

Access to Digital as a Moderating Influence of Parental Role and Balanced Screen Time on Elementary School Children's Digital Literacy Educationally

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Abstract: This study aims to explore the dynamics of digital literacy of elementary school children in Madura and examine the role of parental involvement, balanced screen time and access to technology and digital literacy outcomes. Using a quantitative approach where data were collected through online and in-person questionnaires distributed to 210 parents of elementary school students in Madura. then analyzed using SEM-PLS version 3.0. This study revealed that parental involvement does not have a positive influence on digital literacy of elementary school children. Given the low economic status of parents, it is difficult to access digital. Balanced screen time was found to influence digital literacy, which emphasizes the importance of managing screen time for educational purposes. Access to technology as a moderator strengthens the impact of parental involvement and balanced screen time on digital literacy. This study contributes to the understanding of digital literacy of primary school children in Madura. The findings provide valuable insights for education stakeholders, emphasizing the need for a comprehensive curriculum, parental engagement, equitable access to technology and customized digital learning platforms. This knowledge can inform policies and practices aimed at improving digital literacy in primary school children's education, promoting a balanced and inclusive educational environment in Indonesia.

Keywords: Access to technology; Balanced screen time; Digital literacy; Parental Involvement.

Introduction

The development of digital technology is currently growing and has the potential to drastically change the global landscape (Susanto, 2021). Human life has undergone significant changes in the digital era (Nudin et al., 2024). Advances in information and communication technology have changed our interaction patterns, ways of working, and learning methods. Digital literacy is not just the ability to operate technological devices, but also includes skills in finding, assessing, and using information appropriately and efficiently (Cynthia & Sihotang, 2023). With these technological advances, the ability to access, analyze and use digital information is becoming increasingly important. According to a research UNESCO report,

about 90% of future jobs will require digital skills (Rizal et al., 2022).

In this case, people can freely use digital technology and acquire knowledge in various ways. They enjoy the various conveniences of digital technology, but on the other hand there is also a risk of unfavorable negative impacts. Thus, crimes such as copyright piracy, pornography, and games that damage the mentality of children and young people are becoming increasingly prevalent because of the ease with which they can be done online (Boiliu, 2020). Also, the inability to utilize healthy digital media has an impact on behavioral deviations. In a study Dvoryanchiko et al. (2020) found that the internet and social media have a negative impact that causes children to behave deviantly.

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These negative sides and deviant actions require educational assistance so that there is no decline in the quality of children's thinking and behavior (Suci et al., 2023). To overcome this impact as a whole, an active role is needed from the world of education in fostering and equipping children with relevant abilities.

Therefore, educational institutions need to design effective strategies to improve digital literacy among elementary school students (Masyhura, 2022). Data from Pew Research Center shows that 73% of students use the internet to search for information related to their studies, indicating that technology serves not only as a tool, but also as a link between learners and science (Saumantri, 2023). Digital literacy enhances students' digital knowledge and skills because it motivates students to seek information from multiple sources, select appropriate sources, select references selectively, filter information carefully and thus helps teachers to reorganize that knowledge and skills to be used more creatively with fun at school (McDougall & Wilkinson, 2018).

In this case, parental care is very important because the care provided by parents lasts longer than the care provided by educators in elementary school institutions. Today, children are faced with a digital world that is an inevitable part of people's lives. This understanding arises because of the needs that underlie people's daily activities. As a primary group, the family plays an important role in society. As a social entity, the family is formed from a long-standing relationship between a man and a woman, which aims to give birth and raise children. Thus, the family in its pure form is a social unit consisting of husband, wife, and children, and has a significant influence in shaping the character and development of children (Nudin et al., 2024).

Children still really need proper control and assistance from parents and teachers in using digital technology, choosing positive shows, and according to their needs (Alia & Irwansyah, 2018). Parents' involvement in introducing digital literacy to early childhood makes the use of technology more monitored. Given that not all digital content is suitable for children to access, parents need to provide more intensive guidance and education in the process of introducing digital literacy from an early age (Iys Nur, 2022).

