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## Lore Lindu Culture-Based Education Learning Development for Elementary School Students

**Misnah** 

Tadulako University  
Palu Central Sulawesi, Indonesia

**Burhanuddin Arafah** 

Hasanuddin University  
Makassar South Sulawesi, Indonesia

**Bahri** 

State University of Makassar  
Makassar South Sulawesi, Indonesia

**Sriati Usman** 

Tadulako University  
Palu Central Sulawesi, Indonesia

**Bau Ratu** 

Tadulako University,  
Palu Central Sulawesi, Indonesia

**Nurwahyuni** 

Tadulako University  
Palu Central Sulawesi, Indonesia

**Ruslin** 

State Islamic University Datokarama  
Palu Central Sulawesi, Indonesia

**Abstract.** Education is a process of acquiring knowledge and improving communication skills. It also transforms children through a learning process to achieve a specific objective. An example is the usage of Social Studies learning (IPS) to support the development of students as competent citizens in terms of knowledge, intellectual processes, and democratic character to participate actively in public life. The subject equips students with basic and social skills to solve daily problems as prospective adult citizens and the background information needed to proceed to higher education. Therefore, this research aimed to determine

the influence of applying Lore Lindu culture-based education learning development to elementary school (SD) students. This was achieved through the adoption of different stages of research and development (R&D), which included preliminary study in the form of needs analysis, literature review to determine solutions to the problems encountered, application of Lore Lindu culture-based education learning development, and formulation of a learning model, expert validation, and implementation. The model was subsequently tested at an elementary school in the Sigi District. The results were considered for developing social studies education based on the cultural values of Lore Lindu National Park (TNLL).

**Keywords:** Lore Lindu; culture-based education; learning development

## 1. Introduction

Education is a necessary process designed to occur through interaction between students and teachers (Sriwahyuniati et al., 2023). Through education, people are exposed to both positive and negative elements (Arafah et al., 2024). The achievement of a good education depends on the availability of qualified and skilled teachers (Poole et al., 2018). These talented professionals must also ensure and attain an effective Education 4.0, which focuses on creating quality education (Iqbal et al., 2022) based on various pedagogical and technological approaches. This can challenge teachers to adapt to technological development (Arafah et al., 2023; Usman et al., 2024). Moreover, teamwork, adaptability, and personal approach are observed to be changing the direction of Education 4.0 and Technology 4.0 by integrating content such as learning videos to meet student needs and increase the value of learning (Prayitno et al., 2022). In this situation, teachers must master the learning material quickly (Kuswanti et al., 2023).

Education is a process of acquiring knowledge and improving communication skills. It also transforms children through a learning process to achieve a specific objective (Alkhateeb et al., 2022; Abbas et al., 2024). The higher level of motivation of a child will lead to higher achievement as well, as long as the child or learner gives their full attention to learning (Arafah et al., 2020; Kuswanti et al., 2023). Moreover, education is designed to achieve both social and personal development functions. The mission is to ensure everyone becomes a good member of society by sharing past and present information (Müller, 2021; Halil et al., 2024). The main task is to prepare individuals for the future and ensure a better life by adding new knowledge (Ngatman et al., 2023; Yudith et al., 2024). This learning process can occur in school by using existing technological tools such as television, smartphones, books, and others (Budhiastuti et al., 2023). Using computers is also a solution to using technological tools in online learning, face-to-face learning, or introducing children to coding and programming (Anggrawan et al., 2019; Iksora et al., 2022). Moreover, artificial intelligence (AI) has become one of the electronic devices that can be used in teaching (Kaharuddin et al., 2024).

Innovation is essential for all educational activities in Indonesia owing to its influence on producing independent, capable, and productive students (Nguyen

et al., 2022). This is because Indonesian education is designed to make students become citizens who believe in and fear God Almighty, have a noble character, and are intelligent, creative, independent, and responsible (Talbert & Mor-Avi, 2019), as presented in the National Education System Law No. 322 of 2007. 20 of 2003 Chapter 3. However, these objectives can only be achieved when teachers have the personal development, creativity, and innovation to make the learning process enjoyable (Malysheva et al., 2022). Creative teachers usually positively affect students' learning interests (Ismail et al., 2020) and the learning process by developing a collaborative learning environment. This can be achieved by providing and applying 21st-century technological-based education media. However, the education system in the country is observed to be generally teacher-centric (Geleta & Raju, 2023).

