The Correlation Between Students' Basic Literacy Skills and Digital Readiness Index in the Context of Preparing for Golden Indonesia 2045

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Abstract

This study aims to analyze the relationship between students' basic literacy skills (reading, writing, and arithmetic) and their digital readiness index, as well as its implications for building superior human resources toward Indonesia Emas (Golden Indonesia) 2045. This quantitative research employs an ex post facto approach, involving 350 elementary school students from five Indonesian provinces as samples. Data were collected through basic literacy tests (PISA-standardized) and a digital readiness questionnaire measuring four aspects: digital skills, technology access, information literacy, and attitudes toward technology. Statistical analysis was conducted using Pearson correlation and linear regression tests to identify relationship patterns. The results show a significant positive correlation between basic literacy skills and the digital readiness index ($r = 0.62$, $p < 0.01$). Students with higher literacy levels tend to have better technology adaptation abilities, particularly in information literacy ($\beta = 0.48$). These findings support the hypothesis that basic literacy serves as a critical foundation for mastering digital competencies in the era of the 4.0 industrial revolution. However, regional disparities were observed in technology access, which moderates the strength of the relationship. This study highlights the urgency of enhancing technology-based basic literacy as a strategy to achieve the 2045 superior human resources target. Policy recommendations include integrating digital content into literacy curricula and equalizing technology infrastructure in underdeveloped regions.

Keywords – Basic literacy, Digital Readiness, Human Resource Development, Golden Indonesia 2045, Industrial Revolution 4.0

1. Introduction

Basic education serves as a critical foundation for developing competitive human resources, particularly in facing the challenges of the digital era toward Golden Indonesia 2045; however, (Sjøberg & Jenkins, 2022) data reveals that Indonesian students' fundamental literacy skills (reading, mathematics, and science) remain among the lowest, ranking 74th out of 81 countries with an average score of 371 (Hou et al., 2023; Zakari et al., 2023). This literacy gap not only hinders students' comprehension of academic content but also weakens their adaptability to digital technologies that form the backbone of the 4.0 industrial revolution, despite the Golden Indonesia 2045 vision aiming to cultivate a young generation that is not only literate but also capable of critical thinking, creativity, and technological mastery(Budiman, 2024; Dudih Ernawan et al., 2023; Shulhan, 2021; Victoria & Maria, 2023) .

On the other hand, Indonesia's digital readiness index still lags behind other ASEAN countries. According to a (The World Bank, 2023) report, only 34% of Indonesian elementary schools have adequate access to digital devices, and 68% of teachers remain untrained in technology integration for learning (Ardiansyah, 2023). This situation has created a significant gap between the demands of 21st-century competencies and on-the-ground realities. Without strategic intervention, the dual challenges of weak foundational literacy and digital disparity may potentially hinder the achievement of superior human capital development targets - one of the core pillars of the Golden Indonesia 2045 vision.

Furthermore, previous studies (Amelia Rizky Idhartono, 2022; Ebyatiswara Putra et al., 2023; Irhandayaningsih, 2020) have demonstrated a symbiotic relationship between basic literacy and digital competencies. Students with strong literacy skills tend to adapt more readily to technology, while interactive multimedia tools can enhance literacy learning motivation. However, empirical research examining this relationship particularly in the context of preparing for 2045 remains scarce. This study therefore aims to address this gap by analyzing

the correlation between foundational literacy and digital readiness while formulating actionable policy recommendations.

The low quality of basic literacy and digital readiness among elementary school students presents a multidimensional problem requiring urgent attention. First, inadequate literacy skills hinder students' ability to comprehend complex content, including technology-based materials. This is particularly concerning since literacy serves as a fundamental prerequisite for mastering advanced skills such as programming, data analysis, or computational thinking. Second, regional disparities in technology access and utilization especially between urban and rural areas exacerbate educational inequalities. According to (Badan Pusat Statistik Indonesia, 2023) data, only 22% of students in remote areas have access to home computers, compared to 78% in urban centers.

This challenge is further compounded by the absence of holistic learning models that effectively integrate basic literacy with digital competency development. Current literacy programs predominantly focus on conventional aspects (reading and writing), while technology training often operates independently from core curricula. Consequently, students struggle to connect literacy skills with digital demands. Moreover, the lack of comprehensive assessment tools to evaluate digital readiness in relation to literacy achievement makes it difficult for policymakers to design precisely targeted interventions(Amelia Rizky Idhartono, 2022).