According to Davidson (2012) for children to utilize the internet positively, they need direction from parents. To be able to guide children properly, parents must have skills in technical, knowledge, and emotional aspects when accessing information and entertainment on the internet. In other words, parental assistance is very important in using the internet in the home environment. This assistance is a concrete form of digital literacy that parents can instill and pass on to children, especially those under 12 years old. This is because children at this age do not have sufficient technical skills, knowledge, or emotional control when exploring

various digital content. Therefore, parental involvement is key in ensuring that children can use the internet safely and wisely.

Parents play a role as motivators for children when learning online at home, motivating children to achieve as high as possible. Parents also play a guiding role. Parents play an important role in developing students' critical thinking, in addition to other factors such as parental education, environment, and even logical intelligence (Ardiansyah, 2020).

In this case, children have a set time limit every day to use digital devices. Parents regularly monitor how much time children spend in front of screens. Parents manage screen time to ensure that children have sufficient time for outside activities and learning. Children are given a balance of screen time between entertainment and educational activities. Parents combine screen activities with family and social interactions (Gupta et al., 2022)

Furthermore, this study also adds the variable of access to digital as a moderating variable. Access to digital is the availability of assets at home, ownership of personal digital devices, such as computers, smartphones, or tablets. Access to reliable and updated digital devices for educational purposes. Access to a stable and high-speed internet connection. Frequent use of digital devices for learning or work-related tasks. Access to digital resources, including e-books, online courses and educational software. Participation in online communication and social platforms (Goulding & Dickie, 2018).

With easy digital access, children have greater opportunities to learn and understand digital literacy. This access allows them to explore various sources of information through the internet, such as e-books, educational videos and interactive learning applications. In addition, children can learn anytime and anywhere, according to their needs and interests. This encourages them to be more independent in their learning process. With open access to digital technology, children can also hone their critical and creative thinking skills early on. Therefore, the ease of digital access is very important in supporting the improvement of children's digital literacy.

Primary school students tend to like activities that involve hands-on practice. They are more interested in doing things for real rather than just receiving theoretical explanations. Referring to the three main characters that elementary school children have, namely like to play, move, and interact in groups, a practice-based learning approach will be much more effective. Therefore, educators should provide direct and concrete learning experiences to students. Learning approaches that are too theoretical should be minimized and only used at certain times, such as in the evaluation process or reinforcement of material (Sukasih, 2021).

Based on the discussion described above, this study was conducted with the title "Access to digital as a moderating influence of parental roles and balanced screen time on digital literacy of elementary school children educationally."

Research Hypothesis and Research Framework

Based on previous research the hypotheses of this study are: hypothesis 1 (H1): There is a positive relationship between the role of parents and digital literacy of elementary school children; hypothesis 2 (H2): There is a positive relationship between balanced screen time and digital literacy of primary school children; hypothesis 3 (H3): Access to technology moderates the relationship between parental role and digital literacy of primary school children; and hypothesis 4 (H4): Access to technology moderates the relationship between balanced screen time and digital literacy of primary school children.

These hypotheses provide a framework to investigate the relationship between parental involvement, access to technology, balanced screen time and digital literacy of primary school children.

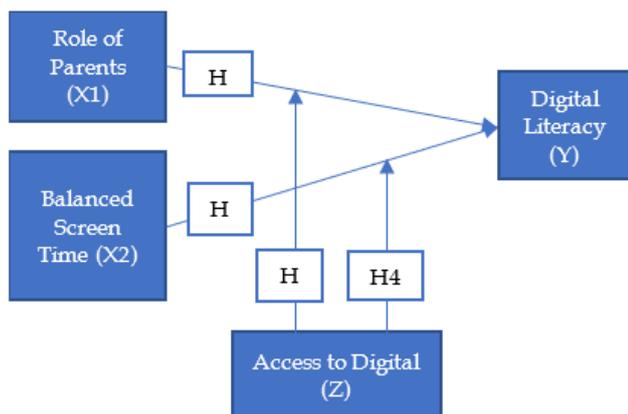


Figure 1. Theoretical Framework

Methods

Type of Research

This research is a quantitative approach using the survey method. Quantitative research aims to reflect various study results through a statistical description of a study questionnaire (Sugiyono, 2019). Quantitative research is a tool used to provide research results in the form of numbers. Therefore, it is necessary to collect relevant data and use the right instruments in analyzing quantitative research (Anshorulloh, 2008).