Learning activities are typically assessed based on students' results because the process focuses on ensuring the development of successful and productive students by using specific resources (Turi et al., 2019). The students' results can be assessed by their ability to pass tests (Mardiana et al., 2023). Moreover, students' problem-solving skills are associated with applying knowledge acquired to new situations through analysis and evaluation (Samsudin et al., 2023). This shows that teachers and students participate in the education process by focusing on fulfilling the curriculum designed for a specific subject. Teachers organize educational activities, while students also have essential responsibilities (Siregar & Prasetyo, 2023). This shows that attaining educational objectives at the start of the learning process requires collaboration between teachers and students (Hutabarat et al., 2023). Effective communication is expected to make a conversational contribution as informative as necessary to deliver the messages clearly (Kaharuddin et al., 2023; Asri et al., 2023).

Learning Social Sciences (IPS) is one of the subjects designed to be taught and learned in elementary and middle schools. It integrates different aspects and branches of social science, such as economics, history, geography, and sociology, into a single subject (Fitria et al., 2021). The learning process was observed to have contributed to improving students' understanding of societal conditions (Indraswati et al., 2020) and the inheritance of values previously developed to be passed on to the next generation (Sri, 2022). Therefore, this can be enriched by introducing cultural aspects to the learning process (Arnawa & Arafah, 2023). This means the subject is designed to make students better citizens with good social skills and a love for the noble heritage values of the nation.

IPS needs to be provided with sufficient space in the curriculum, while the learning process also requires the current conventional method to be updated. This can be achieved by adopting relevant technologies that have been identified to have a significant effect on learning activities in elementary schools (SD) by improving learning skills, increasing motivation, enhancing outcomes, and advancing students' digital literacy skills (Wati, 2023). Meanwhile, navigating the current era of rapid technological advancement poses a challenge in ensuring that all educational environments can harness these technological developments, specifically in learning studies (Kaharuddin et al., 2021). In enhancing the

academic experience, there is a pressing need to evolve innovative methods of social studies instruction, fostering an environment where learning becomes enjoyable and meaningful for students (Wati, 2023).

In this era of globalization, technology has significantly impacted all aspects of the world (Arafah & Hasyim, 2019; Arafah & Hasyim, 2023a), not only in terms of positive impacts but also because the excessive use of technology has negative impacts (Manugeran et al., 2023). Consequently, people's current levels of awareness of environmental changes need to be re-visited (Arafah et al., 2021; Siwi et al., 2022). The modern technology being developed has been integrated and applied in learning activities by teachers (Nguyen et al., 2022). This situation has paved the way for e-learning to be an inclusive term to describe educational technologies that electronically or technologically assist learning and teaching (Kaharuddin, 2022). It is possible to incorporate educational purposes with technology thanks to digital media, where Internet users can seek knowledge anywhere and anytime (Hasyim & Arafah, 2023a; Hasyim & Arafah, 2023b). This is owing to the ability of technology-enhanced learning environments to provide certain benefits associated with changing pedagogical styles and implementing new teaching strategies, organizing and managing learning, and providing access to helpful information resources (Casanova et al., 2020). The existence of digital literacy provides access to information from online-based media in cyberspace as easily as just one click on the Internet, and any kind of information is possible to access (Arafah & Hasyim, 2023b; Arafah et al., 2023; Purwaningsih et al., 2020). Technology has been used in digital education to create a flexible learning environment and increase learning interest. According to Radović et al. (2019), integrating technology in courses creates better interaction and collaboration, develops students' skills quickly, and ensures collaborative problem-solving skills, engagement, learning satisfaction, and motivation. However, Jie and Sunze (2021) reported that teachers experience challenges when using mobile technology in class. These are associated with adopting innovative teaching methods, the consequent anxiety, extended teaching roles, and inflexible environments.

