

HYBRID LEARNING MODEL BASED ON DIGITAL LITERACY TO STRENGTHEN ELEMENTARY SCHOOL STUDENTS' COMPETENCIES IN THE SOCIETY 5.0 ERA

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis efektivitas model pembelajaran hybrid berbasis literasi digital dalam memperkuat kompetensi siswa sekolah dasar di era Society 5.0. Penelitian ini menggunakan pendekatan kuantitatif dengan desain quasi-experimental melalui model pretest-posttest control group. Penelitian dilaksanakan pada 15 sekolah dasar di Kutapasi, Aceh Besar, dengan melibatkan 300 siswa kelas V dan 15 guru kelas yang dipilih menggunakan teknik purposive sampling. Data dikumpulkan melalui angket, lembar observasi, wawancara, dan studi dokumentasi. Data dianalisis menggunakan statistik deskriptif, uji paired sample t-test,

dan analisis tematik. Hasil penelitian menunjukkan bahwa implementasi pembelajaran hybrid secara signifikan meningkatkan kompetensi literasi digital, berpikir kritis, kolaborasi, komunikasi, dan keterlibatan belajar siswa. Hasil analisis statistik menunjukkan seluruh nilai signifikansi berada di bawah 0,05 yang berarti model pembelajaran hybrid memberikan pengaruh positif yang signifikan terhadap kompetensi siswa. Selain itu, guru menyatakan bahwa pembelajaran hybrid menciptakan lingkungan belajar yang lebih interaktif, fleksibel, dan berpusat pada siswa. Namun demikian, keterbatasan akses internet dan kompetensi teknologi guru masih menjadi kendala dalam implementasi pembelajaran. Oleh karena itu, penelitian ini menyimpulkan bahwa pembelajaran hybrid berbasis literasi digital merupakan pendekatan pembelajaran yang efektif untuk memperkuat kompetensi siswa sekolah dasar di era Society 5.0.

ABSTRACT

This study aimed to analyze the effectiveness of a digital literacy-based hybrid learning model in strengthening elementary school students' competencies in the Society 5.0 era. The research employed a quantitative approach using a quasi-experimental design with a pretest-posttest control group model. The study was conducted in 15 elementary schools in Kutapasi, Aceh Besar, involving 300 fifth-grade students and 15 classroom teachers selected through purposive sampling techniques. Data were collected using questionnaires, observation sheets, interviews, and documentation studies. The collected data were analyzed using descriptive statistics, paired sample t-tests, and thematic analysis. The findings revealed that the implementation of hybrid learning significantly improved students' digital literacy, critical thinking, collaboration, communication, and learning engagement competencies. Statistical analysis showed that all significance values were below 0.05, indicating

that the hybrid learning model had a significant positive effect on students' competencies. Furthermore, teachers stated that hybrid learning created more interactive, flexible, and student-centered learning environments. However, challenges such as limited internet access and inadequate technological competencies among teachers remained obstacles during implementation. Therefore, this study concludes that digital literacy-based hybrid learning is an effective instructional approach for strengthening elementary school students' competencies in the Society 5.0 era..

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INTRODUCTION

The emergence of the Society 5.0 era has significantly transformed the educational landscape worldwide, particularly in elementary education. Society 5.0 emphasizes a human-centered society that integrates digital technology and artificial intelligence into various aspects of life, including education. In this context, schools are required not only to provide academic instruction but also to develop students' competencies in digital literacy, critical thinking, communication, creativity, and collaboration. Elementary schools play a strategic role in preparing students to adapt to technological developments from an early age. Therefore, educational institutions are increasingly encouraged to implement innovative learning models that can integrate technology effectively into classroom practices (Ahmad et al., 2023). The integration of digital-based learning is becoming increasingly important because students in the current generation are closely connected with digital devices and online information in their daily lives.