The survey method is research conducted on a natural research object. The data collection is done through questionnaires, tests and structured interviews (Sugiyono, 2019). Based on its nature, this study uses descriptive statistics in providing an overview or description of the object of research in the form of numbers based on the population and sample as it is and

drawing conclusions that apply generally in a study (Sugiyono, 2019).

Population and Research Sample

Population

Population refers to the area of generation of an object of study with certain characteristics in accordance with the needs and criteria set by the researcher. Researchers will study the existing scope tailored to the research problem (Sugiyono, 2013). The population of this study is parents who have children at the elementary school level in Madura.

Sample

This study examines digital literacy by using the Non-Probability Sampling method in sample selection. This technique was chosen to obtain a sample that is able to represent the views or information of the population under study. Non-Probability Sampling is a method of selecting samples based on specific characteristics or characteristics possessed by members of the population. The main focus of this study is on parents, with the aim of uncovering factors that influence their level of digital literacy. Data collection in this study was conducted using a questionnaire as the research instrument.

The questionnaire was distributed through the Google Form platform and consisted of two main sections: the first section contained the respondents' demographic information, while the second section contained research statements measured using a Likert scale of 1 to 5 (from very poor to very good). All questions were organized based on the object of research and covered relevant variables. The number of respondents in this study reached 210 people. To analyze the data, the Smart PLS method was used.

Research design and participants

This research will use a quantitative research design. Data will be collected through surveys and statistical analysis to test the proposed hypothesis. The participants in this study will involve parents or guardians who have children in the age range of 6-12 years old in Madura, East Java, Indonesia. Data will also be collected about their children in this age group. Efforts will be made to obtain a demographically representative sample size of 210 participants.

Research instruments

A questionnaire for parents will be used to measure the level of parental involvement in their children's digital literacy. Measurement of digital literacy: measurement of children's digital literacy will involve tests covering their ability to use digital devices, understand technological concepts, and practice online safety.

Result and Discussion

Based on the variables in this study, a structural model of the study was calculated with the PLS-SEM Algorithm. In the model feasibility test, the outer model is used, which is a relationship or relationship between indicators and variables that become constructs. The following are the results of the model feasibility test.

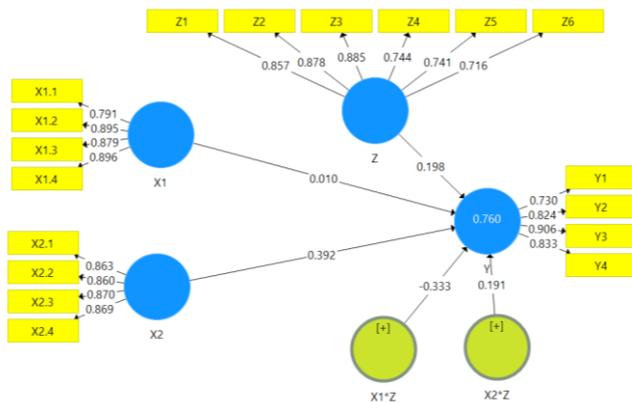


Figure 2. Structural Model

Table 1. Construct Reliability and Validity

Variable	Cronbach's Alpha	rho_A	Composite Reliability	Average
X1	0.888	0.891	0.923	0.751
X2	0.889	0.889	0.923	0.750
Y	0.842	0.844	0.895	0.682
Z	0.891	0.902	0.917	0.651
Z x X1 -> Y	1.000	1.000	1.000	1.000
Z x X2 -> Y	1.000	1.000	1.000	1.000

Based on the validity test results in Table 1, the AVE (Average Variance Extracted) value is greater than 0.5. This shows that the validity test has met the requirements and can be declared good. Thus, the indicators used in this study are considered valid and have met the criteria for convergent validity. In addition, the Cronbach's Alpha and Composite Reliability values obtained are also more than 0.6, which means that the reliability test has met the established standards and the instruments used can be declared reliable.

