general ideas of the meaning of literacy are absorbed into the field of mathematics, giving rise to the term mathematical literacy (Kuswidi, 2015). In mathematics learning, there are several main things related to mathematical literacy, namely mathematical content, mathematical context, and the ability to use literacy as a tool to solve problems, interpret problems, and analyze problems (Bowie & Frith, 2006). The Program for International Student Assessment (PISA) defines literacy skills as an individual's ability to identify, understand, and interpret mathematics in various contexts that are built using and involving mathematics in everyday life (Stacey, 2015).

The research results of the Program for International Student Assessment show that the mathematical literacy skills of Indonesian students are still low, still below the average score. When compared with the average score of Indonesian students' mathematical literacy according to PISA (2015), there is a decrease so that it is only at level 1. Therefore, Indonesia needs to pay attention to the development of mathematical literacy in a systematic and structured manner (Umbara & Suryadi, 2019). It is very important to fully prepare students to understand the necessary skills related to mathematical literacy, by allowing them to improve their basic mathematical skills in the mathematical process. PISA-like tasks have the potential to develop this fundamental capability (Dewantara et al., 2015). Based on the objectives of learning mathematics in junior high schools, making aspects of mathematics literacy is an important part of getting attention in the curriculum (Oktiningrum et al., 2016).

Currently, technology permeates every aspect of life, including the world of education. The ability to navigate and complete tasks through the medium of technology is inevitable. Therefore, it is important to have some technical skills both for communicating with the outside world and for educational purposes (Martin & Grudziecki, 2006; Mistler-

* **Corresponding author:**
Busnawir Busnawir, Universitas Halu Oleo, Indonesia. ✉ busnawir@uho.ac.id

Jackson & Songer, 2000). The increasing use of online media challenges students with integrating visual media to synthesize information. Today's modern learning demands the use of online media in all aspects of life to encourage students to have digital literacy skills or what is known as digital literacy disposition (Falloon, 2020).

Through mathematical literacy, students can develop knowledge, confidence, skills, spatial thinking, analyze critically, make interpretations, and solve problems encountered in everyday life. Teachers are expected to be able to use contextual situations, able to explain mathematical literacy, to understand the context that is being experienced, so that they can develop students' mathematical skills (Graven & Venkat, 2007). Further investigations are needed to improve the desired competencies for Mathematical Literacy. Mathematical Literacy assessment practice is expected to encourage mathematical literacy teachers to be involved in teaching and improvement (Venkat et al., 2009). There are still many problems found related to students' mathematical literacy skills. The mathematical literacy ability of high school students is still in the very low category (Sari & Wijaya, 2017). There is a relationship between the use of digital literacy and mathematical literacy. It is necessary to do more extensive further research related to digital literacy using the Internet (Falloon, 2020; Ic & Tutak, 2018). The current studies need to look at the function of social skills in mediating the relationship between self-regulation and literacy attainment in mathematics (Montroy et al., 2014). Previous research did not explain how far the relationship and contribution of social skills and digital literacy to mathematical literacy skills, so this is what prompted this research.

Literature Review

Mathematical Literacy Ability

Mathematical literacy is a skill that supports the application of mathematics related to life. This enables students to develop skills and confidence to think numerically and spatially to interpret and critically analyze everyday situations and to solve problems (Rizki & Priatna, 2019). Mathematical literacy is defined as a collection of knowledge, skills, and values that overcome difficulties that arise. Mathematical literacy is connected to learning how to think. The conception of mathematical literacy is related to the individual's ability to use mathematics that should be learned in school (Kaiser & Willander, 2005; Wijaya, 2016). Furthermore, it is defined that mathematical literacy ability is an individual's ability to identify, understand, or interpret mathematics in various life contexts that are constructed through the implementation of mathematics in real everyday life (Tokada et al., 2017). This ability consists of two components, namely (a) knowledge, which includes conceptual and procedural, which is the basis for connecting and solving mathematical problems; (b) competencies related to the ability to apply mathematical knowledge and skills in real life (Sumirattana et al., 2017). Mathematical literacy ability can be reviewed in four indicators, namely (a) Content, which is related to mathematical concepts used to solve problems in various contexts of everyday life; (b) context, which relates to the description of the situation in which a mathematical concept is used; (c) competence, which describes the cognitive activities involved in solving mathematical problems; and (d) a mathematical process that describes the procedure for solving mathematical problems using facts, concepts, properties and procedural mathematics (Kaiser & Willander, 2005; Sari & Wijaya, 2017).

Literacy Digital Disposition

Digital literacy includes information and communication technology that plays a significant role in the field of education. Technology can improve the quality of teaching and learning, facilitating access to information so that it solves the problem, and help develop communication skills, language skills, and basic knowledge in mathematics (Aruvee & Vintere, 2022; Yılmaz Koğar, 2019). Along with the rapid development of communication technology in the world of education, digital literacy is indispensable. Therefore, the practice of digital literacy in schools and in classroom learning practices is an important part of equipping students to be able to adapt to the 21st century (Beck et al., 2021).