Culture refers to various social life aspects as a standard for good attitudes and behaviour (Arafah et al., 2023; Takwa et al., 2022; Afiah et al., 2022). Therefore, cultural inheritance must be continuously transferred to the younger generation in this era to preserve inherent values. This is necessary as one of the attempts to cope with the threat of globalization eroding the identity of the Indonesian nation. Science and technology can sometimes influence specific cultural values negatively as well as positively (Suhadi et al., 2022). The shift from a traditional system to a modern one can cause many disadvantages to the value system (Takwa et al., 2022). The phenomenon has led to the implementation of Education Lore Lindu Cultural Heritage in the learning process of elementary schools to pass on the knowledge about Lore Lindu's cultural values. Lore Lindu's culture-based education urgently needs to be developed to ensure that students in elementary school recognize, design, and maintain cultural identity. Cultural identity is usually present in traditions and rituals that symbolize values that help influence young people's character (Arafah et al., 2020; Mokoginta & Arafah, 2022; Hasyim

et al., 2023). It is necessary to integrate cultural values to ensure noble values are inherited and maintained in daily life and to respond to the problems identified in the development of culture-based learning locally in school. Attention to locality can be present in many fields, including academia (Arifin et al., 2022).

As language is the core of culture, it represents and constructs cultural studies through different forms, such as text (Takwa et al., 2024). Literary works can present the local values in the educational system (Arafah et al., 2023). Literary work has improved by the enhancement of its ability to portray the author's idea aesthetically (Asriyanti et al., 2022; Baa et al., 2023). As a product of art in society, literary work reflects the condition of a culture where reality is actual or not (Fadillah et al., 2022; Mutmainnah et al., 2022; Sunyoto et al., 2022). Literary work always gives attention to the values in detail to present a valuable and cultural text in education (Yudith et al., 2023). A noticeable gap exists in the availability of culturally rooted teaching materials; there is a need for more knowledge among teachers in crafting resources for culture-based learning, particularly in the context of Lore Lindu. Therefore, this research was conducted to develop Lore Lindu culture-based education through local cultural heritage embedded in the megalithic tradition in Lore Lindu National Park (TNLL) in Central Sulawesi Province. In the context of this research, the hypothesis posits that the implementation of Edu Lore Lindu has the potential to enhance the knowledge of elementary school students based on local wisdom.

## **2. Literature Review**

### **2.1 Lore Lindu National Park (TNLL)**

The remains of the megalithic tradition can be found in almost all regions of Indonesia (Akbar et al., 2022), generally in the form of monuments such as large menhirs, stone chambers, dolmens of megalithic statues, lumping stones, tetralin, and several others (Triwurjani, 2018). For example, the rocks which were found and identified are proof of the community's traditional religious views (Sope & Suryanto, 2021). These objects are frequently considered communal property, even without a direct connection with the original owner or any clear descendants or heirs. Meanwhile, according to Law Number 5 of 2017 concerning the Advancement of Culture, Article 22 stipulates that the central and regional governments must preserve cultural artifacts (Triwurjani, 2018).

### **2.2 Digital Based Learning**

The conveniences afforded by modern opportunities not only simplify tasks but also give rise to new challenges. Advancements create a dilemma for teachers, demanding adaptation to a facile, rapid, and predominantly digital landscape. Teachers needing help with this adjustment risk being deemed technologically illiterate and sometimes losing their jobs (Nguyen et al., 2022). At this point, teachers need to meet the expectations of the rapid technological change (Arafah & Kaharuddin, 2019). In stark contrast to students, who are often digital natives by birth and upbringing, teachers who grew up without the present technological prowess have a heavier burden. The swift pace of technological evolution compels teachers to enhance constantly their skills and creativity constantly to remain relevant (Jannah et al., 2020). A crucial skill set in this context is digital literacy, defined in the educational context as the capacity to access, identify, create,

critically evaluate, and effectively employ digital materials (Kucher, 2021). Teachers must be adept at navigating, analyzing, and generating content from digital sources, ensuring these resources contribute meaningfully to filling gaps in the curriculum or enhancing educational media (Pratama et al., 2021).