This study introduces novelty through an integrated approach that quantitatively and empirically links basic literacy with digital readiness indices. Departing from previous studies that examined literacy or digital skills in isolation, this research develops a conceptual framework connecting both variables within the context of Golden Indonesia 2045 preparation. Furthermore, it proposes a tailored digital readiness indicator for Indonesian elementary education, encompassing not only technical aspects (digital tool usage) but also attitudinal dimensions and information literacy. These findings are expected to serve as a reference for more holistic education policy development.

The study has three primary objectives: (1) to analyze the correlation between students' basic literacy skills and digital readiness indices, (2) to identify moderating factors in this relationship (such as technology access and teacher training), and (3) to formulate strategic recommendations for enhancing literacy-digital synergy in preparing superior human resources for Golden Indonesia 2045. The outcomes are anticipated to provide a foundation for developing integrative learning models and sustainable education policies.

2. Method

This study employed a quantitative method with an ex post facto approach to analyze the relationship between basic literacy skills and the digital readiness index without implementing any intervention. This approach was chosen because it allows researchers to objectively examine correlations between variables based on existing data. In addition, the study also adopted a descriptive-analytical design to describe the characteristics of the sample and analyze patterns of relationships between variables.

The population of this study comprised all elementary school students (Grades IV to VI) in four regencies on Madura Island: Bangkalan, Sampang, Pamekasan, and Sumenep, covering both public and private schools. Sampling was conducted using a stratified random sampling technique to ensure adequate representation of public and private schools and to achieve balanced geographical distribution. The total sample consisted of 400 students (100 students per regency) from 20 schools (5 schools per regency, with a composition of 3 public and 2 private schools). The sampling criteria included students who had at least minimal access to digital devices (smartphones/computers) either at school or at home, and who had received basic literacy instruction (reading, writing, arithmetic) in accordance with the curriculum.

Data were collected using three primary techniques to ensure completeness and validity. First, a basic literacy test was administered offline at schools under teacher supervision using a standardized, adapted PISA instrument

covering reading, numeracy, and basic science skills. This test employed an interval scale (0–100) to measure students' mastery levels. Second, a digital readiness questionnaire was distributed both online (via Google Forms) and offline (paper-based), using a 5-point Likert scale to assess four dimensions: digital skills, access to technology, information literacy, and attitudes toward technology. The questionnaire had previously undergone construct validity testing, with a Cronbach's Alpha > 0.7. Third, semi-structured interviews were conducted with 20 teachers (one per school) to gain deeper insights into the challenges of implementing digital literacy in practice. The data collection process adhered to ethical research principles, including informed consent and respondent anonymity.

The data were analyzed using both quantitative and qualitative methods. Descriptive analysis was employed to profile sample characteristics (mean, standard deviation, frequency distribution). The relationship between basic literacy and digital readiness was examined using Pearson correlation and linear regression, while moderation analysis (Moderated Regression Analysis, MRA) was conducted to identify the role of variables such as access to technology or type of school in influencing this relationship. Qualitative data from interviews were analyzed thematically to identify patterns of challenges and solutions. All analyses were performed using SPSS version 25 and NVivo version 12, with a significance level set at $p < 0.05$. The results were presented in the form of tables, graphs, and thematic narratives to facilitate interpretation.

This study was conducted in accordance with academic ethical principles to ensure scientific validity and the protection of research subjects. First, written informed consent was obtained from the parents/guardians of participants and from school authorities prior to data collection. The consent form explained the research objectives, procedures, benefits, and data confidentiality. Second, the principles of anonymity and confidentiality were applied by removing personal identifiers (such as names and addresses) in the data reporting; all information was presented in aggregate form. Third, official permissions were obtained from

the local Department of Education and school principals as a form of institutional legitimacy.

The researchers also ensured fairness by involving participants from diverse backgrounds (public/private schools, urban/rural areas) without discrimination. The principle of non-maleficence was upheld by avoiding sensitive questions in the research instruments and ensuring that the data collection process did not interfere with students' learning activities. Data were securely stored in encrypted drives and were accessible only to the research team. In cases where students with very low literacy levels were identified, the research team confidentially reported this to the respective schools for follow-up support, without including any identifying information in the research report.