Disposition of digital literacy includes (a) skills in utilizing digital technology or digital communication networks to understand various information use and evaluate that information, (b) skills in utilizing information in various forms using computers, and (c) skills in completing academic tasks using digital media. Digital literacy is the ability to read and interpret information, create data and images, and apply new knowledge and evaluate information obtained through digital media (Colwell et al., 2013). Until now, there is still a digital literacy gap between society and the world of education. This gap is a social problem that is being faced by society in the digital era (Hadjerrouit, 2010). Facing negative influences due to the use of digital literacy, it is necessary to provide educational understanding as a medium to be introduced and taught in the world of education. Digital literacy skills are very important for students to find, create, use, then evaluate all forms of information obtained to be presented in various academic assignments. Secondary schools are part of basic education to introduce digital literacy (Colwell et al., 2013). Several studies have been conducted, suggesting the need for design and evaluation criteria for digital learning. Teachers in schools need to be equipped with the skills to evaluate the learning resources used in relation to digital media (Hadjerrouit, 2010). Consistent use of technology or digital literacy can increase students' exploration and connection with mathematics (Novita & Herman, 2021). The integration of technology in learning is significant and relevant in facilitating the development of communication and mathematical literacy (Das, 2019; Falloon, 2020). The previous research that has

been stated does not explain in detail the digital literacy indicators and how much they contribute to mathematical literacy skills, so this needs to be studied further.

Social Skills

Social skills have an important role in a person's life, both as an individual and as a social community (Dogan & Kaya-Tosun, 2020; Kopelowicz et al., 2006; see Müller et al., 2012). Social skills are one aspect of education that must be developed in children through habituation and self-regulation (Montroy et al., 2014). In the taxonomy of learning objectives, social skills are included in the realm of affective or behavioral attitudes. Low aspects of social skills can lead to a tendency to be individualistic, disrespectful of different views, intolerant, arrogant, and so on. Conversely, high social skills are an effective means of interacting with others, communicating, learning, and meeting needs (Gökel & Dağli, 2017; Soto-Icaza et al., 2015; Umphrey & Sherblom, 2014). Individuals who show better social skills in managing their behavioral attitudes tend to provide more social support, encourage interpersonal trust, and more effectively balance their needs with others (Mongrain et al., 2011). Social behavior regulation can significantly and positively predict literacy and mathematics skills. Behavior has a role in academic achievement, work performance, or social achievement for children (Hochwarter et al., 2006; McClelland et al., 2007; Van Der Oord et al., 2005). Although there is no significant relationship between self-regulation and growth in mathematics, we still consider social skills as a mediator (Montroy et al., 2014).

Several previous studies separately examined the relationship between social skills and digital literacy in mathematical literacy skills but did not explain in detail the indicators or the magnitude of their contribution. This study examines the effect of social skills and digital literacy dispositions on mathematical literacy skills. This study is based on the results of a preliminary analysis of students' daily assessments of mathematics which includes application, synthesis, and evaluation questions. It was found that the majority of students had difficulty solving questions that required strategy, connectivity, and application of concepts related to problems in everyday life. Students use mathematical concepts regardless of their relevance to the context of the given problem. The author suspects that students' abilities are still very weak in terms of mathematical literacy, digital literacy disposition, and social skills.

Methodology

Research Design

This research design uses a quantitative approach by the ex post facto method (Mansaray, 2020). The design aims to describe the characteristics and analyze the direct and indirect effects of social skills and digital literacy dispositions on mathematical literacy skills.

Population and Sample

The research population was all students of class 12th grader students of state high school #1 of Southern Konawe, totaling 105 people. The purposive sampling technique is applied to obtain a total sample of 58 people. However, due to the COVID-19 conditions, as many as 9 students were unable to participate in the research, so only 49 students were used as samples for further analysis. The use of purposive sampling is based on the consideration of students' experiences using the internet (Arora & Rangnekar, 2016). The data were collected from November 2020 until January 2021.

Variables and Instruments

The variables studied were mathematical literacy abilities as exogenous variables, while social skills and digital literacy dispositions were endogenous variables. Mathematical literacy ability is measured by a description test consisting of 4 items, which was developed by the author by referring to literacy indicators including content, context, competence, and process (Abidin et al., 2017).

This test was carried out by panelists of 5 experts with a reliability level of .87. The social skill variable was measured using a questionnaire of 24 items in the form of a Likert scale. This questionnaire was compiled by the author based on indicators of skills in interacting with others, self-management skills, academic skills, and compliance. This social skills questionnaire has a reliability level of .76. The digital literacy disposition variable was measured using a questionnaire of 32 items in the form of a Likert scale. This questionnaire was developed by the author based on indicators of searching on the internet, evaluating information content from the internet, compiling knowledge from the internet, and sharing information from the internet (Martin, 2006). This questionnaire has a reliability level of .82. Calculation of reliability using Cronbach's alpha coefficient.

Analyzing of Data

The research data were analyzed using descriptive statistics and inferential statistics. Descriptive statistics are used to describe the tendency of the characteristics of students' mathematical literacy abilities, social skills, and digital literacy

dispositions. Inferential statistics are used to examine the theoretical model of the direct and indirect effects of research variables. Inferential analysis using structural equational models (SEM) with Smart PLS 3.00 application (Ramayah et al., 2018).