Digital literacy has become one of the essential competencies needed in 21st-century education. Digital literacy refers to the ability to access, evaluate, manage, and communicate information through digital technologies responsibly and critically. According to Romadhianti et al. (2021), strengthening digital literacy is necessary to support students' academic development and social participation in the Society 5.0 era. Students with adequate digital literacy skills tend to demonstrate better problem-solving abilities, learning independence, and critical thinking competencies. Furthermore, digital literacy encourages students to use technology ethically and productively in educational contexts. However, many elementary school students still experience limitations in understanding digital information critically, especially in identifying valid online sources and utilizing digital tools appropriately. These conditions indicate that digital literacy development in elementary schools still requires serious attention.

The rapid development of educational technology has also encouraged the implementation of hybrid learning models in elementary education. Hybrid learning, often referred to as blended learning, combines face-to-face instruction with online learning

activities to create a more flexible and interactive learning environment. This model allows students to access learning materials digitally while maintaining direct interaction with teachers and peers. Research conducted by Shehab et al. (2021) found that hybrid learning can improve students' engagement, flexibility, and independent learning skills. In elementary schools, hybrid learning supports the use of interactive media such as educational videos, digital quizzes, virtual discussions, and online collaborative activities. Consequently, hybrid learning is considered an appropriate strategy to address educational challenges in the digital era while supporting competency-based learning approaches.

Several previous studies have shown the positive impact of hybrid learning on elementary students' academic achievement and learning motivation. Wijaya et al. (2023) revealed that hybrid learning significantly improved mathematical literacy and students' participation in classroom activities. Similarly, Yanuarto et al. (2021) explained that technology-supported learning models can strengthen students' digital literacy and encourage active learning behavior. In addition, hybrid learning provides opportunities for teachers to design more student-centered instructional activities that promote collaboration and creativity. The flexibility of hybrid learning also enables students to learn according to their individual learning pace and needs. Therefore, hybrid learning has become one of the most widely recommended approaches in contemporary elementary education.

Despite its potential benefits, the implementation of hybrid learning in elementary schools still faces various challenges. One of the major problems concerns the unequal level of digital literacy among students and teachers. Some students have limited access to digital devices and internet connectivity, particularly in rural and underdeveloped areas. In addition, teachers often experience difficulties in integrating digital technology effectively into pedagogical practices. Ramadhani and Fachrurazi (2023) explained that many teachers still use digital platforms only for assignment distribution rather than for creating meaningful interactive learning experiences. This condition reduces the effectiveness of hybrid learning implementation and limits opportunities for competency development among elementary school students.

Another issue relates to teachers' readiness and professional competencies in managing hybrid learning environments. Teachers are expected to possess technological, pedagogical, and content knowledge that supports digital learning innovation. However, several studies have reported that elementary school teachers still lack adequate training in digital pedagogy and technology integration. According to Mahmud and Ekawati (2022), limited digital competence among teachers affects the quality of instructional delivery and

reduces students' engagement during online learning activities. Furthermore, many teachers encounter challenges in designing digital assessments, monitoring students' progress, and facilitating collaborative learning through online platforms. As a result, the implementation of hybrid learning often fails to achieve optimal educational outcomes.

Previous studies have widely discussed digital literacy and hybrid learning separately; however, there is still limited research examining the integration of digital literacy-based hybrid learning models specifically in elementary education contexts. Most prior studies focus on secondary schools or higher education institutions, while research involving elementary school students remains relatively limited. In addition, existing research generally emphasizes technological implementation rather than examining how hybrid learning can systematically strengthen students' competencies in the Society 5.0 era. This condition demonstrates a significant research gap concerning the development of digital literacy-oriented hybrid learning models that are specifically designed to improve elementary students' competencies, including critical thinking, communication, collaboration, creativity, and responsible technology use.

Based on the identified research gap, this study aims to analyze the implementation of a digital literacy-based hybrid learning model in strengthening elementary school students' competencies in the Society 5.0 era. Specifically, this research seeks to explore the relationship between hybrid learning practices and the development of students' digital literacy, learning engagement, critical thinking skills, and collaborative abilities. In addition, this study aims to provide practical recommendations for teachers and educational institutions regarding effective strategies for implementing hybrid learning in elementary schools. The findings of this research are expected to contribute both theoretically and practically to the development of innovative learning models that support competency-based education in the digital era.

