

The correlation between digital literacy and parents' roles towards elementary school students' critical thinking

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Abstract

This study aimed at discovering the positive and significant relationships between digital literacy and the roles of parents together on the critical thinking skills of fifth-grade elementary school students. This study employs quantitative research, particularly correlational research. This research includes comparative causal research. This research is a quantitative research with a correlational design. The sample used was 70 students who were randomly selected. The data collection method used in this study was a survey using a questionnaire. The data analysis technique used to test the hypothesis is the product-moment correlation technique and regression multiple correlation analysis. The results of this study indicate that there is a positive and significant correlation between digital literacy and critical thinking skills. There is a positive and significant correlation between the roles of parents and critical thinking skills. There is a positive and significant correlation between digital literacy and the roles of parents together on critical thinking skills.

Keywords: Digital literacy, the roles of parents, critical thinking skills.

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1. Introduction

One of the greatest impacts of the COVID-19 pandemic on education is the restriction of teacher and student interaction in class (Herwin et al., 2021; Pujiastuti et al., 2021; Astuti et al., 2022). The Ministry of Education in Indonesia made a policy issued in Decree 4, in the year 2020, in which schools are not allowed to conduct face-to-face meetings to prevent the spread of COVID-19. This situation forces teachers and students to find a solution to conduct learning without face-to-face interactions by using the Internet as a medium. Since then, there is a shift in teaching mode, from traditional (face-to-face) to online learning (Herwin et al., 2020; Saptono et al., 2021; Herwin et al., 2022).

The COVID-19 pandemic has made teachers and students realise that the learning mode they have applied is mostly conducted in a traditional way and lacks innovation in developing students' literacy, especially digital literacy. Technology has become the central issue in developing syllabus and course content for online learning. Thus, it is necessary to develop a digital literacy to meet the need of 21st-century learning styles. The 21st-century learning style deals much with technology and so does our daily life in this globalised era. Therefore, it is important to build students' digital literacy, not only for the need for online learning but also to survive in the 21st-century era. In conducting online learning, several platforms that can be used in teaching include WhatsApp, Zoom, web blog, Edmodo etc.).

Critical thinking is one of the main issues in today's modern education that should be taught. The purpose of critical thinking in relation to teaching digital literacy is to improve students' level of thinking to achieve the goal in learning, as well as to prepare students to be ready to solve any challenges they may face in the modern era. Assaly and Smadi (2015), in their research, noted that students fail to comprehend subjects in learning, such as history, biology, social science and mathematics, if they did not read critically. In this case, learning should be directed towards critical thinking so that students could apply and comprehend the lesson learned.

Critical thinking is related to a person's ability to reflect and reason in decision-making. Critical thinking is the ability to analyse and evaluate a problem, to make a decision or to solve a problem. This ability helps a person to view the problem from many perspectives before making assumptions or decisions (Ennis, 1996). Critical thinking is students' cognitive thinking in solving a problem systematically and specifically. In this case, students could analyse systematically and classify a problem precisely and punctually, identify and study information to build a strategy in solving the problem. Critical thinking is a deep and reflective thinking in decision-making and problem-solving in order to analyse the situation, create an argument and make the right conclusion (Stobaugh, 2013). A person who has critical thinking ability is the one who can make a conclusion for all the information he/she gets, knows how to use the information to solve a problem and knows how to find relevant resources to solve the problem.

Critical thinking influences a person's future a lot (Butler et al., 2017). Building students' critical thinking on learning could improve students' learning achievement (Jacob, 2012; Nur'azizah et al., 2021; Taghva et al., 2014), writing skills, problem-solving skills (Han et al., 2019; Utami et al., 2019), decision-making quality (Turan et al., 2019), strategy in decision-making (Helsdingen et al., 2010) and ability to observe and analyse. Critical thinking is very important in the learning process (Adeyemi, 2012). Critical thinking ability can be divided into eight sections in which it denotes the quality of a person's ability to think. This includes the questioning problem, purpose, information, concept, assumption, point of view, interpretation, interface, cause and effect and its implication (Inch, 2014).

Critical thinking is influenced by several factors such as intellectual development, habit, contextual problem-solving, exercise given by the teacher, learning and individual factor (Mahapoonyanont, 2010), learning media, learning resources and family (Thongnuypram & Sopheerak, 2013), curriculum and student-centred learning (Purvis, 2009), student, technological-based lesson plan, curriculum and teaching method to develop students' critical thinking (Terblanche & de Clercq, 2020). Based on these factors, it can be concluded that students' critical thinking can be developed by the teacher as well as the curriculum.