Findings/Results

Mathematical literacy is the ability of students to use their mathematical knowledge in various life contexts through 4 components, namely content, context, competence, and process. Based on the results of the descriptive analysis of each item, a comparison of the average value of each indicator of mathematical literacy is obtained which is presented in Figure 1.

Figure 1 shows that based on the categorization of values, the average mathematical literacy ability of students on all items is moderate. The highest and lowest average values are in question number 2 (item 2), then question number 1 (item 1), then question number 4 (item 4), and question number 3 (item 3). Item 2 measures the ability of the mathematical process, contains geometry and measurement material, which is linked to work context; Item 1 measures the problem-solving strategy, contains numerical material, which is linked to a personal context; Item 4 measures the process of mathematical communication, contains material on uncertainty and data, which is linked to the socio-cultural context; Item 3 measures the process of reasoning and arguments, contains algebraic material, which is related to the scientific context. The score of each item is in the interval 0 to 100.

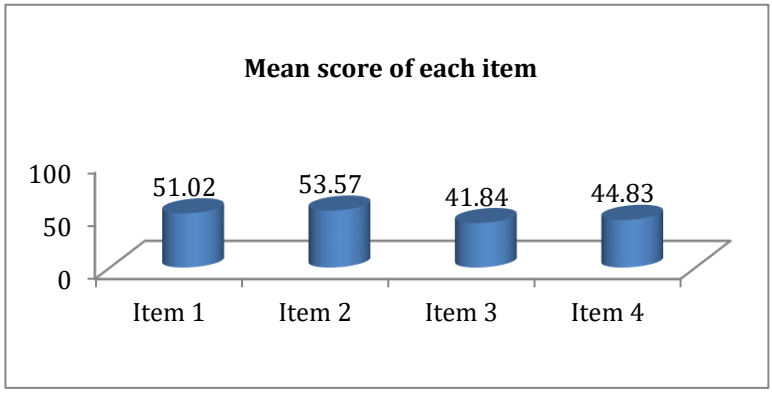

Figure 1. Comparison of Average Score Mathematical Literacy Ability Based on Question Items

The comparison of the average percentage of student responses to the social skills variable is shown in Figure 2. Figure 2 shows that the academics skill indicator is the indicator that gets the lowest response, namely 61.08% compared to other indicators. An academics skill indicator is an indicator of social skills related to students' academic world, such as how students learn independently, techniques for completing assignments, how to use appropriate free time, methods of finding various learning resources, and asking questions. The self-management skill indicator is the indicator that gets the highest response, namely 74.42%. This indicator relates to the skills of students in organizing themselves to solve the problems they are facing.

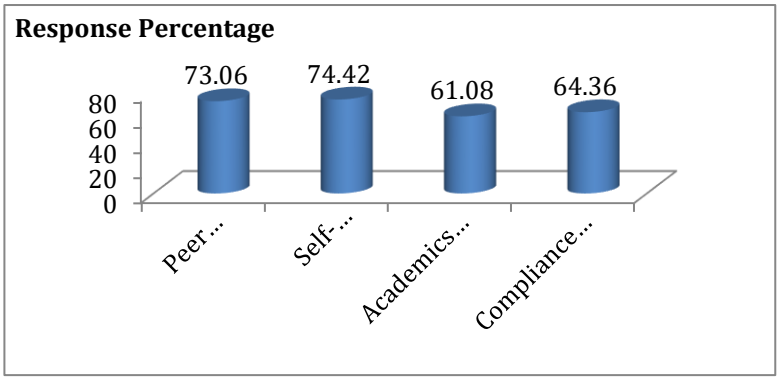

Figure 2. Comparison of Average Percentage of Student Responses Against Indicators of Social Skills

The comparison of the average percentage of student responses to the digital literacy disposition variable is presented in Figure 3. Through Figure 3 it can be explained that the knowledge assembly indicator gets the lowest response compared to other indicators with a percentage of 62.4%. In this case, students have not maximally used the internet to help their learning activities, students can find information from the internet but are unable to connect this knowledge to solve problems. Conversely, the indicator that gets the highest response is internet searching with a percentage of

70%. This shows that students can use the internet as social media and find information that is relevant to their needs. Students can use various internet search engines even though they still experience limitations.

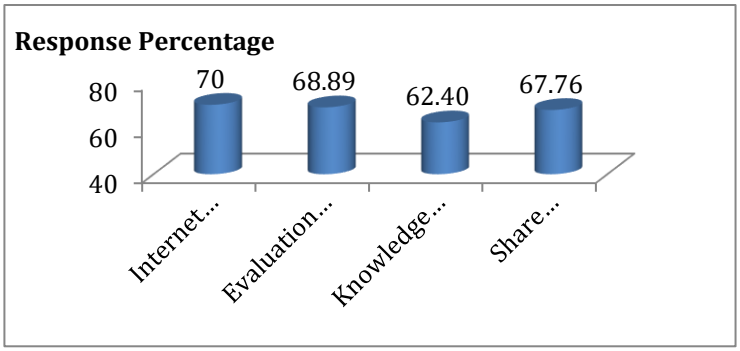

Figure 3. Percentage of Student Responses to Digital Literacy Disposition Indicators

The results of the measurement model analysis begin with the analysis of the convergent validity and construct reliability tests using the Smart PLS application which is presented in Figure 4. Figure 4 shows that all convergent validity values of the research variable indicators are greater than .4, so all of them are declared valid. Then it was found that the Cronbach's alpha values for each variable were .69, .79, and .81 respectively which were greater than .05. This means that the indicator variable is consistent in measuring the variable.