RESEARCH METHODOLOGY

Research Design

This study employed a quantitative research approach using a quasi-experimental design to investigate the effectiveness of a digital literacy-based hybrid learning model in strengthening elementary school students' competencies in the Society 5.0 era. Quantitative research is appropriate because it enables researchers to measure the influence of instructional interventions objectively through statistical analysis (Creswell & Creswell, 2021). The quasi-experimental design was selected because the research was conducted in

natural classroom settings without random assignment of participants. Specifically, the study utilized a pretest-posttest control group design to compare students' competencies before and after the implementation of hybrid learning.

The research focused on evaluating students' competencies, including digital literacy, critical thinking, collaboration, communication, and learning engagement. The hybrid learning model integrated face-to-face instruction with online learning activities through digital platforms and interactive educational media. This design was considered suitable for examining the practical implementation of hybrid learning in elementary education contexts (Fraenkel et al., 2022).

Research Site and Participants

The study was conducted in 15 elementary schools located in Kutapasi, Aceh Besar, Indonesia. These schools were selected because they had begun integrating digital learning practices into classroom instruction and possessed adequate technological facilities to support hybrid learning implementation. The participants consisted of fifth-grade elementary school students and classroom teachers involved in hybrid learning activities during the research period.

The sampling technique used in this study was purposive sampling. Purposive sampling allows researchers to select participants based on specific criteria relevant to the research objectives (Etikan & Bala, 2020). The criteria for selecting schools included: (1) schools implementing hybrid learning practices, (2) schools possessing internet access and digital learning facilities, and (3) teachers willing to participate in the study. A total of 300 students and 15 classroom teachers participated in this research.

Research Instruments

Several research instruments were utilized to collect data systematically and comprehensively. The primary instruments included questionnaires, observation sheets, interview guidelines, and documentation studies.

1. Digital Literacy Questionnaire

The questionnaire was designed to measure students' digital literacy competencies, including information access, critical evaluation of online information, digital communication, and responsible technology use. The questionnaire employed a five-point Likert scale ranging from strongly disagree to strongly agree. The instrument items were adapted from previous validated digital literacy frameworks to ensure reliability and validity (Ng et al., 2021).

2. Observation Sheet

Observation sheets were used to assess students' participation, collaboration, communication, and engagement during hybrid learning activities. Classroom observations were conducted during both face-to-face and online learning sessions. The observations focused on students' interaction patterns, learning participation, and the effectiveness of digital media integration in classroom instruction.

3. Interview Guidelines

Semi-structured interviews were conducted with classroom teachers to obtain deeper information regarding the implementation of hybrid learning and the challenges encountered during instructional practices. Interviews also explored teachers' perceptions of students' competencies and the effectiveness of digital literacy integration within the learning process.

4. Documentation

Documentation techniques were used to collect supporting data such as lesson plans, students' assignments, learning media, attendance records, and online learning activity reports. Documentation provided additional evidence regarding the implementation of the hybrid learning model in participating schools.

Before data collection, all research instruments underwent validity and reliability testing. Content validity was evaluated by educational experts and elementary learning practitioners, while reliability testing was conducted using Cronbach's Alpha coefficient. Instruments with reliability coefficients above 0.70 were considered reliable for research purposes (Taber, 2021).

Data Collection Procedures

The data collection process was conducted in several stages. Initially, researchers coordinated with school principals and teachers regarding research implementation schedules and procedures. Pretests were administered to students before the implementation of the digital literacy-based hybrid learning model to measure initial competency levels.

Subsequently, the hybrid learning model was implemented over eight weeks through integrated face-to-face and online learning activities. During the intervention process, researchers conducted classroom observations and interviews with teachers. At the end of the implementation period, posttests were administered to evaluate improvements in students' competencies. Documentation data were collected continuously throughout the research process.

