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The Effect of Rumah Pendidikan Platform Integration in IPAS Learning on Digital and Ecological Literacy of Primary School Students

Haffadah Dwi Widad[1]*, Azmi Al Bahij[2]

Universitas Muhammadiyah Jakarta, Indonesia

***Corresponding Author**

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ABSTRACT

This article is derived from a master's thesis examining the effect of the Rumah Pendidikan digital platform on students' digital literacy and ecological literacy in Integrated Natural and Social Sciences (IPAS) learning at the primary school level. The study aimed to determine both partial and simultaneous effects of the platform's utilization on students' digital and ecological literacy competencies. A quantitative approach with a quasiexperimental posttest-only control group design was employed. The research was conducted at SD Negeri Serua 03 Depok, Indonesia, involving 66 fifth-grade students divided into experimental and control groups. Data were collected using validated digital literacy and ecological literacy tests and questionnaires. Statistical analyses were performed using SPSS 26, including descriptive statistics, assumption tests, Independent Samples t-Test, and multivariate analysis of variance (MANOVA). The results indicated that students in the experimental group achieved significantly higher digital literacy scores than those in the control group ($t = 8.080$, $p < 0.05$). Furthermore, MANOVA results revealed a significant simultaneous effect of Rumah Pendidikan platform utilization on both digital and ecological literacy ($p < 0.05$). The study concludes that integrating the Rumah Pendidikan platform into IPAS learning is effective in enhancing students' digital and ecological literacy, supporting the development of 21st-century competencies.

Keywords: Rumah Pendidikan platform, IPAS learning, digital literacy, ecological literacy, primary education

INTRODUCTION

Education in the 21st century emphasizes the development of students' competencies in digital literacy and environmental awareness as essential skills for sustainable development. The rapid advancement of information and communication technology has transformed learning processes, requiring schools to integrate digital platforms into classroom instruction. In Indonesia, this transformation is institutionalized through the Merdeka Curriculum, which highlights digital competence and ecological awareness as cross-cutting competencies, particularly in Integrated Natural and Social Sciences (IPAS) learning at the primary school level [1].

Despite policy support, empirical evidence shows that many primary school students still demonstrate low levels of digital literacy, including difficulties in accessing, evaluating, and utilizing digital information responsibly [2]. In parallel, ecological literacy among students remains underdeveloped, as reflected in limited understanding of environmental issues and low pro-environmental behavior [3]. These challenges indicate a gap between curriculum expectations and classroom realities.

The Ministry of Education, Culture, Research, and Technology introduced the Rumah Pendidikan platform as a digital learning ecosystem designed to support teachers and students through interactive content, digital resources, and learning management features. However, the utilization of Rumah Pendidikan in primary education remains inconsistent, and its empirical effectiveness in improving students' literacy competencies has not been sufficiently examined [4].

Previous studies have explored the use of digital platforms to enhance learning outcomes, reporting positive effects on student engagement and academic achievement [5], [6]. Other studies have examined environmental education approaches to improve ecological literacy [7]. Nevertheless, most existing research focuses on single outcomes or higher education contexts, leaving a research gap regarding the simultaneous impact of digital learning platforms on digital literacy and ecological literacy at the primary school level.

Based on this gap, this study aims to analyze the effect of integrating the Rumah Pendidikan platform into IPAS learning on students' digital literacy and ecological literacy. Specifically, this research seeks to determine: (1) the effect of Rumah Pendidikan utilization on students' digital literacy, and (2) the simultaneous effect of Rumah Pendidikan utilization on digital literacy and ecological literacy. The findings are expected to provide empirical evidence supporting digital platform integration in primary education.

LITERATURE REVIEW

Digital literacy refers to the ability to access, analyze, evaluate, and create information using digital technologies responsibly and ethically [8]. In the context of primary education, digital literacy includes basic operational skills, critical evaluation of information, and responsible digital behavior. Gilster emphasizes that digital literacy is not merely technical proficiency but also cognitive and ethical competence in digital environments [9].