Critical thinking can be developed by relevant learning processes. Training students to be critical in thinking can be carried out by giving questions critically, and analysing and evaluating problems in daily life. Training in the 21st century is directed towards building students' digital literacy. Training on digital literacy has got more attention because it is the prominent skill students need in this new era. Digital literacy enables students to comprehend and process much information they get to meet and critically understand. Digital literacy allows society to be critical in thinking and creative; this is because digital literacy has influenced children's psychology, motivated and influenced students learning achievement (Akhyar et al., 2021), has become the smart information for students (Johnson, 2012).

Digital literacy can be defined as the ability and skill that are needed to use the Internet and technology effectively (Cartelli, 2010). According to UNESCO, digital literacy is an individual's ability to read and understand any kind of text, spoken, written and screen-based discourse. Digital literacy is the ability of a person in operating technological devices effectively and efficiently, and using them for different purposes including for school, work etc. Literacy is not merely about learning and education, but it relates to many aspects globally. Digital literacy is also the smart and wise way in using digital media (Eshet, 2004). It is necessary for an individual to have digital literacy to be ready to face the 4.0 Industrial Revolution or globalisation that has been spreading across the countries in this world.

There are several types of digital literacy, namely technological literacy, information literacy, media literacy and visual literacy. People who master digital literacy are those who know how, why and when to use it appropriately and can identify the beneficial chance of using digital technology in their lives. Digital literacy has a prominent role in supporting learning objective, and more frequently it becomes the fundamental basis for educational practices, which aim at allowing a person to be ready to live in a digital society (Leaning, 2019).

Digital literacy enhances students' digital knowledge and skill since it motivates students to find the information from various resources, choose resources accordingly, choose the references selectively, filter the information carefully and thus helps the teacher to reorganise that knowledge and skill to be used more creatively with fun in school (McDougall et al., 2018). Digital literacy is a medium that could make students critical, analytical, reflective, imaginative and creative. Therefore, it is important to implement digital literacy in schools to make the government realise that digital literacy is one of the indicators of the development of a country. Digital resources not only make students focus on learning materials but also make them creative while using technology in a wise and productive way. People who master digital literacy skills can use technology effectively to achieve their goals. They are not easy to be brainwashed, deceived by hoax information and cheated by digital crime. Digital literacy involves comprehending ideas and not just understanding the functions of the buttons on the screen. This includes evaluation of the information and analysis in using the information. Digital literacy increases students' ability in filtering the information they get from their mobile phones.

Digital literacy is important to be developed, specifically by the teacher, as well as parents. This is because teachers can train students to develop their digital literacy at school, while parents are at home.

Both teachers and parents may create a habit of learning that makes it a custom or culture. Culture is a word meaning and symbol that is manifested in value, norm, belief, tradition, ritual, ceremony and myth of a certain group of people. In this case, parents play significant roles in developing children's digital literacy since they were kids. When implementing online learning, parents at home need to understand what materials their children should study to avoid any obstacles in conducting online learning.

Parents become a facilitator in learning; in this case, parents may give technological aid/support as well as teach their children. Parents become a motivator for their children when learning online at home; they may motivate their children so that their children get their highest achievement. Parents also become directors. They have important roles in developing students' critical thinking, besides other factors such as parents' education, environment and even logical intelligence (Ardiansyah, 2020), parents' care (Huang et al., 2015; Wang et al., 2020) and parenting (Zarbakhsh et al., 2012). Developing students' critical thinking may be done at home by giving them contextual problems. These problems trigger students to think of solutions.

Parents are children's roles model in any situation, specifically in using technology. Parents always become guidance for their children; in this context, parents may guide their children in using technology by giving them suggestions on what technological devices their children should learn and operate (Asmawati, 2021). Parents have prominent roles in educating their children. Based on those issues, it is important to conduct a study on the correlation between digital literacy and parents' roles in elementary school students' critical thinking in the Yogyakarta region. The purpose of this study is to gain information on the relationship between digital literacy and parents' roles in relation to students' critical thinking.

2. Method

2.1. Types of research

This type of research is quantitative. The research design used is correlational research, particularly causal comparative. This study aimed at discovering the positive and significant relationship between digital literacy and the roles of parents together on the critical thinking skills of fifth-grade elementary school students in Yogyakarta.