Structural Model Analysis (Inner Model) R-Square The R-Square value is used to explain how much endogenous variable data can be explained by exogenous variable data. R-Square is a number that ranges from 0 to 1, with the condition that the closer to one, the better. Ghozali (2006) view explains that the r-square value is 0.75 (strong), 0.50 (medium), and 0.25 (weak).

Table 3. The t-test

Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values	Decision
X1 -> Y	0.010	0.000	0.077	0.128	0.898	Rejected
X2 -> Y	0.392	0.395	0.115	3.420	0.001	Accepted
X1*Z -> Y	-0.333	-0.326	0.082	4.051	0.000	Accepted
X2*Z -> Y	0.191	0.188	0.079	2.427	0.016	Accepted

It is widely accepted in academic literature that indicators from a study are considered valid if the loading factor value exceeds 0.6. The loading factor refers to the correlation between the indicator and the construct variable. As the level of correlation between variables increases, the level of validity also increases, which indicates a strong level of validity. The findings of the structural model depicted in the figure above show that each indicator shows a loading factor value that exceeds 0.6, thus signaling the validity of all data.

This study used PLS (Partial Least Square) analysis, a component-based structural equation modeling approach that falls under the category of SEM (Structural Equation Model), to conduct the quality assessment. This study utilized software assistance, specifically smartPLS, for analysis purposes.

Table 2. Test Coefficient of Determination

R Square	R Square	R Square Adjusted
Y	0.760	0.754

Based on the results of the coefficient of determination test in the table above, it can be seen that the coefficient of determination or R Square is 76.0%, which means moderate (strong) while the rest can be explained by other variables outside this study. This shows that the variable parental role (X1) balanced screen time (X2) is able to provide an explanation for digital literacy (Y). while the Adjusted R Square shows that the variable parental role (X1) balanced screen time (X2) is able to provide an explanation for digital literacy (Y) of 75.49% which means strong.

Hypothesis Testing

Based on table 3, it can be concluded as follows: the effect of parental roles on digital literacy has a $p\text{-value} > 0.05$ and the resulting value is $0.898 > 0.05$. Based on this explanation, it can be concluded that Hypothesis 1, namely the role of parents on digital literacy, is rejected; the effect of balanced screen time on digital literacy has a $p\text{-value} \leq 0.05$ and the resulting value is $0.001 \leq 0.05$. Based on this explanation, it can be concluded that Hypothesis 2, namely that screen time is balanced on digital literacy, is accepted; the effect of parental role on digital literacy moderated by access to digital has a $p\text{-value} \leq 0.05$ and the resulting is $0.000 \leq 0.05$. Based on this explanation, it can be concluded that Hypothesis 3, namely access to digital is able to moderate the effect of parental roles on digital literacy is accepted; and the effect of balanced screen time on digital literacy moderated by access to digital has a $p\text{-value} \leq 0.05$ and the resulting value is $0.016 \leq 0.05$. Based on this explanation, it can be concluded that Hypothesis 4, namely access to digital, is able to moderate the effect of balanced screen time on digital literacy, is accepted.

The effect of parental role on digital literacy

Based on the research results from the test above, it shows that the role of parents has no effect on digital literacy. Parents with low socioeconomic status face various obstacles, including limited access, lack of digital literacy, and prioritization of other more pressing needs, so the use of digital capital becomes more limited. In contrast, parents with high socioeconomic status tend to utilize digital capital more often in their daily lives compared to parents from low socioeconomic backgrounds.