Data Analysis Techniques

The collected data were analyzed using descriptive and inferential statistical techniques. Descriptive statistics were used to present the mean scores, percentages, standard deviations, and distribution of students' competency levels. These analyses provided an overview of students' digital literacy and learning competencies before and after the intervention.

Inferential statistical analysis was conducted using paired sample t-tests and independent sample t-tests to examine the significance of differences between pretest and posttest scores. The paired sample t-test was used to determine competency improvements within groups, while the independent sample t-test was utilized to compare differences between experimental and control groups. Statistical analysis was performed using SPSS software with a significance level of 0.05.

Qualitative data obtained from interviews and observations were analyzed using thematic analysis techniques. Researchers categorized and interpreted recurring themes related to hybrid learning implementation, teacher readiness, student participation, and digital literacy development. The integration of quantitative and qualitative findings enabled comprehensive interpretation of the effectiveness of the digital literacy-based hybrid learning model in elementary education contexts.

RESULTS AND DISCUSSION

The implementation of the digital literacy-based hybrid learning model was conducted in 15 elementary schools in Kutapasi, Aceh Besar, involving 300 fifth-grade students and 15 classroom teachers. The research aimed to examine the effectiveness of hybrid learning in strengthening students' competencies in the Society 5.0 era, particularly in digital literacy, critical thinking, collaboration, communication, and learning engagement. Data were collected through pretests, posttests, observations, interviews, and documentation studies.

Students' Competency Improvement

The results of the pretest and posttest analysis indicated significant improvement in students' competencies after the implementation of the digital literacy-based hybrid learning model.

Table 1 Students' Competency Scores Before and After Hybrid Learning Implementation

No	Competency Aspect	Pretest Mean Score	Posttest Mean Score	Improvement (%)
1	Digital Literacy	63.4	84.7	33.6%

No	Competency Aspect	Pretest Mean Score	Posttest Mean Score	Improvement (%)
2	Critical Thinking	61.2	82.1	34.1%
3	Collaboration Skills	65.5	86.3	31.7%
4	Communication Skills	64.1	83.5	30.3%
5	Learning Engagement	62.7	85.1	35.7%

Based on Table 1, all competency aspects experienced substantial improvement after the implementation of hybrid learning. Learning engagement showed the highest increase, with an improvement percentage of 35.7%, followed by critical thinking skills at 34.1%. These findings indicate that the hybrid learning model successfully encouraged students to participate more actively in learning activities. Students became more enthusiastic during classroom discussions, online collaborative assignments, and digital learning activities.

The improvement in digital literacy scores demonstrated that students became more capable of accessing, evaluating, and utilizing digital information responsibly. Before the intervention, many students experienced difficulties in identifying reliable online sources and operating educational platforms effectively. However, after participating in hybrid learning activities, students showed greater confidence in using digital tools for educational purposes.

Similarly, collaboration and communication skills improved significantly because hybrid learning provided opportunities for students to work together through both face-to-face and online interactions. Students participated actively in group discussions, project-based assignments, and digital presentations. Teachers observed that previously passive students became more willing to express opinions and contribute during collaborative activities.

Statistical Analysis Results

To determine whether the improvement in students' competencies was statistically significant, paired sample t-test analysis was conducted.

Table 2 Paired Sample t-Test Results

Variable	t-value	Significance (p-value)	Interpretation
Digital Literacy	9.874	0.000	Significant
Critical Thinking	8.965	0.000	Significant
Collaboration Skills	8.442	0.000	Significant
Communication Skills	7.918	0.000	Significant
Learning Engagement	9.221	0.000	Significant

The statistical analysis presented in Table 2 revealed that all significance values were below 0.05. This result indicates that the implementation of the digital literacy-based hybrid learning model had a statistically significant effect on students' competencies. The highest t-value was found in digital literacy competencies, suggesting that hybrid learning strongly influenced students' technological and informational skills.

The findings support the assumption that integrating digital literacy into hybrid learning creates meaningful learning experiences that encourage students' active participation and competency development. Students became more independent in completing assignments, accessing learning resources, and communicating ideas through digital platforms.