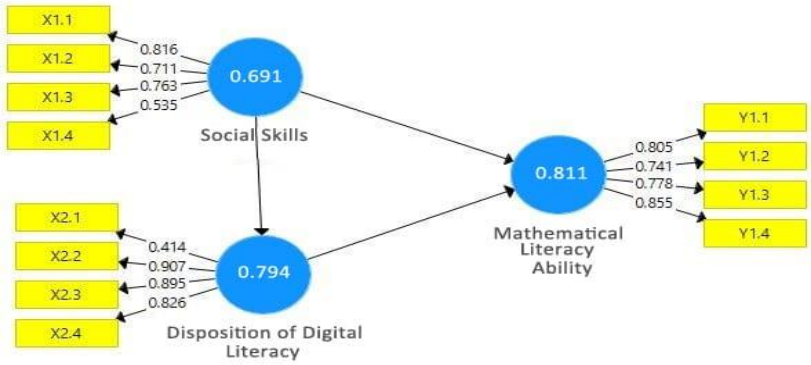

Figure 4. Values of Validity Convergent and Cronbach's Alpha

The next criterion is to be seen based on the average variance extracted (AVE) value. The AVE value of each variable is presented in Table 1. Table 1 shows that all construct variables have AVE values greater than .5. Thus, all construct variables have good diversity to explain through structural relationships (Ulum et al., 2014).

Table 1. AVE Analysis Results

Variable	AVE Value
Social skills	.51
Digital literacy disposition	.62
Mathematical literacy ability	.63

The results of the discriminant validity analysis were carried out by looking at the Heterotrait-Monotrait (HTMT) variance as shown in Table 2. Table 2 shows that the value of digital literacy HTMT on mathematical literacy skills is .28; the value of HTMT social skills on mathematical literacy skills is .44; the value of HTMT social skills on digital literacy disposition is .48. The three HTMT values are each less than .9 so that they meet the criteria for discriminant validity required in the model. This means that when these variables are tested simultaneously, each indicator can explain only the construct variable.

Table 2. Results of Discriminant Validity Analysis

Variable	HTMT	
	Mathematical literacy ability	Digital literacy disposition
Digital literacy disposition	.28	
Social skills	.44	.48

The results of the collinearity test between variables can be seen in Table 3. The table shows that the lowest VIF value is in the internet searching skill indicator, which is 1.20. Meanwhile, the highest VIF value was found in the content evaluation skill indicator, namely 4.64. The range of VIF values does not exceed the tolerance limit of 5.00. This indicates that there is no collinearity problem between the indicators and their respective construct variables.

Table 3. Collinearity Test Results of Variable Indicators

Indicators	VIF Value	Indicators	VIF Value
Peer relationship skill	1.78	*Knowledge assembly*	4.31
Self-management skill	1.31	*Share information*	1.48
Academics skill	1.46	*Using strategics for solving problems*	1.73
Compliance skill	1.22	*Mathematising*	1.78
Internet searching	1.20	*Reasoning and argument*	1.43
Content evaluation	4.64	*Mathematics communication*	2.10

The results of the structural relationship model analysis begin with the R-square analysis as shown in Figure 5. Figure 5 shows that social skills explain the variation in digital literacy dispositions by 18.10%. Social skills and digital literacy dispositions explain the variation in mathematical literacy ability by 20.70%. This shows that the magnitude of the value variation described in this model relationship is low.

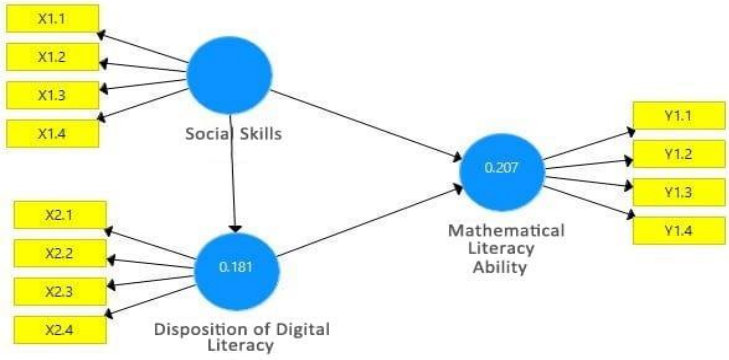

Figure 5. R-Square Value

In Table 4 it can be seen that the f-square value of digital literacy disposition towards mathematical literacy skills is .13 (low). The f-square value of social skills on mathematical literacy skills is .23 (moderate). The f-square value of social skills on digital literacy disposition is .22 (moderate). Based on the goodness of fit (GoF) value of .33 (moderate), it can be concluded overall that the relationship model built in this study is valid (Henseler & Sarstedt, 2013).