The advent of the digital revolution and technological disruption marks a distinct opportunity in Industry 4.0. This is characterized by the widespread integration of computers and the automation of information across different domains (Muheramtahadi & Fataron, 2022). Meanwhile, Industry 4.0 is an era of technological disruption, where global interconnectedness and specialized use redefine business competition and operational paradigms non-linearly. The increasing complexity of the digital age underscores the transformation of information and convenience into integral aspects of contemporary lifestyles (Zahira & Kurniawati, 2022). The convenience offered has not only met the desires and needs of individuals but also presented significant advantages in the education sector, offering considerable potential for teachers and students (Trihudiyatmanto et al., 2022). Acquiring digital skills has become critical to unlocking skills and potential (Kee et al., 2023). For example, someone can do daily teaching and learning activities anywhere and anytime owing to the availability of the Internet and a stable signal (Annisa et al., 2022).

### **2.3 Learning IPS**

IPS is a compulsory subject at elementary and junior high school (SMP) levels. It is an aspect of social sciences designed with materials simplified and adapted to the field of teaching (Pada & Amir, 2022). It also integrates various branches of social sciences and humanities, including sociology, history, economic geography, politics, law, and culture (Yeni et al., (2020). This explanation shows that IPS learning is a subject related to social science studies. The purpose is to support the development of competent citizens regarding knowledge, intellectual processes, and the democratic character needed to participate actively in public life. The objective is to prepare students as prospective adult citizens with adequate social skills and a good understanding of how to solve daily life problems (Widiastuti et al., 2022). Moreover, the subject aims to educate students and provide them with basic skills towards ensuring self-development through talents, interests, skills, and environment, as well as the necessity to continue their education to a higher level (Hopeman et al., 2022).

### **3. Research Methodology**

This study was conducted by adopting the research and development (R&D) method formulated by Gall et al. (2007). The process was achieved through different stages, which included a preliminary study based on a needs analysis followed by a literature review to determine the solutions to the problems encountered and learning development in the form of Lore Lindu-based education. The other stages are the design of the learning model product, expert validation, and implementation of the product in the form of digital learning of Lore Lindu-based education (TNLL) at a foundation school in Sigi District. Moreover, field trials were conducted to validate the model developed using a limited sample and a broader scope.

The research instruments were questionnaires in the form of a printed or written set of questions with answer options (Abidin & Kaharuddin, 2021), which included the Lore Lindu Understanding and Digital Literacy Skill questionnaires. The Lore Lindu Understanding Questionnaire was developed using “Agree”, “Strongly disagree”, and “Strongly agree” as the measure of the 20 statements formulated to determine students' insight regarding Lore Lindu's cultural heritage. In addition, the Digital Literacy Skill Questionnaire was developed using “Agree”, “Strongly disagree”, and “Strongly agree” as the measure of the 20 statements formulated to determine students' insight regarding digital literacy.

The data obtained through the questionnaires were processed and analyzed to determine the improvements in the digital literacy of students and the efficiency of the blended-based learning (TNLL) model developed. The quantitative data were used to identify the number of students who experienced increased skills in understanding and applying digital-based learning materials.

#### 4. Results

##### 1. Learning Conditions with Lore Lindu Local Cultural Values

A preliminary study was conducted to obtain data on the overview of social studies learning content containing Lore Lindu's cultural values as a basis for developing the proposed model. The results obtained are presented in the following subsections:

##### 2. Education Introduction

The results showed that teachers were required to include Lore Lindu application-based learning in IPS as one of the insights regarding the regional culture of Central Sulawesi Province. It was further learned through the interviews conducted with teachers in Watamote Elementary School around TNLL in 2012 that there were some challenges in implementing the learning process, such as low levels of knowledge in developing a curriculum based on local content and applying science and technology (IT). This was observed from the fact that teachers presented several materials to students in the form of textbooks without local contents on TNLL. The results showed that students were less satisfied with this teaching strategy, as explained further in the following figure:

##### 3. Understanding of Lore Lindu Culture by Elementary Students

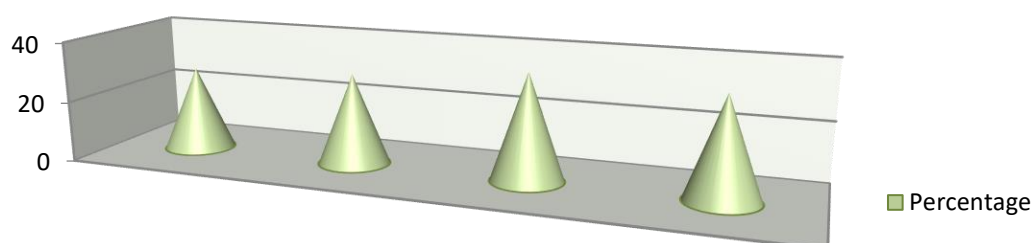
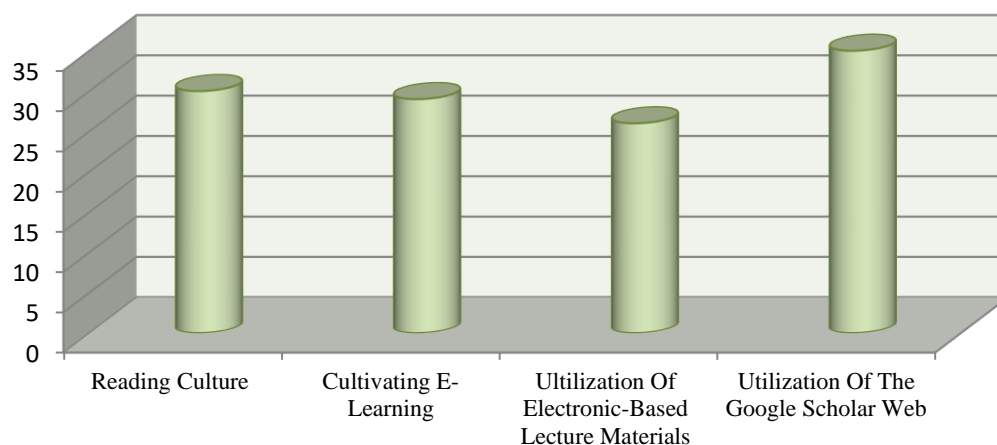


Figure 1: Proficiency of Students Regarding Lore Lindu National Park

Figure 1 depicts the pretest indicators for developing a Lore Lindu-based education plan. It was found that the history students had an average proficiency of 28% in the knowledge of TNLL, 30% in the Palindo Statue, 35% in the Kalamba Statue, and 33% in the Tadulako Statue. This showed that the lowest level of knowledge was observed for the TNLL indicator, showing the lack of appropriate understanding for students in IPS. Meanwhile, the understanding of the Palindo Statue was found to have the highest average pretest percentage; this was because students had visited the site.