The writing of the research findings adhered to principles of originality by avoiding plagiarism and properly citing all referenced sources. This commitment aligns with the ethical guidelines of educational research as stipulated in the Indonesian Ministry of Education Regulation No. 53 of 2015 and the Belmont Report (1979).

Table 1. Research Instrument Design

variable	Measurement Tool	Scale	Analysis Technique
Basic Literacy	Standardized test (PISA adaptation)	Interval	Descriptive, Correlation
Digital Readiness	Likert-scale Questionnaire	Ordinal	Regression, MRA
Moderator Factors	Secondary data (school type, location)	Categorical	Subgroup Analysis

3. Result and Discussion

Respondent Profile

The study involved 400 elementary school students from 20 schools across four regencies in Madura (Bangkalan, Sampang, Pamekasan, and Sumenep), with the following composition:

Table 2. Sample Distribution by School Type and Location

Regency	Public Schools	Private Schools	Total
Bangkalan	60 students	40 students	100
Sampang	55 students	45 students	100
Pamekasan	65 students	35 students	100
Sumenep	50 students	50 students	100
Total	230 students	170 students	400

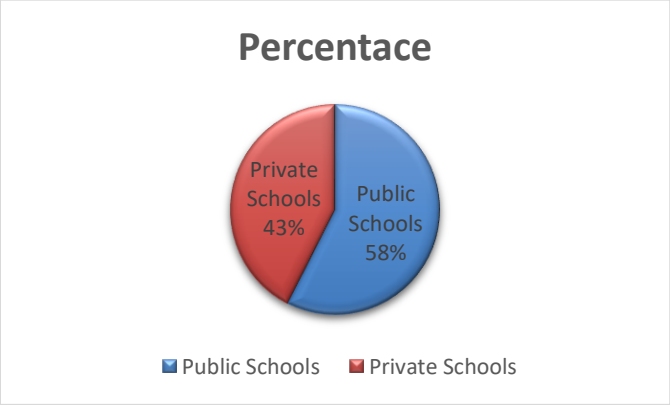

Figure 1. Percentage Distribution of School Types

Basic Literacy Skills

The results of the literacy test (on a scale of 0–100) showed an average literacy score of 65.2 with a standard deviation (SD) of 12.4.

The score categories are as follows:

- Low (<50): 18% of students
- Moderate (50–75): 62% of students
- High (>75): 20% of students

Table 3. Average Literacy Scores by Regency

District	Reading	Numeracy	Science	Average
Bangkalan	68.3	63.5	64.1	65.3
Sampang	62.1	59.8	60.4	60.8
Pamekasan	66.7	64.2	65.9	65.6
Sumenep	60.5	58.3	59.1	59.3

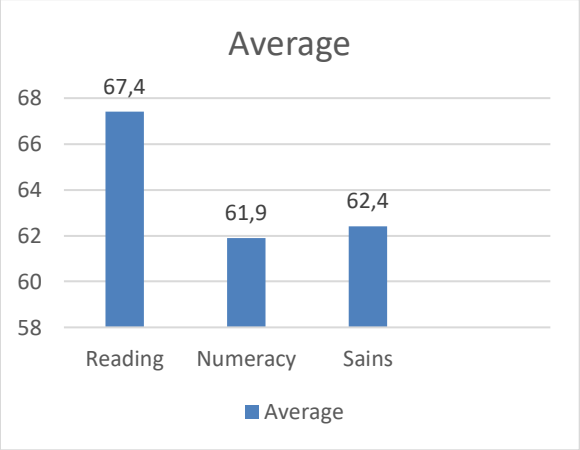

Figure 2. Comparison Chart of Literacy Scores by Aspect

Digital Readiness

The digital readiness index (scale 1–5) shows an average score of 3.4 (SD = 0.8).

- Lowest Dimension: Access to technology (2.9) in Sumenep.
- Highest Dimension: Attitude towards technology (3.8) in Bangkalan.