Table 4. Results f-Square Analysis

Variable	*f-Square*	
	Mathematical literacy ability	Digital literacy dispositions
Digital literacy dispositions	.13	
Social skills	.23	.22

The results of hypothesis testing can be seen in Figure 6. Based on Figure 6 it can be explained that: (a) social skills have a positive and significant direct effect on digital literacy disposition (path coefficient = .426; Sig. = .001 < .05); (b) social skills have a positive and insignificant effect on mathematical literacy skills (path coefficient = .473; Sig. = .162 > .05); (c) the disposition of digital literacy has a positive and significant direct effect on mathematical literacy skills (path coefficient = .357; Sig. = .045 < .05).

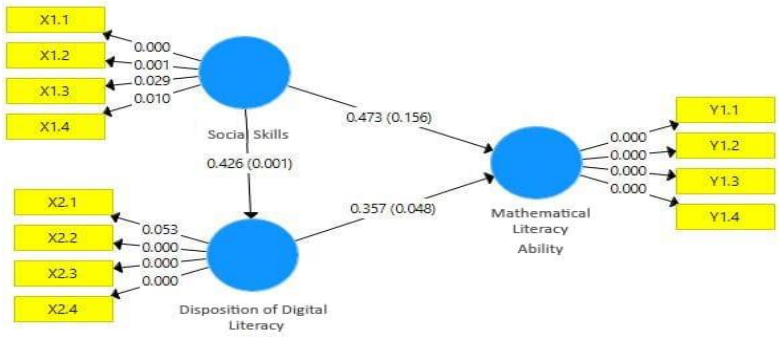

Figure 6. Path Coefficient and Hypothesis Testing

Furthermore, the results of the analysis of the indirect effect between exogenous variables and endogenous variables can be seen in Table 5.

Table 5. Results of Indirect Effect Analysis

Variable	**Path Coefficient**	**T- statistic**	***Sig.***
Social Skills → Digital literacy dispositions → Mathematical literacy ability	.152	1.661	.09

In Table 5 it can be seen that the path coefficient of the social skills variable on the mathematical literacy ability variable through the digital literacy disposition variable is -.152 with a statistical t-value = 1.661 <1.95 (Sig. = .09> .05). This shows that there is no significant indirect effect of the social skills variable on the mathematical literacy ability variable through the digital literacy disposition variable.

Discussion

Based on the study of indicators of social skills, in general, students have pretty good social skills, especially in terms of self-management, taking controlled actions in dealing with problems, viewing discussions as the right way to deal with problems can adapt to the situation at hand. Students' self-management skills in learning activities are still lacking, especially in terms of managing study time. Students also find it difficult to find the various learning resources they need. When interacting with teachers, students are more likely to question other things outside of their learning activities.

The results of this study provide different characteristics from previous research which only examines the general effect of social skills on mathematical literacy and student achievement in school, and also does not examine the contribution of each of its indicators (see Hochwarter et al., 2006; McClelland et al., 2007; Van Der Oord et al., 2005). Two aspects of a child's social functioning, namely social skills and problem behavior, are seen as mediating the relationship between self-regulation and literacy in mathematics (Montroy et al., 2014). In connection with this, it is possible to find different results if observations are made related to children's social skills and problem behavior (Denham et al., 2012, as cited in Montroy et al., 2014).

The student's digital literacy disposition is quite good. They can already use search engines on the internet for social media activities and find the necessary information. In finding information, students use various strategies by utilizing google voice notes, comparing information from various search engines, and writing information directly to search engines. This disposition is a new activity carried out during the online learning period during the COVID-19 pandemic situation. However, student activities in a digital environment have not been fully utilized for learning activities. Students tend to just imitate what it is without judging its truth. Even though one of the benefits of digital literacy disposition is to enrich scientific insights because it provides various learning resources (Shao & Purpur, 2016).

The results of this study are also supported by previous research which states that consistent use of technology or digital literacy can increase students' exploration and connection with mathematics. The integration of technology in learning is significant and relevant in facilitating the development of communication and mathematical literacy (Novita & Herman, 2021). Students' digital literacy skills are quite good but have not been able to optimally utilize digital technology to solve technical problems related to mathematical literacy (Aruvee & Vintere, 2022). Students can use digital literacy or technology as a tool to do calculations, draw, and help solve problems in mathematics (Das, 2019).

Students' mathematical literacy skills in this study were classified as low, especially in the aspects of reasoning and argumentation on algebraic content and social context. Students still experience errors in answering questions, are unable to connect integral concepts with trigonometric identities, and have not been able to perform integral

manipulation. Students have been able to understand the information on the questions but have not been able to fully use the information in solving the questions. This is in line with other findings which state that students' information literacy is still low, and students have not been able to choose the information that is relevant to their learning needs (Wijaya, 2016). Low mathematical literacy skills are influenced by students' readiness to take tests and their abilities. The low mathematical literacy skills of students are also seen (Hayati & Kamid, 2019; Jailani et al., 2020).