2.2. Setting and research subject

The sampling method is proportional random sampling in which the sample is taken randomly from the population, regardless of the level. The population is all elementary school students of grade 5 in Yogyakarta; there are 14 districts, and in each district, 5 samples were taken randomly; thus, the total of the sample was 70 students. The subject of this research is Yogyakarta. Yogyakarta is one of the special regions in Indonesia in which most of the residents hold Javanese traditions strongly. In addition, different from other regions in Indonesia, the government system in Yogyakarta is a monarchy. Yogyakarta's norm, tradition and politeness, as well as respect to parents and the elderly, are cultural values that most parents teach their children.

2.3. Data collection technique

Data were collected using a questionnaire as the research instrument. The questionnaire was used to gather data about digital literacy, parents' roles and the level of critical thinking of elementary school students of grade 5 in Yogyakarta. The type of questionnaire is a Likert scale questionnaire. The question items in the questionnaire are formed by setting the indicators as the variables of the research (Table 1).

Table 1. Blueprint of the questionnaire

No	Variable	Indicator
1	Digital literacy	Information literacy, students' ability in searching, use, and evaluate the information Digital scholarship, students' ability in using resources they get as a reference Learning skill, students' ability in using various technological devices in learning ICT literacy, students' knowledge about IT including its facilities and how to operate it Career and identity management, is students' identity in an online class Communication and collaboration, is students' active participation during online learning and research Media literacy, students' ability in searching for trusted information by comparing various information they get
2	Parents' roles	Learning need Supervision in learning Motivation in learning
3	Critical thinking	Questioning problem Analysing argument Conducting evaluation Being open-minded Explaining something based on the fact

Table 1 presents three variables that are the focus of this research, namely digital literacy, parents' roles and critical thinking. Each variable has shown its measuring indicator which is applied to the participants or students. A total of 15 indicators are used to measure the three main variables. The digital literacy variable has seven measuring indicators, the parents' roles variable has three measuring indicators and the critical thinking variable has five measuring indicators.

2.4. Data analysis technique

After getting the primary data from the questionnaire, the next step is hypothesis testing. The statistical analysis method used is multiple linear regression correlation in which the hypothesis testing involves calculating *t*-test (partial correlation), simultaneous significance test (*F*-statistic test) and test of coefficient of determination.

3. Results and discussion

3.1. Results

The data findings from three variables, namely digital literacy, parents' roles and critical thinking, derived from the questionnaire were classified into five categories (seen in Table 2).

Table 2. The data on digital literacy, parents' roles, and critical thinking

Digital literacy		Parents' roles		Critical thinking	
Interval	Frequency	Interval	Frequency	Interval	Frequency
42-49	14	15-20	16	25-32	14
50-57	14	21-25	19	33-40	3
58-65	25	26-30	16	41-48	24
66-73	5	31-35	9	49-56	16
74-81	12	36-40	10	57-64	13
Mean	59,1	Mean	26	Mean	45,9

It can be seen in Table 2 that the score of digital literacy, parents' roles and critical thinking were generally in the highest frequency in the third interval. The average score of digital literacy skills is 59.1,

with the highest score of 88; the average score of parents' roles is 26, with the highest score of 40; and the average score of critical thinking is 45.9, with the highest score of 68.

Next, is hypothesis testing and the statistical analysis method used is multiple linear regression correlation which involves three tests: a *t*-test (partial correlation), a simultaneous significance test (*F*-statistic test) and a test of coefficient of determination. The *t*-test is used to measure whether there is an effect of each independent variable on the dependent variable partially. In this case, the step that is carried out is comparing the significance score of the *t* score to the 0.05 level of significance. If the *t* score is <0.05 , then it could be concluded that the independent variable has a correlation with the dependent variable partially. On the other hand, if the *t* score is >0.05 , then it could be concluded that the independent variable has no correlation with the dependent variable partially. The results of the *t*-test can be seen in Table 3.

Table 3. The result of the *t*-test

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	<i>t</i>	Sig.
(Constant)	-2.878	1.657		-1.737	.087
Digital Literacy (X1)	.336	.073	.335	4.625	.000
Parents' Roles (X2)	1.110	.122	.658	9.072	.000

a. Dependent Variable: Critical Thinking (Y)

In Table 3, the first hypothesis indicates that the *t* score is $4.625 > t$ table 1.996, with the level of significance being $0.000 < 0.05$. It could be interpreted that the first hypothesis is accepted, which means the variable of digital literacy (X_1) has a significant correlation with critical thinking (Y). Moreover, the second hypothesis indicates that the *t* score is $9.072 > t$ table 1.996, with the level of significance being $0.000 < 0.05$. Therefore, it could be concluded that the second hypothesis is accepted, which means the variable of parents' roles (X_2) has a significant correlation with critical thinking (Y).