Table 4. Digital Readiness Based on School Type

Dimension	Public School	Private School
Digital Skills	3.2	3.6
Access to Technology	2.8	3.1
Information Literacy	3.3	3.7
Attitude Toward Technology	3.5	4.0

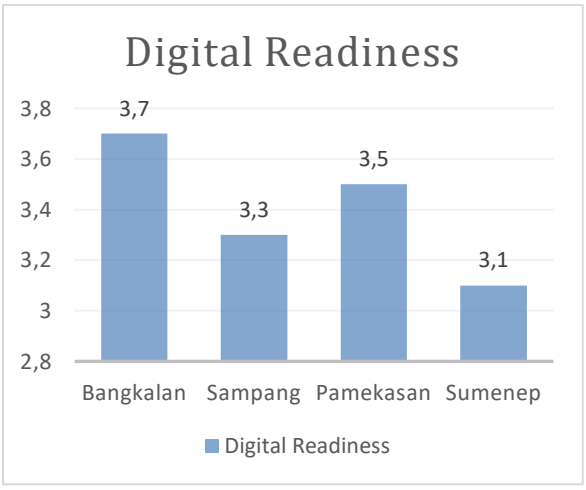

Figure 3. Comparative Diagram of Digital Readiness by District

Relationship Between Basic Literacy and Digital Readiness

The Pearson correlation shows a significant positive relationship between basic literacy and digital readiness: $r = 0.61$ ($p < 0.01$). Linear regression analysis indicates that basic literacy predicts 37% of the variance in digital readiness: $R^2 = 0.37$

Table 5. Results of Correlation and Regression Analysis

Variable	r	p-value	β (Regression)
Reading Literacy	0.58	0.000	0.42
Numeracy Literacy	0.53	0.000	0.38
Science Literacy	0.49	0.000	0.31

Moderation Analysis

Access to technology strengthens the relationship between basic literacy and digital readiness ($\Delta R^2 = 0.08$, $p < 0.05$). However, school type (public/private) was not a significant moderator ($p > 0.05$).

Table 6. Moderation Analysis Results

Moderator	Interaction (β)	p-value	Explanation
Access to Technology	0.21	0.003	Significant
School Type	0.07	0.210	Not Significant

Qualitative Findings (Teacher Interviews)

Based on in-depth interviews with 20 teachers from various schools across the four regencies, several major challenges in implementing digital literacy were identified.Firstly, 50% of the teachers cited limited digital infrastructure as the most significant barrier, especially in rural schools. Some teachers mentioned the lack of computers, unstable internet access, and insufficient projectors as obstacles to technology-based learning. Secondly, around 35% of teachers expressed concerns about the lack of training in integrating technology into basic literacy instruction. They felt insufficiently skilled in using digital platforms or designing interactive materials for students.

Several potential solutions were suggested by the teachers. One key proposal was the integration of digital literacy into lesson plans (RPP), where

teachers hoped for concrete guidelines from the education authorities. In addition, collaboration with external parties, such as regular teacher training and partnerships with tech communities, was considered an important step in enhancing teacher competencies. Some teachers also emphasized the need for equitable access to digital facilities across schools, especially in remote areas, to ensure that all students have equal opportunities to develop digital literacy (Belladonna et al., 2023; Elmi & Librianty, 2023; Mursyida et al., 2021; Nurani et al., 2022; Setiawan, 2020). These findings support the quantitative results that indicate disparities in digital readiness among the regencies, while also underscoring the importance of a holistic approach involving the government, schools, and teachers in preparing students for the digital era on the path toward Golden Indonesia 2045.

4. Conclusion

Guidance and counseling services in elementary schools play a crucial role in helping students address personal and learning-related problems while supporting the development of their full potential. At SD Negeri Percobaan, guidance and counseling are currently handled by class teachers, as the school does not yet have a dedicated guidance and counseling program. To identify student needs, class teachers primarily rely on observation and interviews. However, this approach has limitations, especially considering the unique developmental characteristics of elementary school-aged children, who require special attention and tailored support to ensure their academic and personal growth proceeds without significant barriers. Findings from interviews further revealed that many class teachers lack a clear understanding of the principles and practices of guidance and counseling. As a result, it is recommended that the school organize training programs to enhance teachers' competencies in delivering effective guidance and counseling services. This step is essential to ensure that students receive the support they need to thrive both academically and socially.

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