Social skills have a positive and significant direct influence on digital literacy skills. This indicates that when students can easily interact with other people, they have many relationships. This relationship helps students gain knowledge about the latest digital tools or features. Students who have high social abilities tend to be selective in choosing any information needed. Students who have good communication skills tend to be easily accepted on social networks.

These findings also indicate that social skills do not directly affect students' mathematical literacy abilities. This is because the students' social interaction patterns are still limited to playmate relationships. Social interaction with other people has not been used as a basis for building knowledge. Students do not have the orientation to talk about important things related to their learning when in social groups. The use of social interaction is also weak when interacting with teachers. Students tend to be closed or silent to the teacher about their learning problems.

Conclusion

Students' mathematical literacy ability is still relatively low, especially on indicators of competence and mathematical communication. Students' social skills are quite good in terms of self-management skills but still lacking in academic skills. In general, students' digital literacy dispositions are quite good but have not been utilized optimally for the benefit of their learning at school. Social skills have a significant direct influence on the disposition of digital literacy in the research sample. The disposition of digital literacy has a significant direct effect on mathematical literacy skills. Social skills do not directly affect mathematical literacy skills. This is because the pattern of student social interaction is still limited to the relationship between playmates. Social interaction with other people has not been used as a basis for building knowledge. Students do not have the orientation to talk about important things related to their learning when they are in social groups.

This study has described the indicators of each variable and looked at their relationships simultaneously, thus providing more detailed information. Based on the results of this study, it can be seen that the indicators of each variable need further attention as described. This is what distinguishes it from previous research that examines the relationship between social skills and digital literacy separately to mathematical literacy and without looking further at the indicators that shape it.

Recommendations

The results of this study found that students' mathematical literacy skills were still relatively low. Social skills and digital literacy dispositions have a weak influence on mathematical literacy skills. In mathematical literacy skills, it is necessary to pay attention to indicators of mathematization, competence, and mathematical communication. Social skills that need attention are those related to academic skills, independent learning, utilization of various learning resources, and building the habit of working together. Students have not utilized digital literacy optimally for their educational activities. The findings of this study indicate that mathematical literacy is influenced weakly by both social skills and digital literacy dispositions. Based on these findings, it is recommended that further research should be conducted by examining other factors related to mathematical literacy skills, such as student personality factors and instructional activities.

Limitations

This research has been attempted and carried out by following scientific procedures, but still has limitations. At the time this research was conducted, some students were unable to attend because they were still in a COVID-19 condition. Therefore, the number of data samples in this study was not as expected, so it could affect the internal validity of the conclusions generated.

Acknowledgments

The researcher expressed gratitude to the principal and mathematics teacher at Madrasah Aliah Negeri 1 Konawe Selatan who had given permission and assisted in the data collection process of this research.

Authorship Contribution Statement

Busnawir: Formulation of concepts, research design, preparation of instruments, preparation of results and interpretations, formulation of conclusions and recommendations. Alfari: Determination of population and samples, data collection, data analysis. Sumarna: Reviewing documents, reviewing instruments, compiling interpretation of results. Kodirun: Formulation of concepts, research design.

References

Abidin, N. L. Z., Abdullah, A. H., Abd Halim, N. D., Ibrahim, N. H., Mokhtar, M., Surif, J., & Zaid, N. M. (2017). Thinking blocks: Solving fraction problems involving higher-order thinking skills. *Man in India*, *97*(17), 121-132.

Arora, R. & Rangnekar, S. (2016). Moderating mentoring relationships and career resilience: Role of conscientiousness personality disposition. *Journal of Workplace Behavioral Health*, *31*(1), 19–36. https://doi.org/10.1080/15555240.2015.1074052

Aruvee, E., & Vintere, A. (2022). Use of ICT in mathematics studies to develop digital skills of undergraduate engineering students. In L. Malinovska (Ed.), *Proceedings of the 21st International Scientific Conference Engineering for Rural Development* (pp. 930-935). Latvia University of Life Sciences and Technology. http://tf.llu.lv/conference/proceedings2022/

Beck, E., Goin, M. E., Ho, A., Parks, A., & Rowe, S. (2021). Critical digital literacy as method for teaching tactics of response to online surveillance and privacy erosion. *Computers and Composition*, *61,* Article 102654. https://doi.org/10.1016/j.compcom.2021.102654

Bowie, L., & Frith, V. (2006). Concerns about the South African mathematical literacy curriculum arising from experience of materials development. *Pythagoras*, (64), 29–36. https://doi.org/10.4102/pythagoras.v0i64.96

Colwell, J., Hunt-Barron, S., & Reinking, D. (2013). Obstacles to developing digital literacy on the internet in middle school science instruction. *Journal of Literacy Research*, *45*(3), 295–324. https://doi.org/10.1177/1086296X13493273

Das, K. (2019). Role of ICT for better Mathematics Teaching. *Shanlax International Journal of Education*, *7*(4), 19–28. https://doi.org/10.34293/education.v7i4.641