After hypothesis testing, the next step is the *F* test. *F* test is used to measure whether or not all independent variables have a correlation with the dependent variable. In relation to this, the hypothesis is stated as digital literacy (X_1) and parents' roles (X_2) have a significant correlation with critical thinking (Y). The results of the *F* test can be seen in Table 4.

Tabel 4. The result of the *F* test

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	9224.194	2	4612.097	885.221	.000 ^a
Residual	349.077	67	5.210		
Total	9573.271	69			

a. Predictors: (Constant), Parents Roles (X₂), Digital Literacy (X₁)

b. Dependent Variable: Critical Thinking (Y)

As seen in Table 4, the sig. *F* score is $0.000 < 0.05$. It could be concluded that the hypothesis is accepted. It means that both the variables digital literacy (X_1) and parents' roles (X_2) have a significant correlation with critical thinking (Y). The calculated *F* score is 885.221, while the *F* score from the table is 3.13. Since the calculated *F* score is higher than the *F* score from the table, it could be concluded that there is a linear significant correlation between digital literacy (X_1) and parents' roles (X_2) to critical thinking (Y). The last step is the test of coefficient of determination as shown in Table 5.

Tabel 5. The result of the test of coefficient of determination

R	R square	Adjusted R square	Std. error of the estimate
.982 ^a	.964	.962	2.283

a. Predictors: (Constant), Parents role (X_2), Digital Literacy (X_1)

Based on Table 5, the coefficient score of variable digital literacy (X_1) and parents' roles (X_2) simultaneously to the critical thinking (Y) is 0.982. This score indicates that the correlation level is very high. It could be interpreted that the contribution of digital literacy and parents' roles to the students' critical thinking is 0.964 or 96.4%, while the rest (3.6%) are determined by other variables.

3.2. Discussion

The results of data findings indicate that digital literacy influences students' critical thinking levels. Digital literacy is the ability in operating technology and information using technological devices effectively and efficiently to ease daily tasks. Digital literacy enriches students' knowledge since it motivates students to find information from many references. Students become more skilful in selecting references and filtering information, thus enabling teachers to reorganise that knowledge and skill to be used more creatively with fun in school (McDougall et al., 2018). The process of searching, selecting and reorganising the information that is gathered from the Internet may train students to analyse the information, especially to know which information is valid based on their needs. The habit of analysing something in learning makes students critical in thinking. Several factors contributing to students' critical thinking ability include habit formation, problem-based learning (Aini et al., 2019; Aswan et al., 2018; Yazar Soyadi, 2015), technological-based learning media and curriculum (Terblanche & de Clercq, 2020).

The finding of this study is in line with the research carried out by Masitoh (2018), who noted that the purpose of digital literacy is the implementation of digital technology that is supported with the Internet to access information in order to get the information based on the needs. Digital literacy could enhance students' critical thinking so that it can support the 21st-century education wave (Handayani, 2020). To implement independent learning effectively, students need the skill to use technology properly; this skill is called digital literacy. The transformation of digital and Internet era influences much on the development of students' skill that is useful in the learning process (Techataweewan & Prasertsin, 2018). Digital literacy has a positive impact to the knowledge, literacy and skill in using social media in which it has become the main information resource for young people. Digital literacy programme gives significant contribution to the information processing of social media which is mostly used by young people. In this case, digital literacy could improve the awareness of youth in using social media. Therefore, digital literacy education may be the solution to supporting the development of a country.

Digital literacy based on science, technology, engineering and mathematics (STEM) is the learning approach that could develop students' skill in problem-solving and critical thinking so that their knowledge on digital literacy based on STEM is formed (Handayani, 2020). Developing students' critical thinking using STEM provides chances to the way of teaching and course content based on STEM, especially in this pandemic era. This enables teachers to explore more students' skills based on STEM. The benefit of implementing digital literacy at school is to develop and expand the skills in using technology so that students' creativity, expression and knowledge will improve comprehensively (Kavanagh & O'Rourke, 2016).

Digital literacy approach should be implemented in the learning which focuses on information literacy processing in order to increase students' creativity (Appleton et al., 2017). This must be understood by the teacher because he is the centre of learning activities in the classroom (Tjabolo & Herwin, 2020). Digital literacy as the skill, knowledge, critical understanding, creativity, intelligence and safety in using technology in all aspects of life.