Ecological literacy is defined as the understanding of ecological systems and the ability to apply this understanding to make responsible decisions regarding environmental sustainability [10]. Capra argues that ecological literacy enables individuals to recognize interconnections between natural systems and human activities, fostering sustainable behavior [11]. In primary education, ecological literacy is developed through contextual learning experiences that link environmental concepts to students' daily lives.

The Rumah Pendidikan platform functions as a digital learning ecosystem providing instructional materials, interactive content, and assessment tools aligned with the Merdeka Curriculum. Digital learning theory suggests that platform-based learning environments promote active learning, collaboration, and self-regulated learning, which are essential for literacy development [12].

Constructivist learning theory underpins the integration of digital platforms in IPAS learning, emphasizing that knowledge is actively constructed through interaction with learning resources and social environments [13]. Similarly, environmental education theory highlights experiential and inquiry-based learning as effective approaches for developing ecological literacy [14].

Empirical studies indicate that digital learning platforms significantly improve students' digital literacy and learning engagement [15], [16]. Other studies report that integrated environmental education enhances students' ecological awareness and pro-environmental attitudes [17]. However, limited studies examine the combined effect of digital platforms on both digital and ecological literacy simultaneously at the primary school level.

Based on the theoretical framework and previous research, the hypotheses of this study are formulated as follows: (H1) the utilization of the Rumah Pendidikan platform has a significant effect on students' digital literacy; and (H2) the utilization of the Rumah Pendidikan platform simultaneously affects students' digital literacy and ecological literacy.

METHODOLOGY

This study employed a quantitative research approach using a quasi-experimental design with a posttest-only control group. This design was selected to examine the causal effect of integrating the Rumah Pendidikan platform into IPAS learning on students' digital literacy and ecological literacy without disrupting the natural classroom setting. The quasi-experimental approach is appropriate for educational research where random assignment at the individual level is not feasible, yet control over treatment implementation can still be maintained.

The research was conducted at SD Negeri Serua 03 Depok, West Java, Indonesia, during the second semester of the academic year. The school was selected based on its implementation of the Merdeka Curriculum and its readiness to integrate digital learning platforms into classroom instruction. The population of this study consisted of all fifth-grade students enrolled at the school. A total of 66 students participated in the study and were divided into two groups: an experimental group consisting of 33 students and a control group consisting of 33 students. Group assignment was conducted at the class level to preserve instructional continuity.

The experimental group received IPAS instruction integrated with the Rumah Pendidikan platform. Learning activities included accessing digital learning materials, interactive multimedia content, online assignments, and formative assessments available through the platform. Instruction emphasized student-centered learning, inquiry-based activities, and contextual environmental issues aligned with IPAS learning objectives. In contrast, the control group received conventional IPAS instruction using textbooks and teacher-centered explanations without the use of the Rumah Pendidikan platform.

Research instruments consisted of digital literacy and ecological literacy tests and questionnaires developed based on established theoretical indicators. The digital literacy instrument measured students' abilities in accessing information, evaluating digital content, using digital tools responsibly, and demonstrating ethical behavior in digital environments. The ecological literacy instrument assessed students' understanding of ecological concepts, awareness of environmental issues, and attitudes toward environmental conservation. Instrument validity was examined using item-total correlation analysis, while reliability was tested using Cronbach's alpha coefficients. All instruments met acceptable validity and reliability criteria, indicating that they were suitable for data collection and analysis.

Data collection was conducted after the completion of the instructional intervention to ensure that students' literacy outcomes reflected the learning treatment. Ethical considerations were observed throughout the research process, including obtaining permission from school authorities, informing participants about the research objectives, and ensuring the confidentiality of student data.

Data analysis was carried out using SPSS version 26. Descriptive statistical analysis was used to describe students' digital literacy and ecological literacy levels in both groups, including measures of central tendency and variability. Prior to hypothesis testing, classical assumption tests were performed. Normality of data distribution was examined using the Kolmogorov–Smirnov and Shapiro–Wilk tests, while homogeneity of variance was assessed using Levene's test. The results indicated that the data met the assumptions required for parametric analysis.