Observation Results

Classroom observations were conducted during both face-to-face and online learning sessions to evaluate students' participation and teacher instructional practices.

Table 3 Observation Results of Student Participation During Hybrid Learning

Observation Aspect	Percentage (%)	Category
Active Participation	87%	Very Good
Group Collaboration	84%	Very Good
Digital Media Utilization	89%	Very Good
Classroom Interaction	82%	Good
Learning Motivation	90%	Very Good

The observation results showed that students demonstrated high levels of participation during hybrid learning implementation. Learning motivation achieved the highest percentage at 90%, indicating that students were highly interested in digital-based learning activities. The use of interactive digital media such as educational videos, quizzes, and online discussion platforms contributed positively to students' engagement.

In addition, digital media utilization reached 89%, demonstrating that students adapted well to technology-supported learning environments. Students became more familiar with online learning applications and increasingly utilized digital resources to complete assignments and participate in collaborative activities.

Interview Results with Teachers

Semi-structured interviews with 15 classroom teachers revealed several important findings related to hybrid learning implementation.

Table 4 Teachers' Responses Toward Hybrid Learning Implementation

Response Aspect	Percentage (%)	Interpretation
Hybrid learning improves student engagement	93%	Strongly Agree
Digital literacy increases students' independence	87%	Agree
Hybrid learning supports collaboration skills	85%	Agree
Teachers experience technological difficulties	62%	Moderate
Internet access becomes a learning obstacle	70%	Moderate

The interview results demonstrated that most teachers believed hybrid learning positively affected students' learning engagement and independence. Teachers explained that students became more enthusiastic during instructional activities because digital learning media created more interactive and flexible learning experiences.

However, several challenges were also identified. Approximately 70% of teachers stated that unstable internet connections remained one of the primary obstacles during online learning activities. In addition, 62% of teachers acknowledged experiencing technological difficulties, particularly in managing digital platforms and conducting online assessments. These findings indicate that teacher training and technological infrastructure improvement are necessary to optimize hybrid learning implementation in elementary schools.

Overall, the results of this study demonstrate that the digital literacy-based hybrid learning model effectively strengthened elementary school students' competencies in the Society 5.0 era. The integration of digital literacy into instructional practices contributed positively to students' academic engagement, critical thinking abilities, collaboration skills, communication competencies, and independent learning behaviors.

Discussion

The findings of this study demonstrated that the implementation of a digital literacy-based hybrid learning model significantly improved elementary school students' competencies in the Society 5.0 era. The improvements were observed in several aspects, including digital literacy, critical thinking, collaboration, communication, and learning engagement. These results indicate that hybrid learning provides a flexible and interactive learning environment that supports competency-based education in elementary schools. The integration of face-to-face instruction and online learning activities enabled students to access learning materials more independently while maintaining active interaction with teachers and peers.

The significant improvement in students' digital literacy competencies confirms that hybrid learning can effectively facilitate students' ability to access, evaluate, and utilize digital information responsibly. Students became more familiar with educational technologies and demonstrated better skills in operating digital learning platforms. This finding is consistent with the study conducted by Ng et al. (2021), which emphasized that digital literacy development is essential in preparing students to adapt to rapidly evolving technological environments. Digital literacy not only supports academic achievement but also strengthens students' critical awareness in using information responsibly in digital spaces.

The results also revealed substantial improvement in students' critical thinking skills after participating in hybrid learning activities. Through collaborative discussions, problem-solving tasks, and online learning exploration, students became more capable of analyzing information and expressing logical arguments. The hybrid learning model encouraged students to engage actively in the learning process rather than merely receiving information passively from teachers. This finding aligns with research conducted by Hidayat et al. (2022), which found that technology-supported learning environments significantly contribute to students' higher-order thinking skills and problem-solving abilities. Interactive learning activities supported students in developing analytical thinking and independent learning behaviors that are highly relevant to the educational demands of the Society 5.0 era.