Dewantara, A. H., Zulkardi, & Darmawijoyo. (2015). Assessing seventh graders' mathematical literacy in solving PISA-like tasks. *Journal on Mathematics Education*, *6*(2), 39–49. https://doi.org/10.22342/jme.6.2.2163.117-128

Dogan, B., & Kaya-Tosun, D. (2020). An effective method in improving social skills: Literature circles. *International Journal of Educational Methodology, 6*(1), 199-206. https://doi.org/10.12973/ijem.6.1.199

Falloon, G. (2020). From digital literacy to digital competence: The teacher digital competency (TDC) framework. *Educational Technology Research and Development*, *68*(5), 2449–2472. https://doi.org/10.1007/s11423-020-09767-4

Gökel, Ö., & Dağli, G. (2017). Effects of social skill training program on social skills of young people. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(11), 7365–7373. https://doi.org/10.12973/ejmste/79615

Graven, M., & Venkat, H. (2007). Emerging pedagogic agendas in the teaching of mathematical literacy. *African Journal of Research in Mathematics, Science and Technology Education*, *11*(2), 67–84. https://doi.org/10.1080/10288457.2007.10740622

Hadjerrouit, S. (2010). A Theoretical framework to foster digital literacy: The case of digital learning resources. In N. Reynolds & M. Turcsányi-Szabó (Eds.), *Key competencies in the knowledge society. IFIP advances in information and communication technology* (Vol. 324, pp. 144-154). Springer. https://doi.org/10.1007/978-3-642-15378-5_14

Hayati, T. R., & Kamid, K. (2019). Analysis of mathematical literacy processes in high school students. *International Journal of Trends in Mathematics Education Research*, *2*(3), 116-119. https://doi.org/10.33122/ijtmer.v2i3.70

Henseler, J., & Sarstedt, M. (2013). Goodness-of-fit indices for partial least squares path modeling. *Computational Statistics*, *28*(2), 565-580. https://doi.org/10.1007/s00180-012-0317-1

Hochwarter, W. A., Witt, L. A., Treadway, D. C., & Ferris, G. R. (2006). The interaction of social skill and organizational support on job performance. *Journal of Applied Psychology*, *91*(2), 482–489. https://doi.org/10.1037/0021-9010.91.2.482

Ic, U., & Tutak, T. (2018). Correlation between computer and mathematical literacy levels of 6th grade students. *European Journal of Educational Research*, *7*(1), 63–70. https://doi.org/10.12973/eu-jer.7.1.63

Jailani, J., Heri Retnawati, H. R., Wulandari, N. F., & Djidu, H. (2020). Mathematical literacy proficiency development based on content, context, and process. *Problems of Education in the 21st Century*, *78*(1), 80–101. https://doi.org/10.33225/pec/20.78.80

Kaiser, G., & Willander, T. (2005). Development of mathematical literacy: Results of an empirical study. *Teaching Mathematics and Its Applications*, *24*(2–3), 48–60. https://doi.org/10.1093/teamat/hri016

Kopelowicz, A., Liberman, R. P., & Zarate, R. (2006). Recent advances in social skills training for schizophrenia. *Schizophrenia Bulletin*, *32*(Supp1), S12-S23. https://doi.org/10.1093/schbul/sbl023

Kuswidi, I. (2015). Brain-based learning untuk meningkatkan literasi matematis siswa [Brain-based learning to improve students' mathematical literacy]. *Al-Jabar: Jurnal Pendidikan Matematika*, *6*(2), 195–202. https://doi.org/10.24042/ajpm.v6i2.49

Mansaray, H. E. (2020). Organizational strategies and performance in the banking industry focused on the transnational banks in Sierra Leone: An ex post facto study. *Budapest International Research and Critics Institute-Journal*, *3*(4), 3185-3196. https://doi.org/10.33258/birci.v3i4.1352

Martin, A. (2006). A European framework for digital literacy. *Nordic Journal of Digital Literacy*, *1*(2), 151–161. https://doi.org/10.18261/issn1891-943x-2006-02-06

Martin, A., & Grudziecki, J. (2006). DigEuLit: Concepts and tools for digital literacy development. *Innovation in Teaching and Learning in Information and Computer Sciences*, *5*(4), 249–267. https://doi.org/10.11120/ital.2006.05040249

McClelland, M. M., Cameron, C. E., Connor, C. M. D., Farris, C. L., Jewkes, A. M., & Morrison, F. J. (2007). Links between behavioral regulation and preschoolers' literacy, vocabulary, and math skills. *Developmental Psychology*, *43*(4), 947–959. https://doi.org/10.1037/0012-1649.43.4.947

Mistler-Jackson, M., & Songer, N. B. (2000). Student motivation and internet technology: Are students empowered to learn science? *Journal of Research in Science Teaching*, *37*(5), 459–479. https://doi.org/fc6g44

Mongrain, M., Chin, J. M., & Shapira, L. B. (2011). Practicing compassion increases happiness and self-esteem. *Journal of Happiness Studies*, *12*(6), 963–981. https://doi.org/10.1007/s10902-010-9239-1