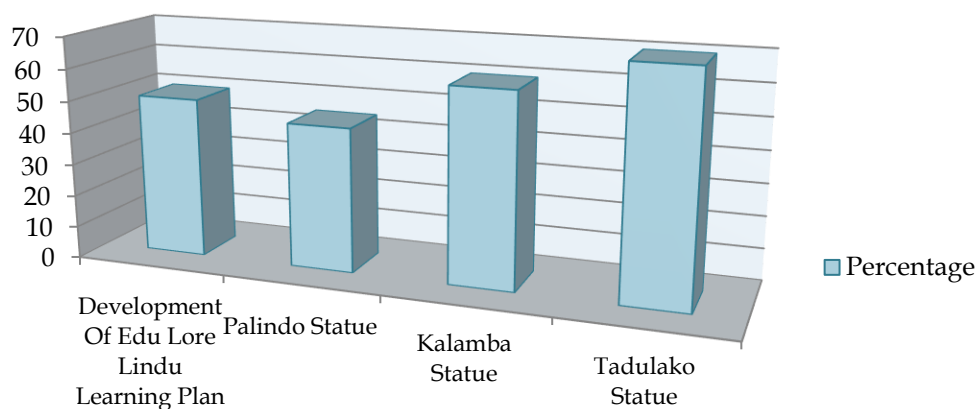
#### 4. Students' Digital Literacy



**Figure 1: Pretest Percentage of Students' Digital Literacy Skill**

Figure 2 shows the digital literacy skills of students based on the pretest conducted. The results showed that students' reading culture before the blended learning model was an average of 30%, the cultivation of e-learning was 29%, the use of electronic-based materials was 26%, and the use of the Google Scholar web was the highest with 35%. Students were observed to have the lowest level of attention regarding electronic-based materials before implementing blended learning. The results also showed that most students used the Google Scholar website during the learning process.

#### 5. Literacy-Based on Lore Lindu National Park (TNLL) Indicators

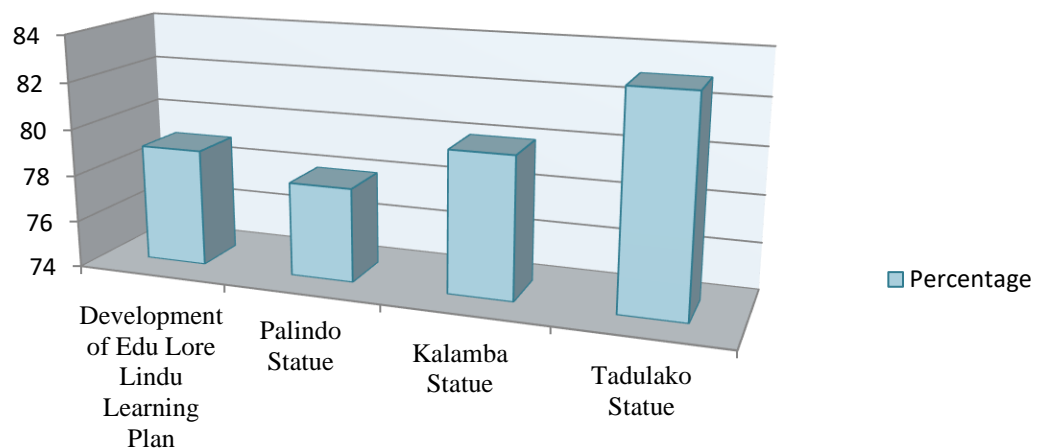


**Figure 2: Capabilities Based on Lore Lindu National Park Indicators**



Students' understanding of TNLL indicators is presented in Figure 3. The results showed that the Tadulako Statue had the highest percentage of 67%, showing the interpretation was quite effective after the model was applied, while the Kalamba Statue followed this with 56%. Meanwhile, the understanding of Lore Lindu's learning plan was found to be less effective by 45%, and the information on the Palindo Statue needed to be more effective, as shown by 40%.

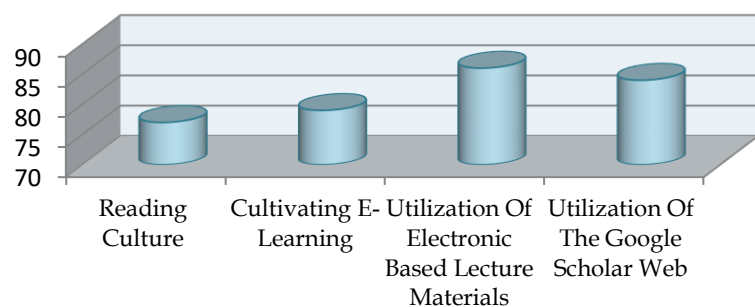
#### 6. Internalization of Local Knowledge of the Elementary School Students



**Figure 4: Posttest Percentage of Lore Lindu National Park Ability of Elementary School Students**

Figure 4 shows the posttest results associated with applying the blended learning model using video to students. It was found that the level of proficiency concerning the development of the Lore Lindu education plan increased to 79%, that of the Palindo Statues became 78%, that of the Kalamba Statue rose 80%, and the understanding of the Tadulako Statue was improved to 83%. This showed that students were enthusiastic after watching the video and better understood the learning materials related to TNLL.