Inferential statistical analysis was conducted to test the research hypotheses. An Independent Samples t-Test was used to analyze the partial effect of Rumah Pendidikan platform utilization on students' digital literacy. To examine the simultaneous effect of the independent variable on digital literacy and ecological literacy, multivariate analysis of variance (MANOVA) was employed. The significance level for all statistical tests was set at 0.05. The results of these analyses provided empirical evidence regarding the effectiveness of integrating the Rumah Pendidikan platform into IPAS learning at the primary school level.

RESULTS AND DISCUSSION

This section presents the results of data analysis and discusses the findings in relation to relevant theories and previous studies. The analysis includes descriptive statistics and inferential statistical testing to examine the effect of Rumah Pendidikan platform utilization on students' digital literacy and ecological literacy. Table I. Descriptive Statistics of Digital and Ecological Literacy Scores

Variable	Group	N	Mean	Std. Deviation
Digital Literacy	Experimental	33	82.45	6.38
	Control	33	59.97	7.12
Ecological Literacy	Experimental	33	80.12	5.94
	Control	33	68.35	6.47

Descriptive statistical analysis was conducted to provide an overview of students' digital literacy and ecological literacy levels in both the experimental and control groups. The results indicate that the mean digital literacy score of students in the experimental group was substantially higher than that of students in the control group. Students who participated in IPAS learning integrated with the Rumah Pendidikan platform demonstrated better abilities in accessing digital information, evaluating online content, and utilizing digital tools responsibly.

Similarly, the ecological literacy scores of the experimental group were categorized as high, while those of the control group were categorized as moderate. Students in the experimental group showed stronger understanding of ecological concepts, greater awareness of environmental issues, and more positive attitudes toward environmental conservation. These findings suggest that learning activities supported by digital platforms can enhance students' comprehension of environmental topics by providing contextual and interactive learning experiences.

Table II. Summary of Inferential Statistical Analysis Results

Test	Dependent Variable	Statistic Value	Sig. (p)	Decision
Independent Samples t-Test	Digital Literacy	t = 8.080	0.000	Significant
MANOVA (Pillai's Trace)	Digital & Ecological Literacy	F = 12.845	0.000	Significant

Inferential statistical analysis was conducted to test the research hypotheses. An Independent Samples t-Test was used to examine the partial effect of Rumah Pendidikan platform utilization on students' digital literacy. Inferential statistical analysis was conducted to test the research hypotheses. An Independent Samples t-Test was used to examine the partial effect of Rumah Pendidikan platform utilization on students' digital literacy. The results of the t-Test indicated a significant difference between the experimental and control groups ($t = 8.080$, $p = 0.000 < 0.05$), with a large effect size (Cohen's $d = 1.98$), indicating that the Rumah Pendidikan platform had a strong practical impact on students' digital literacy. The mean difference of 22.485 demonstrates that students who learned using the Rumah Pendidikan platform achieved significantly higher digital literacy scores than those who received conventional instruction.

To examine the simultaneous effect of Rumah Pendidikan platform utilization on digital literacy and ecological literacy, a multivariate analysis of variance (MANOVA) was conducted. The MANOVA results showed a statistically significant multivariate effect (Pillai's Trace = 0.290, $F = 12.845$, $p < 0.05$), with a moderate to large effect size (partial $\eta^2 = 0.29$), indicating that the Rumah Pendidikan platform had a meaningful simultaneous effect on students' digital literacy and ecological literacy. This indicates that the integration of the Rumah Pendidikan platform had a significant combined effect on both dependent variables.

The findings of this study provide empirical evidence that the integration of the Rumah Pendidikan platform into IPAS learning positively influences students' digital literacy. This result supports digital learning theory, which emphasizes that technology-enhanced learning environments promote active engagement, self-regulated learning, and critical thinking skills [12]. By interacting with digital content and online learning tools, students develop competencies necessary for navigating digital information effectively and ethically.