Montroy, J. J., Bowles, R. P., Skibbe, L. E., & Foster, T. D. (2014). Social skills and problem behaviors as mediators of the relationship between behavioral self-regulation and academic achievement. *Early Childhood Research Quarterly*, *29*(3), 298–309. https://doi.org/10.1016/j.ecresq.2014.03.002

Müller, R., Peter, C., Cieza, A., & Geyh, S. (2012). The role of social support and social skills in people with spinal cord injury—a systematic review of the literature. *Spinal Cord*, *50*(2), 94-106. https://doi.org/10.1038/sc.2011.116

Novita, R., & Herman, T. (2021). Digital technology in learning mathematical literacy, can it helpful? *Journal of Physics: Conference Series*, *1776*(1), Article 012027. https://doi.org/10.1088/1742-6596/1776/1/012027

Oktiningrum, W., Zulkardi, & Hartono, Y. (2016). Developing PISA-like mathematics task with Indonesia natural and cultural heritage as context to assess students' mathematical literacy. *Journal on Mathematics Education*, *7*(1), 1–8. https://doi.org/10.22342/jme.7.1.2812.1-8

Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). *Partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0: An updated guide and practical guide to statistical analysis* (2nd ed.). Pearson.

Rizki, L. M., & Priatna, N. (2019). Mathematical literacy as the 21st century skill. *Journal of Physics: Conference Series*, *1157*(4), Article 042088. https://doi.org/10.1088/1742-6596/1157/4/042088

Sari, R. H. N., & Wijaya, A. (2017). Mathematical literacy of senior high school students in Yogyakarta. *Jurnal Riset Pendidikan Matematika*, *4*(1), 100–107. https://doi.org/10.21831/jrpm.v4i1.10649

Shao, X., & Purpur, G. (2016). Effects of information literacy skills on student writing and course performance. *Journal of Academic Librarianship*, *42*(6), 670–678. https://doi.org/10.1016/j.acalib.2016.08.006

Soto-Icaza, P., Aboitiz, F., & Billeke, P. (2015). Development of social skills in children: Neural and behavioral evidence for the elaboration of cognitive models. *Frontiers in Neuroscience*, *9*, Article 333. https://doi.org/10.3389/fnins.2015.00333

Stacey, K. (2015). The international assessment of mathematical literacy: PISA 2012 framework and items. In S. J. Cho (Ed.), *Selected regular lectures from the 12th International Congress on Mathematical Education* (pp. 771-790). Springer. https://doi.org/10.1007/978-3-319-17187-6_43

Sumirattana, S., Makanong, A., & Thipkong, S. (2017). Using realistic mathematics education and the DAPIC problem-solving process to enhance secondary school students' mathematical literacy. *Kasetsart Journal of Social Sciences*, *38*(3), 307–315. https://doi.org/10.1016/j.kjss.2016.06.001

Tokada, D., Herman, T., & Suhendra. (2017). Discovery learning for mathematical literacy ability. *Journal of Physics: Conference Series*, *895*(1), Article 012077. https://doi.org/10.1088/1742-6596/895/1/012077

Ulum, M., Tirta, I. M., & Anggraeni, D. (2014). Analisis structural equation modeling (SEM) untuk sampel kecil dengan pendekatan partial least square (PLS) [Structural equation modeling (SEM) analysis for small sample with partial least square (PLS)]. *Prosiding Seminar Matematika dan Pendidikan Matemaytika Universitas Jember, 1*(1), 1-15. https://jurnal.unej.ac.id/index.php/psmp/article/view/934

Umbara, U., & Suryadi, D. (2019). Re-interpretation of mathematical literacy based on the teacher's perspective. *International Journal of Instruction*, *12*(4), 789–806. https://doi.org/10.29333/iji.2019.12450a

Umphrey, L. R., & Sherblom, J. C. (2014). The relationship of hope to self-compassion, relational social skill, communication apprehension, and life satisfaction. *International Journal of Wellbeing*, *4*(2), 1–18. https://doi.org/10.5502/ijw.v4i2.1

Van Der Oord, S., Van Der Meulen, E. M., Prins, P. J. M., Oosterlaan, J., Buitelaar, J. K., & Emmelkamp, P. M. G. (2005). A psychometric evaluation of the social skills rating system in children with attention deficit hyperactivity disorder. *Behaviour Research and Therapy*, *43*(6), 733–746. https://doi.org/10.1016/j.brat.2004.06.004

Venkat, H., Graven, M., Lampen, E., Nalube, P., & Chitera, N. (2009). 'Reasoning and reflecting' in mathematical literacy. *Learning and Teaching Mathematics*, (7), 47-53.

Wijaya, A. (2016). Students' information literacy: A perspective from mathematical literacy. *Journal on Mathematics Education*, *7*(2), 73–82. https://doi.org/10.22342/jome.v7i2.3532

Yılmaz Koğar, E. (2019). The investigation of the relationship between mathematics and science literacy and information and communication technology variables. *International Electronic Journal of Elementary Education*, *11*(3), 257–271. https://doi.org/10.26822/iejee.2019349250