#### 7. Internalization of Local Knowledge of Elementary School Students



**Figure 5: Posttest Percentage of Digital Literacy Skill of Elementary School Students**

Figure 5 shows the post-test results after implementing blended learning using digital literacy videos. The results showed an increase in the reading culture to 77%, the cultivation of e-learning attitude to 79%, the application of electronic-based learning materials to 86%, and the use of the Google Scholar website to 84%. It was found that history education students could directly apply digital media after watching the video. Meanwhile, despite the increase, the percentage recorded for the reading culture was less than the required average.

As previously explained, the digital literacy skills and understanding of historical studies of elementary school students were observed to be less than optimal, as shown by the 30% maximum knowledge recorded under the limit of 75%. The trend became even more pronounced during the COVID-19 pandemic, where the predominant learning mode shifted to online or distance education, with limited face-to-face interactions. Therefore, implementing a robust learning system based on Lore Lindu Digital Education becomes necessary to deliver educational content related to studying the local history associated with TNLL effectively. It is essential to state that the park is a rich source for local historical studies and is considered necessary for preservation and in-depth exploration, particularly for elementary school students.

## 5. Discussions

### 1. *Understanding of Lore Lindu Cultural Values in Elementary Schools*

The improvement of learning quality is usually determined based on the audio-visual-based media, science, and technology, as well as animation design implemented in the process (Abdulrahman et al., 2020; Dajani & Hegleh, 2019; Divayana et al., 2021; Yulianti et al., 2022). The transformation of a present school to that of a new institution offering alternative educational services is associated with the current application of strategic and appropriate approaches to pass on values in the global education sector (Reddy et al., 2023). Moreover, instilling scientific and academic values is essential in shaping future generations into a formidable sustainable development force guided by an environmentally conscious perspective. The preservation of local culture and wisdom is a testament to the distinct identity of a nation, as stated by Gil-Cordero et al. (2023). Therefore, safeguarding these cultural elements becomes crucial to shielding against undesirable external influences. This is why local wisdom, an enduring ancestral legacy, is consistently transmitted across diverse regions in Indonesia (Corbett & Spinello, 2020).

### 2. *Understanding Digital Literacy among Elementary School Students*

Students' proficiency in using the Google Scholar website is a crucial indicator of the comprehension and application of course content for assignments. It is reflected in the skill to obtain materials as directed by course instructors and correlates with an above-average performance. The integration of blended learning through social networks is believed to further amplify the significance of technology in the learning process. The introduction of Industry 4.0, characterized by the rapid evolution of information technology, has ushered in the era of digital revolution. This technological surge significantly influences different aspects of life, particularly in the educational domain. It is shown by the fact that education in the 21st century is associated with the availability of information at any place

and time, the implementation of machines or computerization, the skill to manage all routine procedures or automation, and the capacity to perform communication tasks in any place and time (Purnama et al., 2021; Kaharuddin et al., 2022).

Moreover, information and communication technology (ICT) has become critical to education by playing a pivotal role in developing thinking skills, ranging from the basic fundamental to advanced thinking skills (Nguyen et al., 2022). In this digital era, education is characterized by a cyber system, a learning and teaching method that extensively leverages digital technology (Zhong et al., 2023). Cyber systems, closely tied to ICT development, significantly impact teachers' performance across crucial learning activities: planning, execution, and evaluation. Teachers, recognizing the transformative potential of technology, continually strive to enhance the planning and implementation of learning activities. This ongoing effort aims to deliver quality, technology-driven education that works with the contemporary landscape. According to Tian and He (2023), this commitment is integral to optimizing teaching effectiveness, ensuring students benefit from a superior learning experience grounded in information and communication technology.