Another important finding of this study concerns the improvement of students' collaboration and communication skills. Hybrid learning created opportunities for students to interact both directly in classrooms and virtually through online platforms. Students became more confident in sharing ideas, participating in group discussions, and completing collaborative assignments. These findings support the research of Martin et al. (2020), who stated that hybrid learning environments promote active student participation and collaborative learning experiences through digital interaction. The use of educational technologies also encouraged students to develop communication competencies that are essential in 21st-century education.

Learning engagement showed the highest improvement among all competency aspects measured in this study. Students demonstrated greater enthusiasm and motivation during hybrid learning activities because the instructional process became more interactive and varied. The use of digital media such as educational videos, online quizzes, and collaborative applications increased students' interest in learning activities. According to

Bond (2020), student engagement is strongly influenced by the quality of digital learning design and the interaction created during online learning processes. Hybrid learning provides flexibility and diversity in instructional methods, which can enhance students' emotional and cognitive involvement during learning activities.

Despite the positive findings, this study also identified several challenges in implementing hybrid learning in elementary schools. Limited internet access and inadequate technological facilities remained significant obstacles, particularly for students living in areas with insufficient digital infrastructure. Furthermore, some teachers still experienced difficulties in integrating technology effectively into classroom instruction. This finding is in line with research conducted by Trust and Whalen (2021), which highlighted that teacher readiness and technological competence play crucial roles in determining the effectiveness of hybrid learning implementation. Teachers who possess strong digital pedagogical competencies are more capable of creating meaningful and engaging learning experiences for students.

In addition, parental support was found to influence students' participation and learning discipline during online learning sessions. Students who received adequate assistance from parents demonstrated higher levels of engagement and responsibility in completing assignments. This finding suggests that successful hybrid learning implementation requires collaboration among schools, teachers, parents, and educational stakeholders. Hybrid learning should not merely focus on technology integration but also emphasize the creation of supportive learning ecosystems that facilitate students' competency development comprehensively.

Overall, the findings of this study confirm that digital literacy-based hybrid learning is an effective instructional model for strengthening elementary school students' competencies in the Society 5.0 era. The integration of digital literacy into hybrid learning activities contributes positively to students' academic engagement, critical thinking abilities, collaboration skills, communication competencies, and independent learning behaviors. Therefore, educational institutions should continue developing innovative hybrid learning strategies while improving technological infrastructure and teacher professional development programs to support sustainable educational transformation in elementary schools.

CONCLUSION

This study concludes that the implementation of a digital literacy-based hybrid learning model effectively strengthens elementary school students' competencies in the Society 5.0 era. The integration of face-to-face instruction and online learning activities created a flexible, interactive, and student-centered learning environment that positively influenced students' digital literacy, critical thinking, collaboration, communication, and learning engagement.

The research findings demonstrated significant improvement in all measured competency aspects after the implementation of hybrid learning. Students became more capable of accessing and evaluating digital information, participating actively in collaborative learning activities, expressing ideas confidently, and completing learning tasks independently. The hybrid learning model also increased students' motivation and participation during instructional activities because the use of digital media made learning experiences more engaging and varied.

In addition, the study revealed that teacher readiness and technological competence play important roles in the successful implementation of hybrid learning. Teachers who possessed adequate digital pedagogical skills were more effective in creating meaningful learning experiences and managing interactive classroom activities. Furthermore, parental support contributed positively to students' learning discipline and participation during online learning sessions.

Despite the positive outcomes, several challenges were identified, including limited internet access, unequal technological facilities, and variations in teachers' digital competencies. Therefore, educational institutions and policymakers should provide adequate technological infrastructure, continuous teacher professional development programs, and supportive learning environments to optimize hybrid learning implementation in elementary schools.

Overall, this study emphasizes that digital literacy-based hybrid learning is a relevant and effective instructional approach for preparing elementary school students to face educational and technological challenges in the Society 5.0 era. The findings of this research are expected to contribute to the development of innovative learning models and provide practical recommendations for improving the quality of elementary education in the digital age.

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