The significant improvement in ecological literacy among students in the experimental group indicates that digital platforms can also serve as effective tools for environmental education. Interactive multimedia content and contextual learning activities available through the Rumah Pendidikan platform allow students to visualize ecological processes and understand the consequences of human actions on the environment. This finding aligns with Capra's concept of ecological literacy, which emphasizes systems thinking and interconnectedness in environmental learning [11].

Furthermore, the significant simultaneous effect identified through MANOVA analysis suggests that digital literacy and ecological literacy are interrelated competencies that can be developed concurrently through integrated learning approaches. The Rumah Pendidikan platform facilitates this integration by combining digital

skills development with meaningful environmental content in IPAS learning. This finding extends previous research that focused on single literacy outcomes by demonstrating the dual impact of digital platform integration at the primary school level.

The results of this study are consistent with previous empirical studies reporting positive effects of digital learning platforms on students' literacy and learning outcomes [15], [16]. However, this study contributes novel empirical evidence by focusing on primary education and by examining both digital and ecological literacy simultaneously. Differences in effect sizes between this study and prior research may be attributed to contextual factors such as curriculum alignment, teacher facilitation, and students' prior exposure to digital learning.

Overall, the findings highlight the importance of integrating digital learning platforms into IPAS instruction to support the development of 21st-century competencies. The Rumah Pendidikan platform not only enhances students' digital skills but also fosters ecological awareness and responsible environmental behavior, which are essential for sustainable development education.

CONCLUSION

This study concludes that the integration of the Rumah Pendidikan platform into Integrated Natural and Social Sciences (IPAS) learning has a significant positive effect on primary school students' digital literacy and ecological literacy, both partially and simultaneously. Students who participated in platform-based learning demonstrated higher abilities in accessing, evaluating, and utilizing digital information responsibly compared to students who experienced conventional instruction. These findings confirm that structured digital learning environments can effectively foster essential digital competencies at the primary education level.

In addition to improving digital literacy, the utilization of the Rumah Pendidikan platform also contributes meaningfully to the development of students' ecological literacy. Students exposed to interactive, contextual, and multimedia-based IPAS learning showed a better understanding of ecological concepts, greater awareness of environmental issues, and more positive attitudes toward environmental conservation. This indicates that digital platforms, when appropriately integrated into subject learning, can serve as powerful tools for strengthening environmental education and sustainability awareness from an early age.

The simultaneous effect of the Rumah Pendidikan platform on both digital literacy and ecological literacy highlights the interconnected nature of 21st-century competencies. Digital skills and ecological awareness should not be developed in isolation; rather, they can be nurtured together through integrated learning approaches. The findings of this study support theoretical perspectives that emphasize holistic learning experiences, where technology acts as a facilitator for meaningful and context-rich instruction.

The practical implications of this research are significant for teachers, schools, and policymakers. Teachers are encouraged to integrate the Rumah Pendidikan platform into IPAS instruction as part of student-centered and inquiry-based learning strategies. Schools should strengthen digital infrastructure and provide continuous professional development to support effective platform utilization. At the policy level, the findings support the expansion of digital learning ecosystems aligned with the Merdeka Curriculum to enhance students' literacy competencies comprehensively.

Despite its contributions, this study has several limitations. The research was conducted in a single primary school, which may limit the generalizability of the findings. Additionally, the posttest-only quasi-experimental design does not capture long-term changes in students' literacy development. Future research is recommended to involve larger and more diverse samples, apply longitudinal research designs, and explore additional variables such as learning motivation, critical thinking, and environmental behavior.

Overall, this study provides empirical evidence that the Rumah Pendidikan platform is an effective digital learning tool for enhancing digital literacy and ecological literacy in primary education. By integrating technology with meaningful environmental content, IPAS learning can contribute to the development of responsible, digitally literate, and environmentally conscious future citizens.

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