#### ***Literacy-Based on Lore Lindu National Park (TNLL) Indicators***

Developing teaching materials based on regional culture is exciting material for students. In addition to traditional subjects, fostering digital literacy is recognized as a crucial individual competency focusing on the spectrum of digital technology usage, from accessing and processing to analyzing information and constructing new knowledge. It transcends mere hardware operation, requiring proficiency in software use (Daryanes et al., 2023). However, developing this competency necessitates that teachers adapt continually to the rapid pace of technological evolution. This research showed that Indonesian teachers' information, communication, and technology skills were unevenly distributed. Some gaps were also identified in terms of infrastructure and quality of education in different regions of the country (Balogun et al., 2023).

#### ***Natural Conditions of Lore Lindu-Based Learning in Elementary School***

##### ***a. Internalization of Lore Lindu, local knowledge for elementary school students***

Blended learning, in the form of online and offline activities, was applied in this research using video, the Internet, and websites (Al-Kahtani et al., 2022; Shakeel et al., 2023). The educational method instilled in superior schools focuses more on local wisdom as a response to globalization's pervasive negative impact on the country's next generation (Divayana et al., 2021). This inherently environmentally friendly and venerable local wisdom plays a vital role in shaping character education by internalizing values (Sayaf, 2023). The synergy between character-based education and local knowledge is evident, aligning seamlessly with the objectives of the Pancasila study project aimed at shaping students' character (Aderibigbe, 2021). Moreover, recognizing the significance of studying the integration of local wisdom values becomes paramount for strengthening the Pancasila study project. Local culture and wisdom, serving as tangible expressions of the national personality, deserve preservation to shield against external negative influences. This is the continuous transmission of ancestral heritage across diverse regions in Indonesia (Al-Kahtani et al., 2022).

### *b. Internalization of Lore Lindu Local Knowledge for Elementary School Students*

The advancement of digital technology has profoundly impacted the learning process, with the Internet serving as a pivotal element in the current digital era. Digital technology has witnessed significant advancements, transforming almost every facet of daily life through online learning (Fauzi, 2022). People across age groups, from adults to children, now use laptops, mobile phones, and various Internet-connected devices, indicating proficiency in using this technology (Shakeel et al., 2023). This has led to people experiencing both good and bad social influences (Liu, 2023). The widespread adoption of digital technology brings about both opportunities and challenges. However, the lack of digital skills in hardware and software use results in suboptimal use of digital media.

Moreover, a deficient understanding of digital culture may lead to violations of people's digital rights, such as issues related to hoaxes, hate speech, and defamation (Ali et al., 2021). The lack of digital ethics is observed to be contributing to the proliferation of harmful content and creating an unpleasant digital space. The vulnerability of digital security also poses risks, such as personal data leakage and digital fraud. Therefore, cultivating digital literacy skills is crucial to instilling a sense of security for all users. Digital literacy is imperative for diverse groups, including students, by ensuring responsible use of digital media to avoid potential harm to oneself or others (Al-Kahtani et al., 2022). Proficiency in understanding and using digital applications across different social media platforms, such as YouTube, Facebook, WhatsApp, Instagram, Twitter, and TikTok, reflects a form of personal responsibility in the digital landscape (Alom et al., 2023).

## **6. Conclusion**

In conclusion, cultural inheritance needs to be prioritized continuously by the younger generation to preserve inherent cultural values and cope with the threat of globalization eroding the Indonesian identity. This means there is a need to implement process transformation development education by integrating Lore Lindu's cultural heritage into the learning process of elementary schools. This is required to pass on the knowledge about Lore Lindu's cultural values to students and preserve their cultural identity. Therefore, technology was applied to create a flexible learning environment, increase learning interest, and provide better interaction and collaboration. It was also used to develop short-lived skills, collaborative problem-solving skills, learning satisfaction, and motivation for students. However, the method was limited by the challenges faced by some teachers in using mobile technology in classes, such as adopting innovative teaching methods, the consequent anxiety, extended teaching roles, and inflexible environments.

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