This is due to several factors, such as easier access to technology, financial ability to buy digital devices, and higher education levels that make them more familiar and confident in using technology. This statement is also supported by research Racciah (2024), which states that parents with high socioeconomic status use digital capital more often than parents with low socioeconomic status. So it can be concluded that the role of parents towards digital literacy of elementary school children in this study is still not optimal due to economic factors and parents' knowledge of digital.

The effect of balanced screen time on digital literacy

Based on the research results from the tests above, it shows that balanced screen time affects digital literacy. Balanced screen time can improve digital literacy, which emphasizes the importance of managing screen time for educational purposes. This emphasizes that balanced screen time is conducive to the development of digital literacy skills in elementary school children. Educators and parents should collaborate to ensure that screen time is well integrated into learning experiences (Kumpulainen & Nordström, 2020).

In addition, it is important to set clear and consistent guidelines for device use, both in the school environment and at home. These guidelines include not only the duration of use, but also the type of digital content and activities accessed by children. With this approach, children can be directed to use technology as a fun and meaningful learning tool. Proper supervision and mentoring from adults will help children form healthy digital habits and improve their ability to think critically and creatively in dealing with digital information.

Access to digital is able to moderate the influence of parental roles on digital literacy

Based on the research results from the above tests, it shows that access to digital is able to moderate the role of parents on digital literacy. In the digital world, children's access to digital. Ensuring equal assets to technology strengthens the influence of parental involvement and digital literacy. For Indonesia this emphasizes the need to bridge the digital divide, making technology accessible to all children regardless of their background (Van Deursen & Van Dijk, 2019).

Therefore, digital literacy programs that actively involve parents are very important. Training and socialization on the positive use of technology needs to be provided to parents so that they can guide their children appropriately in using digital devices. When parents have a good understanding of technology, they can not only supervise but also become learning partners for children in developing digital literacy skills. With strong involvement from parents, children's learning process in the digital era can be more effective and safer.

Access to digital is able to moderate the effect of balanced screen time on digital literacy

Based on the research results from the above tests, it shows that access to digital is able to moderate balanced screen time on digital literacy. This underscores the important role of technology access in enhancing the impact of balanced screen time on digital literacy. Indonesian policymakers and educators should prioritize equal access to technology resources to support digital literacy goals (Asmayawati, 2023).

Furthermore, it is important for schools and parents to work together to effectively manage children's screen time while keeping in mind the educational aspects of technology use. The use of digital devices should be directed towards activities that support early learning and development of digital literacy skills. With this approach, elementary school children will not only be technology users, but also able to understand, evaluate and produce digital information wisely and responsibly. Strong collaboration between home, school and the surrounding environment is key in creating a healthy

digital ecosystem that supports children's digital literacy development.

Conclusion

This study reveals that the digital literacy of primary school students in Madura is influenced by several key factors. First, the role of parents does not have a significant influence on children's digital literacy, which is thought to be due to economic limitations and parents' low level of digital literacy. Second, balanced screen time is shown to contribute positively to the improvement of digital literacy, emphasizing the importance of managing the use of digital devices in a directed and educational manner. Third, access to digital technology acts as a moderating variable that can strengthen the relationship between parental roles and screen time with children's digital literacy skills. This finding confirms that equal access to digital devices and infrastructure is essential to support the learning process and the development of digital competencies from an early age. In the midst of the rapid development of the digital era, students are required to have strong digital literacy in order to be able to keep up with the dynamics of the times and utilize them productively, both in learning activities and daily life. Therefore, collaboration between parents, schools and government is crucial in creating an inclusive, balanced and sustainable digital learning ecosystem. This research is expected to provide practical contributions for educators, parents and policy makers in designing strategies to improve digital literacy. Empirically, the results also open space for further exploration of other factors that have the potential to influence children's digital literacy but have not been identified in this study.

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Author Contributions

All authors contributed to writing this article

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Conflicts of Interest

The authors declare no conflict of interest.

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