Digital literacy is not only the skill in searching, sharing and using digital media but also the ability to evaluate information critically, the ability to choose the suitable application and software in teaching and learning and the ability to comprehend the information that is got from digital media. McDougall et al. (2018) explained that digital literacy could improve students' knowledge because it motivates students to find the information from many references, to be more skilful in choosing the references and to be able to filter the information, thus enabling the teacher to reorganise the knowledge and skill to be used more creatively with fun in school. This is very important because learning must succeed in the interaction between teachers, students and learning resources (Senen et al., 2021; Wuryandani & Herwin, 2021). Relying on the theoretical framework that is being discussed above and used to formulate the hypothesis, the assumption that there is a positive and significant correlation between digital literacy and students' critical thinking is proved empirically.

Based on the research findings and data analysis, it proven that the variable parents' roles has a positive and significant correlation with students' critical thinking. Parental involvement is very important for a person in various aspects, one of which is education (Sujarwo et al., 2021). Parents' attention and care at home has an influence the child's way of thinking and learning, especially during this online learning era at home. The roles of parents in Indonesia during online learning are to become facilitators in learning, assistants in learning, motivators in learning and supervisors in learning.

Different from the previous study, in this study, parents' roles is being reviewed from the aspect of learning needs, supervision in learning and motivation in learning. Parents who provide good facility in learning will cover students' needs in learning. Students will be more motivated and able to access information better if parents support them with good learning facilities. In addition, supervision and motivation also contribute more to the students' critical thinking ability. Parents' supervision and motivation reflect on the way parents' guide students in learning at home. In this case, parents may guide students to learn independently under their supervision. It could make students to be independent learners and easily understand the learning material. This way could develop students' critical thinking level to be higher rather than helping them do their assignment. In addition, parents who guide their children to use technology carefully, as well as monitor them in filtering the information, will get the result of the improvement of their children' critical thinking. This is because children are getting used to analysing the information better. Critical thinking is influenced by several factors including habit, family (Thongnuypram & Sopheerak, 2013) and teaching method based on critical thinking (Terblanche & de Clercq, 2020).

Parents become the role models for their children for both their demeanour and the way in which they use technology. Parents will always be the director for their children; in this case, they may control what content of information their children will learn and what application their children may operate (Asmawati, 2021). Parents play important roles in managing their children's education; they should make sure that their children follow the right step in education. In addition, parents also play important roles in the children's growth. Children need guidance from parents in understanding the digital world so that they will have many resources to be studied. Parents' guidance will make children become critical in responding to argument; students could evaluate their claim. They could evaluate whether or

not the proof in the claim is right or not, whether the fact is based on the problem faces or not and whether or not children get enough information to solve a problem.

4. Conclusion

To sum up, based on the findings and data analysis, it could be concluded that both digital literacy and parents' roles have significant correlation with critical thinking. Digital literacy could be defined as the ability to select, decide, filter and organise information that is gathered from digital learning resources. The benefit of digital literacy to the development of students' critical thinking is that digital literacy forms students' habit to scan and analyse information they need from various references. Moreover, parents' way of teaching and guiding their children in learning at home influences students' critical thinking ability. In this case, parents may give their children problem-based learning and make their children to get used to thinking critically to develop their children critical thinking. Parents' roles and digital literacy influence students' critical thinking. It is important to note that developing students' digital literacy should be under parents' supervision to develop students' critical thinking to be successful.

Digital literacy should be treated as the special skill that students need to master to build a literate culture. Hopefully, teachers at school could improve students' critical thinking by providing a relaxed and fun atmosphere in class, implementing teaching methods that motivate students to be active participants in discussion and evaluating students' progress in learning. Therefore, digital literacy skills are very helpful for the success of the learning process.

Digital literacy at school, nowadays, has shifted from the ability to read and write manually in printed media to the ability to use digital media. In developing digital literacy, schools should provide enough facilities to all people at school so that they become skilful and creative in operating technological devices. An example is the teacher using WhatsApp group to discuss materials. The school library should provide a digital library that enables students to read e-books. The benefits of digital references not only make students to focus on understanding the material, but also make students creative and wise in using technology. In addition, parents' roles are also important; they are their children's roles model in using technology as well as the guidance for their children in developing their children digital literacy. In this case, it is suggested for parents to monitor their children's progress in learning; they may provide enough facilities for learning such as books, headphone and Internet access.

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